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Quantiative Research Article

Factors associated with the incidence of anemia in pregnant women at the Padang Guci Hilir Community Health Center, Bengkulu City in 2023

Djihan Mifahera[1] , Yuna Trisuci Aprillia[1,2]

Abstract

Background: Anemia in pregnancy remains a national health issue in Indonesia, reflecting socio-economic welfare and significantly influencing maternal and child health. Early marriage, low education, and inadequate knowledge are identified as contributing factors to anemia in pregnant women. Adolescents engaging in early marriage face heightened risks due to underdeveloped reproductive organs and limited nutritional awareness, leading to increased complications during pregnancy.

Objective: This study aims to determine the relationship between early marriage, education, and knowledge with the incidence of anemia in pregnant women in the working area of Padang Guci Hilir Health Center, Bengkulu Province.

Design and Methodology: A cross-sectional study was conducted among 42 pregnant women using total sampling. Inclusion criteria included pregnant women domiciled in the health center's working area and willing to participate. Data were collected through interviews and questionnaires, then analyzed using univariate and chi-square tests to identify associations. Odds Ratios (OR) were calculated to evaluate the strength of relationships.

Findings: Of the respondents, 14.3% engaged in early marriage, 61.9% had low education, and 26.2% experienced anemia. Significant relationships were found between early marriage (p=0.003; OR=25.0), low education (p=0.001; OR=15.4), and insufficient knowledge (p=0.000; OR=8.1) with anemia. Early marriage was identified as the strongest risk factor, increasing the likelihood of anemia 25 times.

Conclusion and Implications: Early marriage, low education, and inadequate knowledge are key determinants of anemia in pregnant women. Targeted interventions, including education programs to delay marriage, nutritional counseling, and improved health education, are recommended to reduce anemia rates and improve maternal health outcomes. These findings highlight the urgent need for community-based policies to address these issues effectively.

Author Affiliation

[1] Prodi Kebidanan Universitas Respati Indonesia
[2] Fakultas Ilmu Kesehatan, Universitas Respati Indonesia
*Corresponding author e-mail: djihanmifahera@gmail.com

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Introduction

Adolescence is part of the stages of growth and development from child to adult. At this stage, children experience accelerated growth, hormonal, cognitive and emotional changes (1). According to

WHO, adolescents are residents in the age range of 10-19 years, while according to the Regulation of the Minister of Health of the Republic of Indonesia Number 25 of 2014, adolescents are residents in the age range of 10-18 years. Maternal mortality rate (MMR) is one of the indicators of the success of a country's health services. 99% of all maternal deaths occur in developing countries. The MMR in the world in 2017 was 211 per 100,000 live births or an estimated 295,000 maternal deaths. This means that 810 mothers die every day from complications related to pregnancy or childbirth worldwide. TheSustainable Development Goals (SDGs) target to reduce MMR to below 70 per 100,000 live births by 2030. (Purnama et al., 2022).

Risk factors for pregnant women aged less than 20 years can cause risky pregnancies that not only lead to maternal and infant deaths, but also generations with various limitations.2 In pregnant women with an age of less than 20 years, the organs in the body are still in the process of maturation and development. One of the organs that is still in the process of maturation and development is the reproductive organs. To fulfill the development of reproductive organs, the body needs a large supply of iron. If pregnancy occurs at an early age, the need for iron increases compared to pregnant women at a healthy reproductive age. If iron in the body is not fulfilled, it will result in anemia.2 The incidence of anemia in pregnant women in 2018 was recorded at 48.9 percent. The case of anemia in pregnant women has increased from the previous survey (Purnama et al., 2022).

Adolescent pregnancy carries the risk of preterm delivery and low birth weight (LBW). Maternal age too old, maternal age too young, close child spacing, and too many children are indirect factors in the high maternal mortality rate (MMR). The age of pregnant women who are too young is pregnancy in adolescents under the age of 20 who should not be ready to become pregnant. Risk factors for miscarriage, preterm labor, LBW, congenital abnormalities, susceptibility to infection, anemia in pregnancy, and death. Adolescence is also a risky time to get pregnant. Adolescent pregnancy has worse pregnancy outcomes such as delayed fetal growth, premature birth, low birth weight (LBW), bleeding and prolonged labor.2 In addition, pregnancy at the age of less than 20 years is biologically not optimal, emotions tend to be unstable, mentally immature so it is easy to experience shocks which result in inattention to the fulfillment of nutritional needs during pregnancy (Dania, 2022).

Adolescent girls who will later become mothers tend to have the potential for anemia. This is due to the desire of adolescent girls to have a thin body so that they ignore a regular and healthy diet. In addition, many consume plant foods that contain little iron, compared to animal foods, so that the body's need for iron is not met. In addition, anemia in pregnancy at a young age is also caused by a lack of knowledge of the importance of nutrition in pregnant women. Based on research, only 14 percent of adolescents know about anemia (Hapisah, 2015). The causes of maternal mortality can be divided into direct causes and indirect causes. The direct cause of maternal mortality is 90% during labor and immediately after delivery (SKRT 2001). The direct causes of maternal mortality are bleeding (28%), eclampsia (24%) and infection

(11%). Meanwhile, based on routine PWS reports in 2007, the direct causes of maternal deaths were bleeding (39%), eclampsia (20%), infection (7%) and others (33%). Indirect causes of maternal mortality include chronic energy deficiency in pregnancy (37%) and anemia in pregnancy (40%). The incidence of anemia in pregnant women will increase the risk of maternal death compared to mothers who are not anemic (Hapi Apriasih, 2014).

