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ORIGINAL ARTICLE

Risk factors for anemia among pregnant women at Bhayangkara Medan Hospital

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ABSTRACT

Anemia is a common complication affecting approximately 30% of pregnant women worldwide. Anemia is defined as a hemoglobin level of less than 11 grams per deciliter (g/dL) in non-pregnant women and less than 10.5 g/dL in pregnant women. This study aimed to determine the prevalence and risk factors of anemia in pregnant women. A cross-sectional study was conducted with 75 samples from 306 pregnant women who underwent ANC at the Bhayangkara Medan Hospital between January and June 2022. The risk factors studied included parity, pregnancy spacing, diet, maternal knowledge, and family support. Data regarding the risk factors were collected using questionnaires and medical records. Frequency distribution calculation and the chi-squared test were used for data analysis. The results showed that 30.7% of pregnant women experienced anemia. Chi-square test results showed that pregnancy spacing (0.001), diet (0.002), maternal knowledge (0.039), and family support were risk factors for anemia in pregnant women. Parity alone was not associated with anemia (0.306). The increased risk of anemia during pregnancy is influenced by short pregnancy spacing, poor diet, lack of maternal knowledge, and lack of family support.

Keywords: anemia, pregnant women, predictors

Introduction

Anemia is a pathophysiological condition characterized by a decrease in hemoglobin content or red blood cell count and is a global issue affecting all age groups.[1,2] It is the most prevalent nutritional deficiency among pregnant women worldwide.[3] Iron deficiency anemia is the most frequently diagnosed type of anemia in pregnant women.[4] During pregnancy, iron requirements increase to an average of 4.4 mg/day.[5] Anemia during pregnancy poses risks to both mother and fetus, with affected mothers being more susceptible to hemorrhage and complicated deliveries.[6–8] Previous literature has indicated that folate deficiency can elevate the risk of spina bifida, while calcium deficiency is associated with increased risks of pre-eclampsia and growth restriction.[9,10]

According to a 2022 report by the WHO, many low- and middle-income countries saw an increase in anemia among pregnant women between 2012 and 2016.[11] Data indicates that more than 50% of women of reproductive age in Southeast and South Asia are affected by anemia, with a prevalence of 70.3% in Nepal. In the Philippines, approximately 13.3% of women have anemia.[12] In Indonesia, 48.9% of pregnant women are anemic.[13]

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Several studies have identified risk factors associated with anemia during pregnancy. Clinical illnesses, intestinal parasitic infections, and a history of excessive menstrual bleeding increase the likelihood of anemia in pregnant women.[14] Other research indicates that lower levels of education and family income correlate with anemia.[15] Additionally, high parity, menstrual cycles longer than five days, bleeding during pregnancy, infrequent meat consumption, low intake of fruits and vegetables, habitual tea consumption after meals, and a history of anemia are recognized as significant risk factors.[16,17] Family support, particularly from husbands, is also a strong predictor of anemia during pregnancy.[18,19]

Secondary data from Bhayangkara Hospital in Medan City indicated an increasing trend of anemia cases among pregnant women from January to June 2022, with 32 diagnoses recorded. This indicates that anemia remains a significant health concern for pregnant women. This study aims to measure the prevalence of anemia among pregnant women and analyze associated risk factors. Given the significant variations in anemia prevalence reported across different regions of Indonesia and other countries, local data is essential for developing effective prevention programs. This study will provide a comprehensive understanding of the prevalence, causes, and severity of anemia among pregnant women, informing policymakers in the development of targeted health policies and programs to improve maternal and fetal health.

Method

This study employed a cross-sectional design, including 75 samples from a cohort of 306 pregnant women who received antenatal care (ANC) at Bhayangkara Hospital Medan between January and June 2022. The risk factors examined in this study included parity, pregnancy spacing, dietary patterns, maternal knowledge, and family support. Data collection was conducted in May 2023 using questionnaires and medical records.

