Analysis of Factors that Correlated with Anemia Incidence in Pregnant Women at Working Area of the Sidomulyo Health Center Outpatient UPTD Pekanbaru City

Dince Safrina[1], Oktavia Dewi[2], Nurlisis[3], Mitra[4], Ika Putri Damayanti[5]

[1,2,3,4,5]STIKes Hang Tuah Pekanbaru, Indonesia

Email: dincesafrina@gmail.com, dewitavia@yahoo.com, nurlisis@htp.ac.id, mitra@htp.ac.id, ikaputridamayanti@gmail.com

Abstract:

Anemia in pregnant women is a condition of mothers with hemoglobin (Hb) less than 11gr / dl which can effect to risk of hemorrhage, stunted fetal growth (CHD), prematurity, low birth weight (LBW), and stunting and even death in pregnant women. The research aimed to analyze the factors that correlated with anemia incidence in pregnant women at working area of the Sidomulyo Health Center UPTD Outpatient Pekanbaru City. The type of research method was quantitative with cross sectional design. The population of pregnant women in the 2nd and 3rd trimesters based on secondary data from medical records for January 2019 - March 2020 were 2036 people with sample of 325 people. The sampling technique was systematic random sampling used secondary data from medical records. Data analysis ware univariate, bivariate and multivariate with regresi logistik ganda application. The results showed that 192 pregnant women with anemia (59.1%), the variables related with significantly to anemia in pregnant women at working area of the Sidomulyo Health Center UPTD Outpatient Pekanbaru City with nutrition status (POR = 40.647, parity (POR = 3.473), mother's age (POR = 1,993). That can be concluded the dominant variable related to anemia in pregnant women at working area of the Sidomulyo Health Center UPTD Outpatient Pekanbaru City was nutrition status (POR = 40,647). It is recommended to Sidomulyo Health Center UPTD Outpatient to increase the implementation of service standard program the ANC 10 T, when the Covid pandemic nowadays increasing online promotion and prevention by using available technology.

Keywords:

anemia; parity; nutrition status; mother's age

I. Introduction

Anemia is a major health problem in developing countries, anemia in pregnancy causes morbidity and mortality in mothers and babies. Anemia is a condition when the number of red blood cells or the concentration of oxygen carriers in the hemoglobin (Hb) blood is not sufficient for the body's physiological needs (Ministry of Health, Republic of Indonesia, 2017).

According to the World Health Organization (WHO, 2017), anemia is a condition in which the number and size of red blood cells, or hemoglobin concentration, falls below the set limit value, consequently damaging the capacity of the blood to be transported to oxygen around the body. Anemia is an indicator of poor nutrition and poor health (Yuristi et al, 2020)

The condition of the mother with hemoglobin (Hb) levels in her blood is less than 11gr/dl as a result of the inability of red blood cell forming tissue (Erythtopoetic) in its production called pregnancy anemia (WHO, 2017). According to the US National Library of Medisine, anemia in pregnant women is defined as blood hemoglobin levels <11 g/dL during

trimesters 1 and 3, and <10.5 g/dL during the second trimester (US National Library of Medisine, 2015).

The main cause of anemia in pregnancy is deficiencies of nutrition, especially iron deficiency, although deficiency of folate, vitamins B12 and A are also important causes of hemoglobinopathy and infectious diseases, such as malaria, tuberculosis, HIV and parasitic infections (WHO, 2018).

The impact of anemia in pregnancy can cause miscarriage, premature labor, uterine inertia, prolonged labor, uterine atony and cause bleeding and shock, while the fetus can cause low birth weight (LBW), premature labor, abortion, post partum bleeding (Dewi, 2011). Some of the factors that influence the occurrence of anemia in pregnant women include family income, knowledge, education, maternal age, parity, gestational age, gestational distance, nutritional status, diet, food processing, employment status, Antenatal Care (ANC), compliance with added tablet consumption. blood, health facilities, husband's support, history of disease, infection, and bleeding.

