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Prevalence and Risk of Anemia During Pregnancy

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Abstract: Anemia is a problem experienced by 41.8% of pregnant women worldwide. Riskesdas data 2018 on pregnant women in Indonesia with Anemia is 48.9%. Anemia in pregnant women can be multifactorial, from pure iron, folate, B12 deficiency, and malaria/hemolytic or sickle cell disease. Anemia in pregnancy is influenced by poverty, lacking nutritional intake, gender inequality, and ignorance about the proper diet. Pregnant women need many nutrients to meet the body's needs for themselves and their fetuses. For pregnant women, anemia plays a role in increasing the prevalence of maternal mortality and morbidity. The study aimed to analyze the prevalence and risk of anemia during pregnancy. The new thing in this study is that research conducted using the baby's chest circumference variables and the length of the baby's body was also investigated. Of the 50 babies studied, 2 were born with a head circumference < 33 cm, and 3 were born with a length < 48cm. After being processed with the baby's weight, the results showed no relation between the baby's chest circumference and weight. This study used a retrospective cohort with a sample of 50 mothers with 1-year-old children in the city of Semarang. There is a relationship between the status of newborns, gestational age, length of the baby's body, and the frequency of ANC. At the same time, the variables that did not exist with the status of the newborn were education level, consumption of Fe tablets, Hb TM I, Hb TM II, and Hb TM III. These results are expected as input for the Health Office to enhance outreach activities evenly to pregnant women.

Keywords: anemia, pregnancy, prevalence, risk factor.

怀孕期间贫血的患病率和风险

摘要：贫血是全世界41.8%的孕妇所经历的问题。风险达斯2018年关于印度尼西亚贫血孕妇的数据为48.9%。孕妇贫血可能是多因素的，包括纯铁、叶酸、B12缺乏和疟疾/溶血或镰状细胞病。妊娠期贫血受贫困、营养摄入不足、性别不平等和对适当饮食无知的影响。孕妇需要许多营养素来满足身体对自己和胎儿的需求。对于孕妇来说，贫血在增加孕产妇死亡率和发病率方面发挥着作用。该研究旨在分析怀孕期间贫血的患病率和风险。这项研究的新鲜之处在于，还调查了使用婴儿胸围变量和婴儿身体长度进行的研究。在所研究的50名婴儿中，2名出生时头围<33厘米，3名出生时身长<48厘米。用宝宝的体重处理后，结果显示宝宝的胸围和体重没有关系。本研究采用回顾性队列，样本为三宝垄市50名有1岁儿童的母亲。新生儿的状况、胎龄、婴儿的身体长度和产前保健的频率之间存在关系。同时，与新生儿状况不存在的变量是受教育程度、铁片消费量、地中海贫血小血红蛋白I、地中海贫血小血红蛋白II和地中海贫血小血红蛋白III。这些结果预计将作为卫生办公室的投入，以加强对孕妇的外展

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活动。

关键词：贫血、怀孕、**患病率**、**危**险因素。

1. Introduction

Anemia is a problem experienced by 41.8% of pregnant women worldwide. About half of the incidence of anemia is caused by iron deficiency. The prevalence of anemia in pregnant women globally is estimated at 57.1% in Africa, 48.2% in Asia, 25.1% in Europe, and 24.1% in America [1].

Anemia in pregnant women can be multifactorial, from pure iron, folate, B12 deficiency, and malaria/hemolytic or sickle cell disease. Anemia in pregnancy is influenced by poverty, lacking nutritional intake, gender inequality, and ignorance about the proper diet. Pregnant women need many nutrients to meet the body's needs for themselves and their fetuses. For pregnant women, anemia increases the prevalence of maternal mortality and morbidity [2].

One of the factors that cause anemia in pregnant women is the lack of knowledge about the importance of consuming nutritious foods that can meet the needs of mothers and their babies during pregnancy. For example, a vital nutrient for pregnant women is iron; if the mother's intake is insufficient, it will increase the risk of anemia, which results in impaired fetal growth and development. The impact of anemia on pregnant women is abortion, premature labor, prolonged labor, postpartum hemorrhage, shock, intrapartum/postpartum infection [3].

From the results of interviews conducted with health workers at the Puskesmas in Semarang City, pregnant women were suffering from anemia almost 30% even though the prevention and pregnancy check-up program had been carried out. From the results of a preliminary survey implemented at the Puskesmas in Semarang City, the results of examinations and interviews conducted, as many as 15 mothers (60%) showed symptoms of anemia such as quickly tired, pale conjunctiva. Of the 10 people whose hemoglobin (Hb) levels were checked, it was found that 6 mothers had Hb <11 g/dl. After being interviewed about dietary restrictions during pregnancy, 6 mothers said they did not eat fish and drink milk during pregnancy. Also did not take Fe tablets, and the LILA was below 11gr/dl. 3 of them are under 20 years old as well.