Anemia data were obtained from medical records containing hemoglobin level examination results of pregnant women who received ANC at Bhayangkara Hospital Medan between January and June 2022. Information on parity and pregnancy spacing was collected through interviews with respondents during the questionnaire administration. Maternal knowledge was assessed using a 12-question questionnaire covering general information about anemia during pregnancy. A Food Frequency Questionnaire was utilized to gather data on the dietary patterns of pregnant women, where each participant was required to indicate the food and beverage items consumed within a one-month period. Family support was measured using a separate 12-question questionnaire.

Following data review and coding, the collected data were analyzed using SPSS version 26 software. In the initial analysis stage, the researchers calculated frequency distributions for all study variables. Subsequently, the correlation between predictors and the occurrence of anemia was tested using the Chi-squared test. This study received ethical clearance based on the assessment of the Health Research Ethics Committee of Prima Indonesia University (Number: 008/KEPK/UNPRI/V/2023).

Results

Table 1 indicates that the majority of pregnant women had a parity of three or fewer (94.7%) and lacked adequate family support (61.3%). More than half of the pregnant women surveyed had pregnancy intervals of less than two years (53.3%). The majority exhibited poor knowledge (46.7%) and adequate dietary patterns (46.7%). Nearly one-third experienced anemia (30.7%).

Chi-square test results revealed that pregnancy interval ($p = 0.001$), dietary patterns ($p = 0.002$), maternal knowledge ($p = 0.039$), and family support were significant risk factors for anemia in pregnant women (see Table 2). Pregnant women with intervals of less than two years had a higher prevalence of anemia compared to those with intervals of two years or more. Those with poor dietary patterns had a lower prevalence of anemia compared to women with adequate or good dietary patterns. Additionally, women with poor knowledge had a higher prevalence of anemia compared to those with adequate or good knowledge, and those lacking family support also showed higher prevalence rates compared to those with good support.

In this study, parity was the only factor that did not significantly correlate with anemia during pregnancy ($p = 0.306$). Interestingly, pregnant women with a parity of three or fewer had a higher prevalence of anemia compared to those with a parity greater than three.

Table 1. Subject characteristic (n= 78)

Variable	n	%
Parity		
> 3	4	5,3
≤ 3	71	94,7
Pregnancy spacing		
Non-ideal (< 2 years)	40	53,3
Ideal (≥ 2 years)	35	46,7
Dietary pattern		
Poor	20	26,7
Fair	35	46,7
Good	20	26,7
Maternal knowledge		
Poor	35	46,7
Fair	26	34,7
Good	14	18,7
Family support		
Poor	46	61,3
Good	29	38,7
Anemia incidence		
Anemia	23	30,7
Non-anemia	52	69,3

Table 2. The relationship between parity, pregnancy spacing, dietary patterns, maternal knowledge, family support and the incidence of anemia during pregnancy

Variable	Anemia	Non-anemia	p
	n (%)	n (%)	
Parity			
> 3	0 (0,0)	4 (5,3)	0,306
≤ 3	23 (30,7)	48 (64,0)	
Pregnancy spacing			
Non-ideal (< 2 years)	19 (25,3)	21 (28,5)	0,001
Ideal (≥ 2 years)	4 (5,3)	31 (88,6)	
Dietary pattern			
Poor	2 (2,7)	18 (24,0)	0,002
Fair	9 (12,0)	26 (34,7)	
Good	12 (16,0)	8 (10,7)	
Maternal knowledge			
Poor	7 (9,3)	28 (37,3)	0,039
Fair	8 (10,7)	18 (24,0)	
Good	8 (10,7)	6 (8,0)	
Family support			
Poor	10 (13,3)	36 (48,0)	0,035
Good	13 (17,3)	16 (21,3)	

