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## **Determinants of Anemia in Pregnant Women in Health Centre Biak City and Sumberker Regency, Biak Numfor**

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### **Abstract**

Anemia in pregnant women can cause complications during pregnancy, childbirth and postpartum to newborn. The prevalence of anemia in Biak Numfor very high in 2014 78.92%. The research objective is to prove determinant of anemia in pregnant women at health centers and the city of Biak district Sumberker Noemfoor includes a history of malaria, nut meal, nutrition, drinking tea consumption and the adequacy of iron tablets. The method used is analytical observational study design approach Case Control Study. The location of research carried out in health centers and health centers Sumberker City Biak Biak Numfor. This study is retrospective. The total sample consisted of 70 pregnant women from the case group and the control group 35. Research results obtained are: the multivariate analysis, three variables which is a risk factor significantly associated anemia and pregnant women are variable consumption of betel OR = 9.397 95% CI (2.360 to 37.424), Variable nutritional status OR = 7.834 95% CI (1.780 to 34.484) and the variable adequacy taking iron tablets OR 95% CI = 10.244 (2.358 to 44.510) while the variable history of malaria and tea consumption is not related.

**Keywords:** Anemia; pregnant women; malaria; nut; iron tablets.

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## **1. Introduction**

Anemia in pregnancy is a national problem because it reflects the value of socio-economic welfare of society and a huge influence on the quality of human resources. Pregnant Anemia is called a "potential danger of mother and child" (potentially harmful to the mother and child) [1]. Most women suffer from anemia in pregnancy, both in developed countries and in developing countries. The World Health Organization or the World Health Organization (WHO) estimates that 35-75% of pregnant women anemia in developing countries and 18% of pregnant women in developed countries are anemic. But many of those who had suffered from anemia at the moment of conception, with an estimated prevalence of 43% in non-pregnant women in developing countries and 12% in more developed countries [2]. The prevalence of anemia in pregnant women America 24.1%, Europe 25.1%, 30.7% Western Pacific, Southeast Asia and Africa 48.2% 57.1%. Indonesia in the 2001 Survey of pregnant women suffering from anemia was 40.1%, 24.5% Riskesdas 2007 and Riskesdas 2010 [3].

In Biak Numfor prevalence of anemia in pregnant women is very high in 2011 of anemia in pregnancy in 2012 reached 80.02% while the prevalence was 80%, in 2013 decreased to 73% and in 2014 increased to 78.92% [4]. Habits of pregnant women in consuming foods and drinks can affect the ability of the intestine to absorb iron. Eat nut is commonly practiced by various tribes in Indonesia. This nut eating habits is a tradition that carried hereditary initially closely associated with local customs. Some pengkomsumsi nut do every day while others may be eaten occasionally. Frequency of eating betel begins when children and adolescents but eat betel activity is more and more often found in adults, men and women [5].

Eat nut is the process of concocting a mixture of elements that have been chosen will vary by between one area though so relatively consistent greatest composition consisting of betel nuts (*Areca catechu*), betel leaves or pieces of betel, lime and some areas using Gambir. The betel nut eaters have a reason and the reason why the habit is carried out continuously. Reported that chewing betel nut had some influence on the appeal of eating betel, such as the effects of stimulants or effects of euphoria, the effect to stimulate saliva, drugs for respiratory and eliminate hunger, as well as having the effect to strengthen teeth and gums and as a breath freshener. Chemical constituents of areca arecoline, arekaidin, arekain, arecolidine, guvasin, guvakolin, isoguvasin, nicotine, glusida, tannins, catechins. Prevention of anemia has been taken by the Government through the Ministry of Health since 1970 by implementing a program providing iron tablets. The amount of iron tablets are consumed by pregnant women is a minimum of 90 tablets during pregnancy. Supplementation should be given to the second and third trimester, when the absorption efficiency increases and decreases the risk of nausea and vomiting. Expected to pregnant women in the third trimester of pregnancy already taking iron tablets acquired 90 [6].

Although supplementation program iron tablet (Fe) has been executed, but still found the incidence of anemia in pregnant women. Reference [7] showed that 80.7% of pregnant women taking iron tablets. Based on the number of drinking days 0-30 days minimum number of days that is 36.3%, the number of 31-59 days at 2.8%, the amount is 8.3% 60-89 days and 90 days or more is 18% (Ministry of Health in Melisa, 2013). Biak Numfor for pregnant women who drank 30 iron tablets as much as 72.38% were taking 90 tablets but only 52.17%.