Ramadhannanti's research (2018) shows that maternal age has a 2.49 risk of anemia in pregnancy. Research by Huang et al (2015) stated that the incidence of anemia in TM III is closely related to the incidence of LBW and preterm birth. The results of the study by Syarfaini et al (2019) show that pregnant women with low education are at 3 times more likely to experience anemia than those with high education. Pregnant women who do not take extra blood tablets and have a history of diseases such as malaria and intestinal worms can also cause anemia (Alene and Abdulahi, 2014). This study is in line with Majidah (2018) who concluded that there is a significant relationship between parity and anemia in pregnant women. Meanwhile, the research of Nursyahid et al (2019) concluded that the nutritional status of pregnant women has a 7.1 times risk of anemia in pregnancy.

Based on the ANC report at Sidomulyo Outpatient Health Center in 2017, the number of ANC visits was 1525 (91.4%), in 2018 1624 (96.6%) then in 2019 1674 (99.6%) and Local Area Monitoring Report (PWS-KIA) from 21 puskesmas The highest proportion of anemia incidence in Pekanbaru City in 2019 is in the work area of the UPTD Puskesmas Sidomulyo Outpatient with a figure of 70.1%.

Based on a preliminary survey conducted in the UPTD Puskesmas Sidomulyo Outpatient working area in March 2020, data were obtained from 18 pregnant women who had their Hb checked, there were 8 people (44.4%) who had mild anemia, including 6 people (33, 3%) had low education and 2 people (11.1) had high education, 7 people (38.8%) were housewives and 1 person (5.5%) worked. Based on the above background, the authors are interested in conducting research on "Analysis of Factors that Correlated with Anemia Incidence in Pregnant Women at Working Area of the Sidomulyo Health Center Outpatient UPTD Pekanbaru City".

II. Research Methods

This research is a quantitative analytic study with cross sectional. The research design is Cross sectional. This research was did at working area of the Sidomulyo Health Center Outpatient UPTD Pekanbaru City in July-August 2020. The population in this study were all second and third trimester pregnant women at working area of healt center from January 2019 to March 2020 recorded on medical records, as many as 2036 women. The sample in this study were 325 pregnant women second and third trimester who visited working area of the Sidomulyo Health Center Outpatient UPTD Pekanbaru City from January 2019 to March 2020, the sampling technique in this study was random sampling through systematic random sampling. Dependent variable of this study is Anemia. The data was collected by using primary data of questioner, data analysis was univariate, bivariate and multivariate.

IV. Results and Discussion
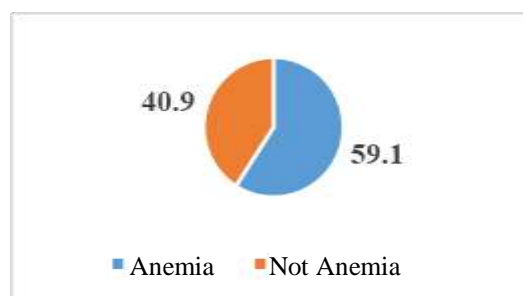
4.1 Results

Figure 1. *Incidence of Anemia in Pregnant Women in the Work Area UPTD Puskesmas Sidomulyo Outpatient*

Based on the results of univariate analysis of 325 pregnant women, it is known that pregnant women who have anemia are 59.1%, while pregnant women who do not have anemia are 40.9%.

Table 1. Resume of Univariate Analysis Results

No.	Variable	Frequency	Percentage (%)
1.	Age		
	a. It's risky	224	68.9
	b. No Risk	101	31.1
2.	Education		
	a. Low	85	26.2
	b. High	240	73.8
3.	Gestational age		
	a. TM III	260	80
	b. TM II	65	20
4.	Parity		
	a. High risk	160	49.2
	b. Low risk	165	50.8
5.	Pregnancy distance		
	a. It's risky	79	24.3
	b. No Risk	246	75.7
6.	Nutritional status		
	a. KEK	169	52.0
	b. Not SEZ	156	48.0

7. Job status							
a. Work	140				43.1		
b. Does not work	185				56.9		
8. Obedience							
a. Not obey	207				63.6		
b. Obey	118				36.3		

Based on the results of univariate analysis of 325 pregnant women, it is known that the majority of pregnant women have a low age, namely 224 people (68.9%), high education 240 people (73.8%), TM III gestational age 260 people (80%), parity low-risk 165 people (50.8%) without a risk pregnancy 246 people (75.7%), 169 KEK pregnant women (52.0%), 185 non-working pregnant women (56.9%), The majority of pregnant women who did not have adherence to Fe tablet were 207 people (63.6%).