Discussion

This study aimed to measure the prevalence of anemia in pregnant women and analyze associated risk factors. In the study population, 30.7% of pregnant women experienced anemia, a figure lower than that reported in some previous studies. Prior research has indicated that anemia affects approximately 40% of pregnant women.[20] A 2017 study in India reported an anemia prevalence of 63% among pregnant women.[21] Similarly, a study in the South Leitimur and Ambon Bay Districts reported a prevalence of 50.3% during pregnancy.[22]

Pregnancy spacing was identified as a significant risk factor for anemia in this study. This is attributed to the depletion of iron reserves in the mother's body, which are not fully replenished between current and previous pregnancies, leading to anemia.[23] Short intervals between pregnancies do not allow sufficient time for mothers to replenish their nutritional reserves before the next pregnancy, thereby increasing the risk of maternal anemia and adverse pregnancy outcomes.[24] This increased risk is particularly observed in mothers with pregnancy intervals of less than two years.[25]

Dietary patterns were also significantly associated with the incidence of anemia in pregnant women. Poor dietary habits during pregnancy, particularly insufficient consumption of iron-rich foods, can lead to iron deficiency anemia. Low intake of key nutrients such as calories, protein, fat, iron, and folic acid are significant factors contributing to anemia prevalence.[26,27] This issue is particularly pronounced in developing countries, where anemia during pregnancy is common.[28] Gibore et al.[29] highlighted dietary diversity, meal frequency, and tea or coffee consumption as predictors of anemia. A study concluded that pregnant women with inadequate protein intake had a 3.4 times greater risk of anemia compared to those with adequate protein intake.[30]

The results indicate that pregnant women's knowledge is significantly related to the incidence of anemia. A lack of knowledge about anemia correlates with a higher incidence of the condition, as found in other studies.[31,32] Poor understanding can impact health behaviors during pregnancy; women with limited knowledge may neglect consuming iron-rich foods due to their lack of awareness, which can lead to anemia.[33,34] Providing pregnant women with better knowledge about anemia and its prevention is crucial for reducing its incidence.

Family support was also identified as a predictor of anemia incidence among pregnant women. Previous research consistently shows that family and spousal support play vital roles in preventing anemia during pregnancy.[19,35] Family support—particularly from husbands who encourage their wives to eat nutritious foods—is significantly associated with anemia prevention during pregnancy.[36] This indicates family awareness regarding the importance of diet for maternal and infant health. Proper maternal nutrition is essential for fetal development and birth weight, making a balanced diet during pregnancy crucial.[37]

In this study, parity was not associated with the incidence of anemia during pregnancy. This finding aligns with research by Afni et al.[38], Apriliani et al.[39], and Purwaningtyas & Prameswari[40]. The absence of a relationship between parity and anemia may be due to the majority of participants being non-risk parity; specifically, among the 71 respondents with three or fewer children, most were not anemic (48 women or 67.6%), while a minority were anemic (23 women or 32.4%). The likelihood of anemia in women who have never been pregnant before or are carrying their first child is influenced by their pregnancy status.[41] Repeated childbirth can lead to health issues during pregnancy, including miscarriage and anemia. The more frequently a woman becomes pregnant and gives birth, the more iron she loses. If iron reserves are insufficient, each pregnancy depletes these reserves further, potentially leading to anemia.[23–25] Women with more than two pregnancies are at increased risk for anemia, which is also influenced by pregnancy spacing.[24,41]

Conclusion

This study found a prevalence of anemia in pregnant women of 30.7%, which is lower than previous studies that reported rates between 40% and 63%. The findings indicate that short pregnancy intervals, poor dietary patterns, lack of family support, and limited maternal knowledge can increase the risk of anemia in pregnant women. Only parity was not associated with the incidence of anemia. Therefore, it is necessary to educate pregnant women about anemia, including its prevention through healthy eating patterns and iron supplementation. Encouraging pregnant women with short pregnancy intervals to seek medical checkups and obtain appropriate iron supplementation is essential. Additionally, families need to provide support to pregnant women in terms of information, encouragement, and practical assistance to help them prevent anemia.

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