Puskemas Kota Biak pregnant women who drink iron tablets 30 tablets 78.36% while taking up to 90 tablets only 47.83% and Puskemas Sumberker pregnant women who drink 30 tablets only 36.32% and taking up to 90 tablets of 40% [8].

## **2. Materials and Methods**

### **2.1 Research design**

This research was analytic observational with case control study design, which is one form of study design that follows the course of the disease towards the rear by time (retrospective). It is said that because of this study see cases of disease or health status seen today at this time, but the risk factors identified occurrence or views towards the past [2]. This study was carried out in the district of Biak Noemfoor Papua during the two health centers, namely health centers and health centers Sumberker Biak town, and was conducted in July-October 2015. The population in this study was all pregnant women at health centers and the city of Biak Sumberker recorded in the full cohort of mothers, Hb examination has been carried out in the months of September-October and has got iron tablets. The sample in this study was pregnant women with inclusion criteria:

- a. Pregnant women who are anemic.
- b. Age 20-35 Years.
- c. Parity  $\leq 4$ .
- d. Graduated from elementary school through high school.
- e. Pregnant women Papuan tribe either from the mother or father.
- f. Pregnancy Single.
- g. Trimester III.
- h. Full recorded in the register of pregnant women.

Control is pregnant with the inclusion criteria:

- a. Pregnant women who are not anemic.
- b. Age 20-35 Years.
- c. Parity  $\leq 4$ .
- d. Graduated from elementary school through high school.

- e. Pregnant women Papuan tribe either from the mother or father.
- f. Single pregnancy.
- g. Trimester III.
- h. Full recorded in the register of pregnant women Exclusion criteria for cases and controls was not willing to be a respondent.

## ***2.2 Techniques of Data Collection***

Methods of data collection is done by collecting secondary data obtained from registers and card pregnant women at health centers and health centers Samofa Biak town. After that, re-examined whether the data required completing the recording is done or not.

## ***2.3 Data analysis***

Data analysis was carried out in stages, with the analysis of univariate, bivariate, and multivariate analysis using SPSS 16.00 for Windows.

### ***2.3.1 Univariate Analysis***

Univariate analysis was intended to describe the incidence of anemia in pregnancy between cases and controls using frequency distribution table, to determine the frequency distribution of the observed variables. Univariate analysis are expected to know the characteristics of each variable that aims to look at the feasibility of the data, the image data collected in their optimal state whether or not to allow for further analysis.

### ***2.3.2 Analysis Bivariat***

Bivariate analysis is the simultaneous analysis of two variables. This is usually done to see if one of the variables associated with other variables. Bivariate analysis intended to look at the influence of the independent variable to variable dependent using Chi Square test for the hypothesis one side and knowing the risk (odds ratio) of exposure to the case using a 2x2 table.

## **3. Research Result**

Summary of Analysis Results Bivariat determinant anemia in pregnant women in Biak Pusksemas City and Sumberker 2015 P-Value Factor OR (95% CI) The incidence of Malaria

- Malaria

- No Malaria 0.284 2.207 (0,505-9,639) Consumption Pinang

- Eating Pinang
- Do not Eat Pinang 0.008 4.500 (1.411 to 14.348) Nutritional status
- SEZ
- Not KEK 0.023 4.043 (1,154-14,164) Tea Consumption
- Drinking tea
- Do not Drink the 0.225 0.552 (0,211-1,446) Drinking adequacy of iron tablets Enough
- Not enough 0.012 4.580 (1.316 to 15.932)

Based on the above table, the variables are candidates for the multivariate analysis Consumption Pinang, Nutritional Status and Adequacy Drink Iron tablets.

### 1. Multivariate Analysis

Multivariate analysis aims to look at some of the variables are jointly associated with the incidence of anemia in pregnant women. In this study used logistic regression analysis to find the most dominant risk factor for anemia in pregnancy. In this research, there are three (3) variables are supposed to influence the incidence of anemia that consumption Pinang, Nutritional Status and Adequacy Drink Iron tablets.