Table 2. The Relationship of Independent Variables about Anemia in Pregnant Women in the Sidomulyo Health Center Work Area in 2019

Test variable	Anemia		Not anema		Total		P value	PORS 95% CI
	N	%	n	%	N	%		
Mother's Age								
It's risky	149	66.5	75	33.5	224	100		2,680
No Risk	43	42.6	58	57.4	101	100	**0,000**	(1,654-
amount	192	59.1	133	40.9	325	100		4,340)
Education								
Low	44	51.8	41	48.2	85	100		0.667
High	148	61.7	92	38.3	240	100	0.142	(0.405-
amount	192	59.1	133	40.9	325	100		1.098)
Gestational Age								
TM III	155	59.6	105	40.4	260	100		1,117
TM II	37	56.9	28	43.7	65	100	**0,000**	(0.649-
amount	192	59.1	133	40.9	325	100		1,936)
Mother's Parity								
High risk	104	65.0	56	35.0	160	100		1,625
Low risk	88	53.3	77	46.7	165	100	**0.043**	(1,040-
amount	192	59.1	133	40.9	325	100		2,539)
Pregnancy Distance								
It's risky	40	50.6	39	49.4	79	100		0.634
No risk	152	61.8	94	38.2	246	100	0.105	(0.381-
amount	192	59.1	133	40.9	325	100		1.057)
Mother's Nutritional Status								
KEK	154	91.1	15	8.9	169	100		31,881
Not SEZ	38	24.4	118	75.6	156	100	**0,000**	(16,744-
amount	192	59.1	133	40.9	325	100		60,701)
Job status								
Work	78	55.7	62	44.3	140	100		0.784
Does not work	114	61.6	71	38.4	185	100	**0.031**	(0.502-
amount	192	59.1	133	40.9	325	100		1,224)
Mother's Compliance								

Not obey	192	92.7	15	7.3	207	100			0.072
Obey	0	0	118	100	118	100	**0,000**		(0.045-
amount	192	59.1	133	40.9	325	100			0.118)

Based on table 2, it shows that there are 6 variables that are related to the incidence of anemia in pregnant women, namely mothers with a higher risk of experiencing anemia 2.6 times compared to mothers with no risk age.(95% CI: POR = 1,654-4,340), mothers with TM III gestational age were 1.1 times more likely to experience anemia than mothers with TM II gestational age (95% CI: POR = 0.649-1.936), mothers with high risk parity 1.6 times more risk of experiencing anemia than mothers with low risk parity (95% CI: POR = 1.040-2.539), mothers with nutritional status of KEK were 31.8 times more likely to experience anemia than mothers with no KEK nutritional status (95% CI : POR = 16,744-80,701), working mothers are 0.7 times more likely to experience anemia than mothers who do not work (95% CI: POR = 0.502-1,224), mothers who are not compliant are 0.07 times more likely to experience anemia than mothers compliant (95% CI: POR = 0.045-0.118).

Table 3. Final Multivariate Modeling

No.	Variable	*P Value*	ORP	95% CI	
				Lower	Upper
1.	Mother's Age	**0.045**	**1,993**	**1,017**	**3,908**
4.	Mother's Parity	**0,000**	**3,473**	**1,753**	**6,878**
6.	Mother's Nutritional Status	**0,000**	**40,647**	**19,507**	**84,695**
2.	Education	0.284	0.321	0.040	2,561
5.	Pregnancy distance	0.278	3,252	0.387	27,329

* Ombinus Test = 0.000 Nagerkerke R Square = 0.582

The results show that the variable that has a significant relationship is the variable nutritional status, in pregnant women with high risk of developing CED are 40.6 times more likely to experience anemia than pregnant women without KEK with POR = 40.647, maternal parity variable, pregnant women with high risk parity are more at risk 3 , 4 times having anemia compared to pregnant women with low risk parity with POR = 3.473 and maternal age, at the age of mothers at risk of having anemia 1.9 times more likely to experience anemia than those who are not at risk with POR = 1.993 The variables that are not significantly related are: the variable of education of pregnant women with low education does not affect anemia in pregnant women, the variable of low pregnancy interval does not affect anemia in pregnant women.