2. Methods

The type of study used in this research is analytical, with a retrospective cohort approach. Therefore, the subject of this research is used as a source of information. Sampling was carried out through the sampling technique. This research used purposive sampling is a mother with a 1-year-old child. The independent variable in this study was iron deficiency anemia, while the dependent variable was BBL. Therefore, the sample of this research is mothers who have children aged 1 year. This study used primary data directly from respondents, and secondary data is data obtained from personal documents, namely the respondent's MCH Handbook. The data obtained will be analyzed using the chi-square test to see whether there is a relationship between anemia status and determinants of BBL. Furthermore, it will be tested again using multiple logistic regression to see if two independent variables are affected simultaneously on the dependent variable. In this case, multiple logistic regression tests were performed on the anemia status from the determining factor of BBL.

3. Results and Discussion

The results of the analysis are shown in Table 1. In this table, the variables that have a relationship with the status of the newborn are gestational age, length of the baby's body, and the frequency of ANC (Ante Natal Care). At the same time, the variables that did not exist with the status of the newborn were education level, consumption of Fe tablets, Hb TM I, Hb TM II, and Hb TM III.

Table 1 Correlation between characteristics and birth weight status

Category Gestational Age	Birth weight status				Total		P-value
	LBW		Normal				
	n	%	n	%	n	%	
Gestational Age							
Preterm (<37 weeks)	2	50	2	50	4	100	0.005
Aterm (37-42 weeks)	3	6.5	43	93.5	46	100	
Baby Body Length							
<48cm	3	60	2	40	5	100	<0.001
48-52cm	2	4.4	43	95.6	45	100	
ANC Frequency							
<4 times	1	50	1	50	2	100	0.054

Continuation of Table 1

>4 times	4	8.3	44	91.7	48	100	
Mother's Education							
Base	1	2	10	20	11	100	0.361
Intermediate	4	8	23	46	27	100	
Tall	0	0	12	24	12	100	
Consumption of Fe tablets							
<90 tablets	3	15	17	85	20	100	0.336
>=90 tablets	2	6.7	28	93.3	30	100	
Hb TM 1							
Mild Anemia	3	15.8	16	84.2	19	100	0.285
Normal (No Anemia)	2	6.5	29	93.5	31	100	
Hb TM II							
Mild Anemia	3	10	27	90	30	100	1,000
Normal (No Anemia)	2	10	18	90	20	100	
Hb TM III							
Mild Anemia	3	20	12	80	15	100	0.123
Normal (No Anemia)	2	5.7	33	94.3	35	100	

Based on Table 1, the results of this study show that the variables that do not exist with the status of the baby being born are maternal education, consumption of Fe tablets, Hb TM I, Hb TM II, and Hb TM III. That is in line with the research about relationship between age, parity, hemoglobin levels, and body mass index (BMI) with BBL, shows that non-anemic Hb levels can contribute 16.646 times the risk of BBLr compared to anemic mothers [4]. Another similar study entitled Risk Factor Analysis of Low Birth Weight (LBW) infants showed that there was no significant relationship between maternal age and birth weight ($p > 0.05$) [5]. Another similar article showed that a study entitled the relationship between the hemoglobin levels of pregnant women in the third trimester and newborns' weight showed no relationship between the age of pregnant women and the weight of newborns. Therefore, Sirait suggested that midwives improve services in conducting Hb checks during the first pregnancy check-up and continue to monitor the mother's weight gain during pregnancy [6].

However, some research results are not from the author's research. For example, the research article entitled the relationship between age, parity, hemoglobin levels, and body mass index (BMI) with bbl showed that hemoglobin and body mass index had a significant relationship with bblr ($p = 0.002$), BMI had a significant relationship with bblr ($p = 0.002$). = 0.025) with or = 2.524; this also indicates that mothers with normal BMI risk 2.524 times for giving birth LBW compared to mothers with abnormal BMI [4].

The study on the relationship between age, birth spacing, and hemoglobin levels of pregnant women with the incidence of low birth weight showed that there were 90 subjects with maternal age at risk. 36 (40%) mothers had various risks of birth by 20 mothers (22.2%), 16 mothers were anemic (17.8%), and babies born with low birth weight are 42 babies (46.7%). The results of maternal statistical tests in the at-risk age category (p-value = 0.001) mean a significant correlation between age and the incidence of low birth weight. Another study entitled the relationship between the hemoglobin levels of pregnant women in the third trimester and fetal weight showed a significant relationship between the hemoglobin levels of pregnant women in the third trimester and fetal weight [7].

Another similar article entitled the relationship between nutritional status and anemia with the case of low birth weight infants showed a relationship between nutritional status and the occurrence of low birth weight. There is a relationship between anemia and the occurrence of low birth weight. In pregnancy, oxygen demand is higher, thereby triggering increased erythropoietin production. As a result, the volume of plasma and red blood cells (erythrocytes) increases. However, the increased plasma volume occurs in a more significant proportion when compared to the increase in erythrocytes, which causes the concentration of hemoglobin (Hb) to fall due to hemodilution [8].

