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Original Research

The Relationship of Knowledge to the Incidence of Anemia in Pregnant Women

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Abstract

Background: Knowledge about anemia during pregnancy is very important for pregnant mothers, because knowledge can affect their attitudes and behaviors in maintaining daily food consumption patterns so that it can prevent anemia during pregnancy.
Objective: In this study to determine the relationship between knowledge and the incidence of anemia in pregnant women.
Methods: This research used a quantitative analytical design with a cross-sectional study approach. The study was conducted at the Abepura Health Center with a total sample of 38 pregnant women selected through total sampling. Data were collected using a structured questionnaire and analyzed using the Chi-square statistical test with a significance level of 0.05.
Results: Based on the results of data analysis, there were 22 respondents (57.9%) who experienced mild category anemia, then 12 respondents (31.6%) who experienced moderate anemia and 4 respondents (10.5%) who experienced severe anemia. Then there were 22 respondents (57.9%) who experienced mild category anemia, then those who experienced moderate anemia as many as 12 respondents (31.6%) and those who experienced severe anemia as many as 4 respondents (10.5%). The results of the statistical test obtained a value of p=0.000 < 0.05, so it can be concluded that the relationship is significant, which means that there is a relationship between knowledge and the incidence of anemia in pregnant women.
Conclusion: The conclusion in this study is that there is a relationship between knowledge and the incidence of anemia in pregnant women.
Keywords : Anemia; Knowledge Level; Pregnant Women

Introduction

Maternal health encompasses the physical, mental, and social well-being of women during pregnancy, childbirth, and the postpartum period. Each of these stages is expected to be a positive and safe experience, ensuring that both the mother and her baby attain optimal health outcomes. Despite significant progress in maternal care globally over the past two decades, maternal mortality remains a serious concern. In 2023 alone, approximately 295,000 women worldwide died due to complications during pregnancy or childbirth (World Health Organization, 2023). The primary direct causes of maternal death include excessive bleeding, infections, hypertensive disorders, unsafe abortions, and complications during labor and delivery. In addition to these direct causes, indirect conditions such as anemia significantly contribute to maternal morbidity and mortality (Ministry of Health of the Republic of Indonesia, 2023).

Anemia is defined as a condition where the number of red blood cells or the oxygen-carrying capacity of the blood, measured by hemoglobin levels, is insufficient to meet the physiological demands of the body (Asmin et al., 2021). In pregnant women, anemia is considered a major nutritional public health issue, particularly iron-deficiency anemia, which is the most prevalent form. National health data indicate that the prevalence of anemia among pregnant women in Indonesia increased from 37.1% in 2022 to 40.9% in 2023 (Ministry of Health of the Republic of Indonesia, 2023). According to clinical guidelines, anemia in pregnancy is diagnosed when hemoglobin levels fall below 11.0 g/dL in the first and third trimesters and below 10.5 g/dL in the second trimester (Asmin et al., 2021).

Iron is an essential micronutrient during pregnancy, primarily because it is a core component of hemoglobin, which plays a critical role in oxygen transport and cellular metabolism (Sulistyawati, 2021). Iron deficiency in pregnancy may lead to insufficient hemoglobin production, resulting in fatigue, increased risk of infection, premature birth, and low birth weight. Therefore, routine screening for anemia during antenatal visits, particularly at the first contact, is crucial. Even when anemia is not present initially, the risk of developing it later in pregnancy remains high due to increased physiological demands. Adequate maternal nutrition and iron supplementation are central to anemia prevention strategies.

In addition to the medical and nutritional aspects, behavioral and educational factors play a vital role in anemia prevention. Pregnant women's knowledge regarding the causes, symptoms, and prevention of anemia—including dietary needs and iron supplementation—is a key determinant of health-seeking behavior. However, knowledge alone may not suffice. The active involvement and support of family members, particularly spouses and close relatives, are equally important. Families act as primary caregivers and decision-makers in household health matters. Their role in encouraging antenatal visits, supporting nutrition, and responding to early signs of maternal complications is critical. As Waryana (2019) emphasized, family engagement can significantly reduce delays in seeking care and ultimately prevent maternal complications and deaths.