The Multivariate model that was formed was fit / fit for use, the meaning of the model was significant (p value omnimbus test 0,000). The value of Nagelkerke R square = 0.582 means that there are 58.2% of the studied variables affecting pregnant women anemia while 41.8% of other variables that influence such as socio-cultural factors, family relationships, knowledge, perceptions, family support, and health care support.

4.2 Discussion
a. Anemia

The multivariate results showed that from 325 respondents, the incidence of anemia in pregnant women in this study was 192 people (59.1%) compared to those who were not anemic, namely 133 (40.9%). Meanwhile, based on Riskesdes data (2018) the prevalence of anemia was reported to be 48.9%. Based on the data above, it is expected that the Health Office will conduct money once in 3 months. Anemia is a condition or condition

characterized by a decrease in hemoglobin, hematocrit, or red blood cell count (Sjahriani, 2019).According to the US National Library of Medisine, anemia in pregnant women is defined as a blood hemoglobin level <11 g / dL during trimesters 1 and 3, and <10.5 g / dL during the second trimester (US National Library of Medisine, 2015). Amanupunnyo (2018) in his research on the analysis of factors that cause anemia in pregnant women at the Kairatu Seram Barat Health Center shows that the prevalence of anemia in pregnant women is 87.5%.

Another factor that can cause anemia is the knowledge factor of mothers with the incidence of anemia, this is in line with the research of Salmariantity (2012) which states that the prevalence of pregnant women who experience anemia with insufficient knowledge is 48 respondents (66.7%). Research conducted by Yanti (2015) states that respondents who have low economic status experience pregnancy anemia as much as 79, 1% stated that anemia in pregnant women is more experienced by low-income families.Based on the explanation above, it is recommended that pregnant women carry out routine Hb checks during pregnancy, at least Hb examinations are carried out in the first trimester and in the third trimester to find out if the pregnant woman has anemia (Ministry of Health, 2019).

b. Variables Associated with Pregnant Mother Anemia
1. Nutritional Status

The multivariate results showed a significant relationship between nutritional status and the incidence of anemia in pregnant women. The nutritional status of pregnant women is an important factor in preventing anemia in pregnant women. In this study, the nutritional status of mothers has a causal relationship with the incidence of anemia in pregnant women. Mothers with KEK were 31.8 times more likely to experience anemia than mothers without KEK. The results that have been presented show that 169 pregnant women with KEK, of whom 154 people (91.1%) have anemia. Pregnant women whose KEK with LILA <23.5 are more at risk of developing anemia in pregnant women this is due to insufficient nutrition.

Respondents who frequently consumed tea or coffee during pregnancy had a greater risk of developing anemia than respondents who did not consume tea during pregnancy. Because the phenolic compounds or tannins that tea gets in tea are compounds that can bind iron and inhibit iron absorption in the body (Amanupunnyo, 2018). This is in line with research(Juliana, 2019)shows that there is a relationship between LILA and the incidence of anemia. Based on the explanation above, it is recommended that pregnant women consume PMT regularly by involving their husbands, families and cadres to monitor their consumption of PMT, process food properly, choose food ingredients that are in accordance with balanced nutrition and a regular diet and maintain protein intake (Ridwan, 2019).

2. Mother's Parity

Multivariate results showed a significant relationship between maternal parity and the incidence of anemia in pregnant women. Children more than 4 can cause fetal growth problems and bleeding during childbirth because the uterus is usually already weak. In this study, parity has a causal relationship with the incidence of anemia in pregnant women. mothers with high risk parity were 1.6 times more likely to develop anemia than mothers with low risk parity. In a healthy pregnancy, hormonal changes cause an increase in plasma volume which causes a decrease in hemoglobin levels but does not fall below a certain level (for example 11.0 g / dl) (Al-Farsi YM, 2011).