**Table 1:** Final Results Logistic Regression Determinants Anemia in Pregnancy in Biak City Pusksemas and Sumberker Pusksemas 2015

Variable	B	P Value	Exp (B)	95% C.I for EXP (B)	
				Lower	Upper
Eat Pinang	2,240	0,001	9,397	2,360	37,424
Nutritional status	2,058	0,006	7,834	1,780	34,484
Drinking adequacy Fe Tablet	2,327	0,002	10,244	2,358	44,510
Constant	-11,617	0,000	0,000		

Based on the results of logistic regression analysis in Table 15 shows that all variables have statistically significant correlation  $p < 0.05$ , it was determined that consumption Pinang, Nutritional Status and Adequacy of iron tablet taking medication affecting the incidence of anemia in pregnancy. This means there is a synergistic relationship nut consumption, nutritional status and adequacy of taking iron tablets with anemia in pregnancy. To ensure the above model is the best model to describe the risk factors of anemia, prior assessment of whether the model is feasible. The feasibility of the model seen from the goodness of fit as measured by the value of chi-square (p-value).

Based on Chi-square test results obtained value of 0.917 with a p-value = 0.922. The meaning of this value is accepted with the hypothesis H0:

H0: The model has been adequately explain the data (Godness of Fit).

H1: The model is not enough to explain the data.

So that the p-value of  $0.922 > 0.05$ , it can be concluded that the model was sufficiently explain the data. From the above table it can be in the interpretation of the variable consumption of nut OR = 9.397 a risk factor and 95% CI values of more than 1 (2.360 to 37.424) so that OR meaningful. This means that pregnant women who consume nut 9.397 times at risk to suffer from anemia. For variable taking iron tablets adequacy OR = 10.244 is a risk factor and 95% CI values of more than 1 (2.358 to 44.510) so that OR meaningful. This means that pregnant women who do not drink enough iron tablets 10.244 times the risk of developing anemia. For variable nutritional status OR = 7.834 a risk factor and 95% CI values of more than 1 (1.780 to 34.484) so that OR meaningful. This means the nutritional status of pregnant women who have a risk of 7.834 times KEK to suffer from anemia.

#### **4. Discussion**

##### ***4.1 Consumption Pinang***

Based on multivariate analysis showed that nut consumption in pregnant women is a risk factor for anemia (OR = 9.397 p = 0.001 95% CI 2.360 to 37.424) means that pregnant women who consume nut 9.397 times at risk to suffer from anemia. This study is consistent with research in Bangladesh, stating that pregnant women who consume tobacco are nut plus 2.57 times more likely to have anemia (OR 2.57 CI 1.23 to 5.36 p 0.012) while consuming nut 2-3 times a day by 2.51 times more likely to be anemic (OR 2.51 CI 1.07 to 5.92 p 0.035).

Many factors cause iron deficiency anemia, in general these factors are divided into two factors, namely food and non food. Food factor is the low input of iron from food as well as the low level of absorption of iron from food. Low levels of absorption caused by the composition of the food menu contains more factors that can inhibit iron absorption (factor inhibitors) such as fiber, phytate and tannin. Meanwhile, non-food factors that cause iron deficiency anemia among others because of illness caused by the parasite (malaria and worm infection), and bleeding.

Chemical constituents of betel nut by [5] mentioned besides betel nut extracts containing taninn, also flavan compounds, phenolics, gallic acid, gum, lignin oil evaporates and does not evaporate and salt. Betel nut tannin content of 15% [5]. Tannins can bind some metals such as iron, calcium, and aluminum, and formed a bond chemically complex. Because the position is bound to continue, then the compound of iron and calcium contained in food is difficult absorbed by the body, causing a decrease in iron (Fe).

Eat nut is on tribal culture byak, for people chewing betel nut is a good daily habits of young to old. Nut used in the association, especially ahead of the payment of a dowry or events suitor. Eat nut is also a tribute to the

guests who come or visit the house. Reported that chewing betel nut had some influence on the appeal of eating betel, such as the effects of stimulants or effects of euphoria, the effect to stimulate saliva, drugs for respiratory and eliminate hunger, as well as having the effect to strengthen teeth and gums and a breath freshener [4,5]. Eating nut at some respondents most happy morning and after eating, especially eating fish or foods that cause stench. Nut eat the morning to make the mouth feel fresh and also causes a feeling of fullness so that the desire to eat in the morning reduced whereas the need for pregnant women to eat two times more than in non pregnant if the needs are not satisfied then it is this which also causes anemia in pregnancy.