Many factors influence the incidence of anemia in pregnant women. A short or short interval between the previous and next pregnancy, for example less than 2 years, can increase the risk of anemia in pregnant women. Likewise, the age of the mother during pregnancy, age under 20 years and over 35 years has a significant risk of anemia (Romiko, 2020).

Anemia in pregnancy is caused by several factors, including maternal age and parity. Mothers who are too young (<20 years old) are not ready to pay attention to the environment needed for fetal growth. Mothers who have more than three children are also one of the factors that cause anemia during pregnancy. This is because too many pregnancies can deplete the nutritional reserves of the mother's body. Most anemia suffered by the community is due to iron deficiency. To overcome this, iron (Fe tablets) is given regularly and regular nutrition is also improved. The use of health for the world in the midwife strategy in employment opportunities is where midwives are still needed in midwifery services in order to reduce the incidence of anemia in pregnant women.(Amini et al., 2018)

Although teenage pregnancy has a negative impact on the mother and fetus, the incidence rate is increasing. The purpose of this study is to explore the causal factors and risks that arise from teenage pregnancy so that it can be used as a basis for conducting further research on creating a teenage pregnancy control model. The impact that occurs is a decrease in the number of teenage pregnancies and reducing complications and maternal and fetal deaths (Rahayu et al., 2017).

According to the Basic Health Research (Riskesdas), the prevalence of lack of Hb levels in pregnant women in Indonesia is at 48.9 which occurs in urban and rural areas. This is a concern for the government in formulating strategies to reduce maternal mortality in Indonesia to the world. Because Indonesia is among the contributors to the highest maternal mortality rate in the world (Indonesian Ministry of Health, 2022).

Based on data obtained from the Bengkulu Provincial Health Office's mother and child program report in 2022, the number of adolescents aged 15-19 years was 162,932 people and there were 684 people or 0.42% of adolescent girls experiencing early pregnancy. The highest percentage came from Kepahiang district, namely 217 people or 31.7% Kaur Regency is part of the Bengkulu Province region.

Based on data obtained from the Bengkulu Provincial Health Office in 2015, the incidence of anemia in pregnant women in Bengkulu Province is also still relatively high where there are (45%) pregnant women in Bengkulu Province experiencing deficiency anemia. Data from the Kaur Regency Health Office

in 2021 there were 262 (15.7%) mothers who experienced anemia. Where the Padang Guci Hilir Health Center has the highest incidence of anemia in pregnant women, namely 136 (27.4%) pregnant women who experience anemia. An initial survey was conducted at the Kaur District Health Office. Based on the results of the survey in 2022 the highest number of pregnant women with an age of less than 20 years was in Padang Guci Hilir District as many as 44 people (21.6%).

Data obtained from the report book of the Padang Guci Hilir Health Center, Kaur Regency 2022 pregnant women totaling 70 pregnant women under the age of 20 as many as 44 people in the village of Talang Besar 7 people, Air Kering two 4 people, Talang Jawi one 6 people, Talang Jawi two 5 people, Pulau Panggung 6 people, Talang Padang 7 people, Gunung Kaya 5 people, Ulak Agung 3 people, Air Kering one 1 person.

Methods

Research design

The study used a *Cross-Sectional* research design. The *independent* variable is early marriage and the dependent variable is anemia in pregnant women.

Criteria and sample size

The sample in this study was a part or representative of the population studied (Sugiyono, 2013). all pregnant women (total sampling) registered in the MCH register book at the Padang Guci hilir Health Center, Bengkulu Province, which amounted to 70 pregnant women. Sampling in this study using *Probability Sampling* technique. Where each member of the population has the same opportunity to be selected as a sample member. Where sampling was carried out Samples of all pregnant women (total sampling) at the Puskesmas padang guci hilir Bengkulu Province which amounted to 42 pregnant women. The sample taken by researchers using the Solvin formula in Arikunto (2017), which is:

$$n = \frac{N}{1 + N.d^2}$$

n = the sample size sought

N = total population

d^2= Presis set, in this study researchers took a tolerance limit of 10% (0.1)

$$n = \frac{N}{1 + N.d^2}$$

$$= \frac{70}{1 + 70\ (0,1)^2}$$

$$= \frac{70}{1 + 0,7}$$

$$= \frac{70}{1,7}$$

= 41,17 respondents ≈ 42 peoples

The inclusion criteria for this study consisted of pregnant women who were willing to participate as respondents. Conversely, the exclusion criteria encompassed pregnant women who were not domiciled in the working area of the Padang Guci Hilir Health Center, Kaur Regency, and those who were unwilling to participate as respondents.