Other articles under the title association between iron deficiency anemia and clinical features among pregnant women showed that anemia in general and hypochromic microcytic anemia, in particular, were significantly associated with higher gravidity and parity. Significant outcomes associated with anemia during pregnancy were lower spontaneous vaginal delivery and antenatal fetal distress rates. Compliance with iron supplementation to prevent adverse outcomes for mother and fetus [9]. Another similar study entitled Factors related to anemia in pregnant women showed that attitudes, consumption of iron tablets, nutritional status, the role of health workers with anemia in pregnant women influenced the incidence of anemia [10].

Based on table 1: regarding the age of the respondents, it can be concluded that there are 4 LBW babies from 2 mothers who are at high risk (50%). The results of this study are in line with the research entitled there is a relationship between maternal age, parity, and hemoglobin levels with the incidence of low birth weight [11]. Another similar study entitled the

relationship between maternal age, parity, and hemoglobin levels with low birth weight infants (LBW). It showed there was a relationship between maternal age and the incidence of LBW (p=0.006), there was a relationship between parity and the incidence of LBW (p=0.006), and there was a relationship between hemoglobin levels and the incidence of LBW (p=0.006) [11]. The article entitled anemia of pregnancy and its influencing factors concluded that most respondents were at risk. Maternal age affects the incidence of LBW, especially with high parity, namely maternal age less than 20 years or more than 35 years. At a too young age (less than 20 years), blood circulation to the cervix and the uterus is still not perfect, so that can interfere with distributing nutrients from the mother to the fetus it contains [12].

Another similar study entitled maternal characteristics and low birth weight showed that the factors of low birth weight were maternal factors (malnutrition during pregnancy, maternal age of 35 years, the distance between pregnancy and childbirth being too close, chronic disease). On the other hand, labor factors were too heavy, pregnancy factors (pregnancy with hydramnios, multiple pregnancies, antepartum hemorrhage, pregnancy complications), fetal factors (congenital disabilities, infection in the womb), and still unknown factors. Several studies have shown that LBW is caused by maternal factors such as maternal parity, maternal education, age less than 20 years or more than 35 years, and a history of miscarriage or pregnancy complications such as: Gestational Diabetes Mellitus (GDM), hypertensive disorders during pregnancy, anemia, and obesity. Oligohydramnios. Premature birth and chronic disease (hypertension, diabetes [13].

Based on table 1. Regarding respondents' education, it can be concluded that there are 4 LBW babies born to mothers who have junior high school education (25%) and high school (75%). The research entitled anemia of pregnancy and the factors that influence it shows that most of the respondents aged at risk have a low level of knowledge and do not comply with consuming iron with the incidence of anemia in pregnant women. The dominant factor influencing anemia is the knowledge factor of pregnant women [12].

Another article entitled Determinants of the incidence of anemia in pregnant women found that the factors related to the incidence of anemia in pregnant women revealed that there was a relationship between low and low education levels with p=0.001 with the incidence of anemia in pregnant women and birth weight. Given the many problems that occur in LBW infants, more specific knowledge related to LBW is needed for health workers, especially midwives and nurses [14]. Another researcher concluded that most respondents at risk had high education, did not work, had sufficient family income, low parity, pregnancy interval > 2 years, high level of knowledge, and did not comply with consuming Fe [12].

Based on Table 1: regarding the respondent's occupation, it can be concluded that there are 4 LBW babies born from their work as housewives. Several studies have found that work is related to and is a trigger for anemia in pregnant women. The study about anemia of pregnancy and its influencing factors showed that most of the respondents of risky age were unemployed, had sufficient family income, had low parity, pregnancy interval > 2 years, a high level of knowledge, and non-adherence to consuming iron. There is a relationship between work and adherence to consuming iron with the incidence of anemia in pregnant women [12].

Another article entitled factors related to anemia in pregnant women showed that attitudes, consumption of iron tablets, nutritional status, the role of health workers with anemia in pregnant women influenced the incidence of anemia [10]. Other researchers concluded that most respondents did not work, had adequate family income, had low parity, had pregnancy interval > 2 years, had a high level of knowledge, and non-adherence to consuming Fe [12].

4. Conclusion

Our study found that 60% of pregnant women experience mild anemia. There is a relationship between the status of newborns, gestational age, length of the baby's body, and the frequency of ANC. There is no relationship between hemoglobin levels in the first, second, and third trimesters with infant birth weight. The new thing in this study is that research conducted using the baby's chest circumference variables and the length of the baby's body was also investigated. Of the 50 babies studied, two were born with a head circumference <33 cm, and 3 were born with a length <48cm. After being processed with the weight of the baby born, the results showed no relation between the baby's chest circumference and the weight. The limitation of our research is that existing policies constrain our research. For example, Hb examination when ANC is only done during trimester I and trimester III, while we researched pregnant women who did ANC and Hb examination in trimester I, II, and trimester III. So, we have to look for pregnant women when ANC did Hb examination in trimesters I, II, and trimester III.

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