The results that have been presented show that 160 pregnant women have high risk parity, of which there are 104 people (65.0%) experiencing anemia. According to theory after the third pregnancy, the risk of anemia increases. This is because too many children (> 3)

people can cause illnesses during pregnancy and childbirth, including anemia. The more often a woman experiences pregnancy and childbirth, the more she loses iron and is at increased risk of anemia. Furthermore, repeated pregnancies cause damage to blood vessels and uterine walls which usually affect the circulation of nutrients to the fetus as well as blood loss and have an impact on decreasing Hb levels. Each time a woman gives birth, the amount of iron lost is estimated at 250 mg.
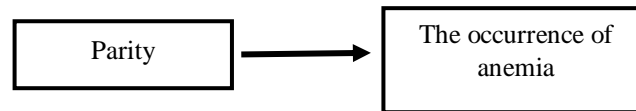
```
┌──────────────┐              ┌──────────────────┐
│    Parity    │─────────────▶│ The occurrence of│
│              │              │     anemia       │
└──────────────┘              └──────────────────┘
```

Figure 2. Relationship between Parity and Anemia in Pregnant Women

The results of this study are consistent with the results of Hidayati's (2018) study on the relationship between the amount of parity and gestational age with the incidence of anemia in pregnant women. Based on the explanation above, it is recommended that pregnant women participate in the family planning program in spacing their pregnancies, besides pregnant women with high risk parity to always have their pregnancies checked, pregnant women with high risk parity to always check their pregnancies early and ask their husbands to be alert.

3. Mother's Age

Multivariate results show a significant relationship between maternal age and the incidence of anemia in pregnant women. Age between 20-35 years is the safest period for childbirth. At that age the function of the reproductive organs is in optimal condition, while at the age of less than 20 years the condition is still in growth, so that food input is widely used for maternal growth which can cause fetal growth disorders.(Demmouche A, Khelil S, 2011). Meanwhile, pregnant women over the age of 35 tend to experience anemia due to the effect of decreased iron reserves in the body. In the first pregnancy, women over 35 years of age will also have the risk of complicating labor and starting to decrease the function of the reproductive organs.

The results that have been presented show that 224 pregnant women, of whom 149 people (66.5%) had anemia. This is in accordance with research research(Amini, Aulia, 2018)explained that there is a significant relationship between maternal age and the incidence of anemia in pregnant women, mothers who are pregnant at risk age (<20th and> 35 years) have the potential to experience anemia 5.7 times compared to the age of mothers who are not at risk. Based on the explanation above, it is recommended that pregnant women with a risky age always have their pregnancy checked early.

c. Variables Not Related to Anemia in Pregnant Women
1. Education

The distribution of mothers based on education on anemia in pregnant women, most of the pregnant women in the Work Area of the UPTD Puskesmas Sidomulyo Outpatient with low education amounted to 44 people (51.8%), while higher education amounted to 148 people (61.7%). Based on multivariate analysis, it was obtained p value of 0.284 and POR value of 0.321, which means that there is no significant relationship between education and anemia in pregnant women. The results of this study are in line with the results of Yanti's (2015) study, it is known that there is no statistical relationship between education and the incidence of anemia in pregnant women with a p value of 0.3.

2. Pregnancy distance

Distribution of mothers based on distance between pregnancy and anemia among pregnant women, most pregnant women in the Work Area of the UPTD Sidomulyo Outpatient Health Center with low pregnancy spacing were 40 people (50.6%), while high pregnancy spacing was 152 people (61.8%) . Based on multivariate analysis, it was obtained p value of 0.278 and POR value of 3.252, which means that there is no significant relationship between pregnancy interval and anemia in pregnant women. The results of this study are in line with the results of Amanunpunyo's research (2018), it is known that there is no statistical relationship between pregnancy distance and the incidence of anemia in pregnant women with a p value of 0.549.

3. Job status

The distribution of mothers based on occupation of anemia in pregnant women, it is known that pregnant women in the Work Area of the UPTD Puskesmas Sidomulyo Outpatient who work are 78 people (40.6%), while the number of respondents who do not work is 114 people (59.3%) which means There is no significant relationship between work status and anemia in pregnant women. The results of this study are in line with the results of Amallia's (2017) study, it is known that there is no statistical relationship between work status and the incidence of anemia in pregnant women with a p value of 0.829.