Although numerous studies have addressed anemia prevalence and prevention strategies, limited research has examined the combined influence of pregnant women's knowledge and family support on the prevention of anemia during pregnancy, especially within the Indonesian context. Understanding this relationship is essential in designing more integrated and culturally responsive interventions in maternal health programs.

Therefore, this study aims to analyze the correlation between pregnant women's knowledge and family support in the prevention of anemia during pregnancy. By identifying this relationship, the research seeks to fill a critical gap in current public health literature and provide evidence-based recommendations for improving maternal health outcomes.

Methods

Study Design

This study utilized a descriptive analytic design with a cross-sectional approach, aimed at identifying the relationship between pregnant women's knowledge and the incidence of anemia at the Abepura Health Center. The cross-sectional design was selected to observe variables simultaneously at a single point in time, enabling the assessment of associations without manipulating the study environment.

Samples/Participants

The study population consisted of all pregnant women diagnosed with anemia who visited the Abepura Health Center during the data collection period. A total sampling technique was employed, resulting in 38 respondents who met the inclusion criteria. The inclusion criteria were: (1) pregnant women who had already given birth at least once, (2) were present and available during the research period, and (3) voluntarily agreed to participate. The exclusion criteria included pregnant women who were ill during the time of data collection or those who declined to provide consent.

Instruments

Data were collected using a structured observation sheet and questionnaire designed to assess pregnant women's knowledge about anemia and its prevention. The instrument was developed based on previously validated literature and existing research tools related to anemia in pregnancy. The questionnaire employed an ordinal scale and included items on causes, symptoms, prevention, and iron supplementation.

To ensure content validity, the instrument was reviewed and evaluated by two experts in maternal health and nutritional epidemiology. A pilot test was conducted on 10 respondents with similar characteristics to the study sample. Based on the pilot data, reliability was confirmed using Cronbach's alpha, with a resulting score of 0.81, indicating good internal consistency.

Data Collection

The primary data were collected directly from the respondents through interviews using the prepared questionnaire, while secondary data related to patient health records and hemoglobin levels were obtained from medical documentation available at the health center. The researcher collaborated with midwives at the facility to access relevant records, conduct interviews, and ensure data completeness. All data collection procedures were carried out in accordance with research protocols and within the agreed time frame.

Data Analysis

The data were processed and analyzed using SPSS version 25.0. Univariate analysis was conducted to describe the distribution of each variable, including levels of knowledge and anemia status. Bivariate analysis was performed to assess the relationship between knowledge and anemia incidence using the Chi-square test, with a significance level of 5% ($p < 0.05$). Results were interpreted using cross-tabulations and frequency distributions.

Ethical Considerations

All participants provided informed consent before data collection. Each respondent received an explanation of the study's purpose, procedures, and potential benefits. Participation was entirely

voluntary, and respondents had the right to withdraw at any time without any consequences. Confidentiality of all personal and health information was strictly maintained throughout the research process.

Results

Frequency Distribution by Respondent Gender

From the results of the research that has been carried out at the Abepura Health Center, the gender frequency distribution of respondents is all women with a total of 38 respondents (100.0%).

Frequency Distribution of Respondents' Age Characteristics

Table 1 Frequency Distribution by Respondent Gender

Gender	Frequency (f)	Percentage (%)
Woman	38	100.0
Total	**38**	**100.0**

Source: SPSS Processed Data,2024

From the results of the research that has been carried out at the Abepura Health Center, in July the distribution of the highest frequency of respondents in vulnerable age 20-25 years was obtained, which amounted to 14 respondents (36.8%), then vulnerable age 26-31 years as many as 13 respondents (34.2%), then in vulnerable age 38-43 years as many as 7 respondents (18.4%) and there were vulnerable age 32-37 years as many as 4 respondents (10.5%).