#### **4.2 Nutritional Status**

Based on the analysis for nutritional status variables showed that OR = 7.834 a risk factor, p 0.006 and 95% CI values of more than 1 (1.780 to 34.484) so that OR meaningful. This means the nutritional status of pregnant women who have a risk of 7.843 times KEK to suffer from anemia compared with mothers. This is consistent with research Marlapan Sandrayayuk et al (2013) which states that the nutritional status of pregnant women who KEK 3 times greater risk of anemia in pregnant women whose nutritional status well with the results of statistical tests OR 3.109 p 0.005. MUAC measurement results, there are two possibilities, namely less than 23.5 cm and greater than or equal to 23.5 cm. when less than 23.5 cm means that the woman is at risk of KEK. LILA portray the nutritional status of pregnant women and to determine the risk of malnutrition. Pregnancy causes increased energy metabolism, because it needs energy and other nutrients increases during pregnancy, especially increased need for iron. If the nutritional needs are not met, it will cause anemia in pregnancy. So this study are consistent with Yaze Agus (2014) which states the same thing that there is a significant relationship between anemia and nutritional status with p = 0,031.

#### **4.3. Adequacy drinking Iron Tablets**

Results of multivariate analysis showed that iron tablets Adequacy drinking is a risk factor for anemia (OR 10.244 p = 0.002 CI = 2.358 to 44.510) means that pregnant women who do not drink enough iron tablets have a risk of developing anemia was 10.244 times greater when compared with pregnant women drinking enough iron tablets. Fe requirement is quite high because in addition be required to the fetus and placenta as well as adanyanproses water retention or addition of liquid as much as 40% in the mother's body. The recommended amount of Fe in pregnant women 18 mg per day. The recommended requirements are difficult to obtain from food sources alone without the addition of iron in the diet. In regular meals are 10-20 mg of iron each day, but only <10.0% of the amount absorbed [3]. Reference [6] in the study stated that 83.6% of pregnant women do not obey to consume iron tablet in accordance with the rules and the right way. This study is also in line with Melisa et al (2013), there is a significant relationship between anemia in pregnancy and tablet intake SF with p = 0.001 and OR 2,439 CI 1.379 to 4.314 means that SF tablet intake is not enough to have the opportunity fatherly 2,349 times anemic compared with SF tablet intake enough.

#### **4.4. Malaria**

The proportion of pregnant women suffering from malaria in the cases of 17.1% greater than the control group

to 8.6%. However Bivariate analysis obtained by value  $p = 0.284$  means that there is no relationship between the incidence of malaria, anemia in pregnancy while  $OR = 2.207$ , this shows that malaria is a risk factor for anemia, but not significant. This study is not in line with [6] which states that there is a significant relationship between malaria infection with anemia in pregnancy with  $p = 0.001$  and  $OR = 20.216$  means that pregnant women have an opportunity terinfeksi malaria suffer from anemia 20.2 times compared to uninfected malaria. No significant relationship between malaria with malaria due to the influence of other variables are more powerful. Anemic with a history of malaria is not only influenced by one factor alone although pregnant women suffer from malaria but has a good nutritional status, food consumption sufficient and no confounders absorption of iron is not the case then the chances of anemia. Limitations of this study is also due to the small sample used in the ratio 1: 1.

#### **4.5. Consumption of Tea**

The proportion of pregnant women in the group who consumed tea case 34.3% less than the proportion of pregnant women who did not consume tea in the case group and 65.7%  $p = 0.225$  means that there is no relationship between tea consumption with incidence of anemia in pregnancy. In some studies are not in line with Besral that 49% of elderly respondents have the habit of drinking tea every day  $OR = 54$  and  $p = 0.000$ , meaning that every elderly who drink tea every day at risk of anemia 54 times than not drinking tea. There is no effect in this study because the proportion who consumed tea in 41.4% of cases similar to the control group 58.6%. In this study only look from the habit of drinking tea every day. Effect of tea against anemia is also influenced by the amount of drink a day are drunk, for example the type of tea drunk green tea or black tea and the distance between tea consumption with meals taken with anemia.

#### **5. Conclusion**

Based on the results and the discussion conducted in the previous chapter, it can be concluded as follows:

1. History of malaria is not a risk factor for anemia in pregnancy  $p = 0.284$   $OR = 2.207$  (0.505 to 9.639).
2. Eat Pinang is a risk factor for anemia in pregnancy  $p = 0,001$   $OR = 9.397$  (2.360 to 37.424).
3. Nutritional status is a risk factor in pregnancy  $p = 0,006$   $OR = 7.834$  (1.780 to 34.484).
4. Tea consumption is not a risk factor in pregnancy  $p = 0,225$   $OR = 0.552$  (0.211 to 1.446).
5. Adequacy taking iron tablets during pregnancy is a risk factor  $p = 0,002$   $OR = 10.244$  (2.358 to 44.510) and is the most dominant risk factor affecting the incidence of anemia among pregnant women in Puskesmas and Puskesmas Sumberker Biak town.

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