4. Gestational Age

Distribution of mothers based on gestational age towards anemia in pregnant women, it is known that pregnant women in the UPTD Sidomulyo Outpatient Health Center with a gestational age of TM III amounted to 155 people (80.7%), while mothers with gestational age TM II were 37 people (19 2%) which means that there is no significant relationship between maternal age and anemia in pregnant women. The results of this study are in line with the results of Amanunpunyo's research (2018), it is known that there is no statistical relationship between gestational age and the incidence of anemia in pregnant women with a p value of 0.076.

d. Compliance with Blood Supplement Tablets

The distribution of mothers based on compliance with the consumption of supplemented blood tablets to anemia among pregnant women who did not comply with the supplemented blood tablets was 192 people (19.2%). This is because there is no data on maternal compliance in consuming Fe tablets in medical records. The data obtained is only based on the date of return visit, so the results obtained are less valid. Supported by research(Syarfaini, 2019)states that there is no relationship between adherence to taking blood-supplemented tablets with the incidence of anemia in pregnant women. Consuming blood-supplemented tablets regularly, by involving husbands, families and cadres in monitoring the consumption of blood-supplemented tablets.

V. Conclusion

Based on the descriptions in the research results and discussion chapters, the researchers hereby draw the following conclusions: The proportion of pregnant women who have anemia were 192 (59.1%). Variables that have a causal relationship with the incidence of anemia in pregnant women, such as: Nutrition status: Pregnant women who have Chronic Lack of Energy were 40.6 times more having anemia than pregnant women who were not Chronic Lack of Energy, (95% CI: POR = 19,507-84,695), parity: Mothers with high risk parity were 3.4 times have anemia than mothers with low risk parity, (95% CI: POR = 1.753-6.878), mother's age: mother's age at risk was 1.9 times having anemia than mothers with age

third trimester pregnancy, (95% CI: POR = 1,017-3,908). The variables were not significantly related to the incidence of anemia in pregnant women are: education, pregnancy spacing, job status, gestational age, compliance with consume blood suplement tablets there were 2 confounding variables: the education variable, pregnancy distance.

Thank-You Note

The author expresses his gratitude to various parties, including 1) To Hang Tuah STIKes Pekanbaru that has provided knowledge to the author 2) to the head and all officers of the Sidomulyo Health Center UPTD Outpatient Pekanbaru.

References

Al-Farsi YM, et. a. (2011). Wallenburg HC. Effect of high parity on occurrence of anemia in pregnancy: a cohort study. BMC Pregnancy Childbirth; 11: 7.

Alene KA and Abdulahi MD. (2014). Prevalence of Anemia and Associated Factors among Pregnant Women in an Urban Area of Easthern Ethiopia. Hindawi Publishing Corporation.

Amanupunyo Astri Notesya, et. a. 2018. Analysis of Factors Causing Anemia in Pregnant Women at Kairatu West Seram Health Center. Aisyah's Journal: Journal of Health Sciences. vol.3, No. 2, December 2018. pp. 173-181. ISSN 2502-9495.

Amallia Siti, et. a. 2017. Risk Factors for Anemia in Pregnant Women at BARI Palembang Hospital. Journal of Health. Vol. VIII, No. 3 Nov 2017, htl 389-395.

Amini, Aulia., D. (2018). Maternal Age and Parity as Risk Factors Affecting the Incidence of Anemia in Pregnant Women in the Work Area of the Ampenan Health Center. Midwifery Journal of Midwifery, Muhammadiyah University of Mataram. ISSN 2503-4340 | e-ISSN 2614-3364 / Vol. 3 No. 2 August 2018, p. 108-113.

Amini, Aulia., D. (2018) 'Umur Ibu Dan Paritas Sebagai Faktor Risiko Yang Mempengaruhi Kejadian Anemia Pada Ibu Hamil Di Wilayah Kerja Puskesmas Ampenan', *Midwifery Journal Kebidanan Universitas Muhammadiyah Mataram. ISSN 2503-4340 |e-ISSN 2614-3364/ Vol. 3 No. 2 Agustus 2018, Hal. 108-113.*

Demmouche A, Khelil S, and M. S. (2011) 'Journal An EpidemiologicStudy : Anemia Among Pregnant Women in the Sidi Bel Abbes Region (West Algeria)', *Journal of Blood Disorders and Transfusion 2:113.*

Juliana, R. (2019) 'Determinan Kejadian Anemia Pada Ibu Hamil Di Puskesmas Tunggakjati Kecamatan Karawang Barat Tahun 2019', *Jurnal Kesehatan Masyarakat Universitas Respati Indonesia*, Vol. 3, No.