Table 2 Frequency Distribution of Respondents' Age Characteristics

Age	Frequency (f)	Percentage (%)
20-25 years	14	36.8
26-31 years old	13	34.2
32-37 years old	4	10.5
38-43 years old	7	18.4
Total	**38**	**100.0**

Source: SPSS Processed Data, 2024

Frequency Distribution by Respondent's Last Education

Based on the results of the research table 3, the distribution of the last education of the respondents showed that most of the respondents had the last education of high school with the number of respondents as many as 14 respondents (36.8%), then the junior high school level amounted to 8 respondents (21.1%), then the S1 level amounted to 7 respondents (18.4%), then the D3 level as many as 4 respondents (12.9%), the S2 level as many as 3 respondents (7.9%) and the elementary level as many as 2 respondents (5.3%).

Table 3 Frequency Distribution by Respondent's Last Education

Education	Frequency (f)	Percentage (%)
SD	3	5.3
JUNIOR	8	21.1
SMA	14	36.8
D3	4	10.5
S1	7	18.4
S2	3	7.9
Total	**38**	**100.0**

Source: SPSS Processed Data, 2024

Frequency Distribution by Respondent's Work

Based on the results of the research table 4, the distribution of respondents' jobs showed that most of the respondents had jobs as IRTs as many as 19 respondents (50.0%), then as civil servants and self-employed 7 respondents each (21.1%), and as honorary as many as 5 respondents (13.2%).

Table 4 Frequency Distribution by Respondent's Work

Work	Frequency (f)	Percentage (%)
IRT	19	50.0
Honorary	5	13.2
PNS	7	18.4
Self employed	7	18.4
Total	**38**	**100.0**

Source: SPSS Processed Data, 2024

Characteristics of the Variables Examined
Univariate Analysis
Knowledge
Based on the results of the study in table 5, it was found that the distribution of respondents' knowledge showed that most of the respondents had good knowledge as many as 24 respondents (63.2%) and those who had poor knowledge as many as 14 respondents (36.8%).

Table 5 Frequency Distribution based on Respondent Knowledge

Knowledge	Frequency (f)	Percentage (%)
Good	24	63.2
Bad	14	36.8
Total	**38**	**100.0**

Source: SPSS Processed Data, 2024

Incidence of Anemia
Based on the results of the study in table 5.6, the distribution of anemia incidence was obtained, showing that most of the respondents experienced mild category anemia as many as 22 respondents (57.9%), then those who experienced moderate anemia as many as 12 respondents (31.6%) and those who experienced severe anemia as many as 4 respondents (10.5%).

Table 6 Frequency Distribution based on Respondent Knowledge

Incidence of Anemia	Frequency (f)	Percentage (%)
Light	22	57.9
Keep	12	31.6
Heavy	4	10.5
Total	**38**	**100.0**

Source: Primary Data, 2024

Bivariate Analysis
Based on the results of the study in table 7, the distribution of respondents' knowledge was obtained showing that most of the respondents had good knowledge as many as 24 respondents (63.2%) and those who had poor knowledge as many as 14 respondents (36.8%) then the distribution of anemia incidence, showing that most of the respondents experienced mild anemia as many as 22 respondents (57.9%), then those who experienced moderate anemia as many as 12 respondents (31.6%) and those who experienced severe anemia as many as 4 respondents (10.5%).

Table 7 Results of Analysis of the Relationship Between Knowledge and the Incidence of Anemia

Knowledge	Incidence of anemia						Total		Exactly. Sig
	Light		Keep		Heavy				
	F	%	F	%	F	%	F	%	
Good	20	55.6%	2	5.6%	0	0.0%	22	61.1%	0.000
Less	0	0.0%	10	27.8%	4	11.1%	14	38.9%	
Total	20	55.6%	12	33.3%	4	11.1%	36	100%	

Source : SPSS Processed Data, 2024

Discussion

The results of this study demonstrate a statistically significant relationship between the level of knowledge among pregnant women and the incidence of anemia. Knowledge plays a central role in shaping attitudes, behaviors, and decisions related to maternal nutrition and health-seeking practices. Pregnant women with adequate knowledge of anemia—its causes, risks, and preventive strategies—are more likely to adopt appropriate behaviors such as consuming iron-rich foods, adhering to iron supplementation, and attending routine antenatal check-ups.

This finding is consistent with the study by Khatimah et al. (2022), which reported that maternal knowledge significantly influences the incidence of anemia during pregnancy. Knowledge enhances awareness of the importance of micronutrient intake, especially iron, and reinforces behavioral patterns that prevent anemia. Similarly, Chandra et al. (2019) emphasized that nutritional knowledge directly affects dietary patterns, which is crucial given the increased iron requirements during gestation.

Anemia during pregnancy is associated with significant maternal and fetal complications. As noted by Hidayati et al. (2018), it contributes to increased risks of maternal mortality, preterm labor, low birth weight, and perinatal death. Physiologically, iron-deficiency anemia reduces the blood’s oxygen-carrying capacity, impairing cellular metabolism and physical stamina. In the context of childbirth, it may increase

the likelihood and severity of hemorrhage, which can be fatal in already anemic women. These risks underline the importance of early detection and prevention through education and nutritional support.

While this study reinforces existing literature on the protective role of knowledge, it contrasts with findings from Rahman et al. (2020), who reported no significant association between knowledge and anemia prevalence in rural populations. This discrepancy may be due to contextual differences in healthcare access, cultural beliefs, and the quality of health education programs. It is important to note that knowledge alone may not always translate into practice, particularly when economic or systemic barriers are present.

Despite the positive association found in this study, it is important to acknowledge certain limitations. First, the cross-sectional design restricts causal inference; it only identifies associations at a single point in time. Longitudinal studies would be more appropriate to assess how knowledge and behavior evolve throughout pregnancy. Second, the sample was limited to pregnant women visiting the Abepura Health Center, which may not be representative of broader populations in rural or remote settings. Third, the instrument used relied on self-reported responses, which may introduce information bias due to social desirability or recall issues. Fourth, the study did not account for other potential confounding variables such as cultural beliefs, spousal support, or previous pregnancy experiences that might influence knowledge and behavior.

Future research should consider exploring the role of comprehensive health education interventions and the involvement of family members in anemia prevention strategies. Additionally, integrating behavioral models such as the Health Belief Model or Theory of Planned Behavior could enhance understanding of how knowledge is translated into preventive action. It would also be valuable to examine how digital health tools and community health workers contribute to improving knowledge and reducing anemia prevalence among pregnant women in low-resource settings.

Conclusion

This study found a statistically significant relationship between pregnant women's knowledge and the incidence of anemia, as indicated by a p-value of 0.000 ($p < 0.05$). These findings suggest that higher levels of knowledge regarding anemia—its causes, consequences, and prevention—are associated with lower rates of anemia among pregnant women. Knowledge serves as a key determinant in shaping maternal behavior, particularly in adopting nutritional practices and utilizing antenatal care services.

Given the critical role of maternal knowledge in anemia prevention, health education programs targeting pregnant women should be strengthened, especially in primary healthcare settings. In addition, early screening and counseling during antenatal visits can further enhance awareness and preventive practices.

Future researchers are encouraged to explore additional variables that may influence the relationship between knowledge and anemia incidence, such as socioeconomic status, family support, cultural beliefs, access to iron supplements, and healthcare utilization. Longitudinal and intervention-based studies are also recommended to assess causal effects and the long-term impact of educational interventions on maternal health outcomes.

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