Ridwan, M. (2019) 'Message from the Editor', *Britain international of Humanities and Social Sciences.*

Syarfaini. Dkk (2019) 'Faktor Risiko Kejadian Anemia Pada Ibu Hamil Di Wilayah Kerja Puskesmas Sudiang Raya Kota Makassar', *Jurnal Epidemiologi . ISSN-P : 2086-2040.ISSN-E : 2548-5334 Volume 11, Nomor 2, Juli-Desember 2019*, (Universitas Islam Negeri Alauddin Makassar).

Dewi Lia, S. (2011). Midwifery Care for Ms. NIfas. Salemba Medisa.

Riau Health Office. (2018). Riau Province Health Profile.

Hidayati, I. (2018). Correlation of Total Parity and Pregnancy Age with Incidence of Anemia in Pregnant Women. Faculty of Psychology and Health, UIN Sunan Ampel Surabaya. Journal of Health Science and Prevention, Vol. 2 (1), April 2018. ISSN 2549-919X.

Huang LL, Gowreesunkur P, Su MW, Lin LZ, HT (2015). The Influence of Iron-deficiency Anemia during the Pregnancy on Preterm Birth and Birth Weight in South China. Journal of Food and Nutrition Research 3 (9): 570-574.

Juliana, R. (2019). Determinants of Anemia in Pregnant Women at the Tunggakjati Health Center, West Karawang District, 2019. Journal of Public Health, Respati Indonesia University, Vol. 3, No.

RI Ministry of Health. (2016). Indonesia Health Profile. 70. http://doi.org?10.1111/evo.12990

Majidah, A. (2018). Relationship Between Parity and Maternal Age with Anemia in Iii Trimester Pregnant Women in Yogyakarta City in 2017. Journal of Health, Health Polytechnic of the Ministry of Health Yogyakarta.

Nursyahid. (2019). The Relationship between Nutritional Status and Incidence of Anemia in Third Trimester Pregnant Women at Aminah Amin Clinic, Samarinda in 2018. Journal of Health Polytechnic of the Ministry of Health, East Kalimantan, Volume IV.

Salmarantity, Abdul Bari. (2012) Factors Associated with Anemia in Pregnant Women in the Work Area

Sjahriani, T. (2019). Factors Related To The Incidence Of Anemia In Pregnant Women. Journal of Midwifery Vol 5, No 2, April 2019: 106-115., Doctor of Education Study Program, Faculty of Medicine, Malahayati University.

Susanti, I. (2018). Relationship between Age and Incidence of Anemia in Pregnant Women at Pekauman Health Center, Banjarmasin. Health Journal of Stikes Sari Mulia Banjarmasin.

Sharfaini. Et al. (2019). Risk Factors for Anemia Incidence in Pregnant Women in the Work Area of the Sudiang Raya Community Health Center, Makassar City. Journal of Epidemiology. ISSN-P: 2086-2040.ISSN-E: 2548-5334 Volume 11, Number 2, July-December 2019, Alauddin State Islamic University Makassar.

Viteri F. (2011). The Consequences of Iron Deficiency and Anemia in Pregnancy on Maternal Health, the Foetus and the Infant.

WHO. (2015). The global prevalence of anemia in 2011.

WHO. (2018). Maternal Mortality.

Yanti Dei Ari Madi. (2015). Factors for the occurrence of anemia in primigravida mothers in the working area of the Pringsewu Lampung health center. Journal of Nursing. Vol 6. No 2. July 2015. P-ISSN 2086-3071.

Yuristi, I., et al. (2020). Relationship between Spraying Technique and Use of PPE (Personal Protective Equipment) With Anemia Farmers in Juhar Ginting Sadanioga Village, Karo Regency in 2018. Britain International of Exact Sciences (BIoEx) Journal. P. 430-435.