Data collection and analysis

The study was conducted through the process of collecting data from the medical records of pregnant patients. The data obtained from the patient's medical record then direct data collection using the interview method using a questionnaire in the field this process is carried out checking the contents of the questionnaire, whether the answers listed are complete, clear, relevant, and consistent processed using *Microsoft excel* and using the *Statistical Package for the Social Science* (SPSS) 22.0 edition program. The data analysis used was Univariate Analysis. This analysis only produces the distribution and percentage of each variable. Data will be presented in percentage tables using the *frequency* feature in the SPSS 22.0 program.

Results

Based on the results of the frequency distribution and percentage of each variable, namely the independent variable (early marriage, education, knowledge) and the dependent variable (the incidence of anemia in pregnant women) in the Padang Guci Hilir Health Center Working Area, Kaur Regency as follows (Table 1):

Table 1. Characteristics of Pregnant Women at Padang Guci Hilir Health Center 2023

Characteristic	n=42	%
Incidence of anemia		
Not anemia	31	73,8
anemia	11	26,2
Early marriage		
Not early marriage	36	85.7
Early marriage	6	14,3
Education		
Low Education	26	61,9
Higher Education	16	38,1
Knowledge		
Good	33	78,6
Enough	9	21,4

Description: n = number of samples / frequencies

Anemia in pregnant women is still one of the national problems because it reflects the value of the socio-economic welfare of the community, and its influence is very large on the quality of human resources.

Pregnancy anemia is called a *'potential danger to mother and child'*, therefore anemia requires attention from all parties involved in health services at the forefront.

Based on **Table 1**, if the mother's Hb before pregnancy is around 11%, with the occurrence of hemodilution will result in physiological pregnancy anemia, and the mother's Hb is at risk of decreasing to 9.5-10%. After delivery with the birth of the placenta and bleeding the mother will be at risk of losing about 900 mg of ice. During lactation, the mother still needs optimal physical health to be able to prepare breast milk for the development and growth of the baby. In a state of anemia, lactation is unlikely to be carried out properly. (Leny, 2019)

Many factors influence the incidence of anemia in pregnant women. A short interval between the previous and next pregnancy, for example less than 2 years, can increase the risk of anemia in pregnant women. Likewise, the age of the mother during pregnancy, age under 20 years and over 35 years has a significant risk with the incidence of anemia. (Romiko, 2020)

Based on **Table 1** based on early marriage, it is dominated by respondents who did not marry early, namely 36 (85.7%) while respondents who married early were 6 (14.3%).In adolescence, it is immature with emotional instability which will affect fetal growth and development. Children born to teenage mothers often experience developmental and behavioral disorders. Although teenage pregnancy is bad for both mother and fetus, the incidence rate is increasing. The purpose of this research is to explore the causal factors and risks that arise from teenage pregnancy so that it can be used as a basis for conducting further research on the creation of a teenage pregnancy control model. The impact that occurs is a decrease in the number of teenage pregnancies and reducing complications and maternal and fetal deaths. (Rahayu et al., 2017).

Based on **Table 1**, there are 26 (61.9%) low education, 16 (38.1%) high education. The higher the level of education, the lower the acceptance of the concept of healthy living independently, creatively, and continuously. The level of education greatly affects the ability to receive nutritional information. The level of education also determines or influences whether or not a person receives knowledge. The higher the education, the easier it is for a person to receive nutrition information. Usually a highly educated Hamilyang mother can balance her consumption patterns. If the consumption pattern is appropriate, the intake of nutrients obtained will be sufficient, so it is possible to avoid the problem of anemia. The low level of education of pregnant women can cause limitations in efforts to deal with family nutrition and health problems and affect the receipt of information so that knowledge about iron Fe becomes limited and has an impact on the occurrence of iron deficiency. (Afriyanti, 2020)

Based on **Table 1**, there are 33 (78.6%) with good knowledge and 9 (21.4%) with sufficient knowledge. One of the factors causing 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. A very important nutrient for pregnant women is iron, if the mother's intake is less, 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 partus, prolonged partus, postpartum hemorrhage, shock, intrapartum/postpartum infection. (Leny, 2019)

Table 2. Relationship between Early Marriage and the Incidence of Anemia in Pregnant Women at the Padang Guci Hilir Health Center, Kaur Regency

Early Marriage	**Incidence of Anemia**				**Total**		OR (95%C!)	P *value*
	Not Anemia		Anemia					
	n	%	n	%	F	%		
No	30	83,3	6	16,7	36	100	25.0	0,003
Early Marriage	1	16,7	5	83,3	6	100		
Total	31	73,8	11	26,2	42	100		

The results of statistical tests on early marriage variables with the incidence of anemia obtained the results of respondents who did not marry early there were 30 respondents (83.3%) who did not experience anemia and there were 6 respondents (16.7%) who were anemic. Of the 6 respondents who had early marriage, there was 1 respondent (16.7%) who did not experience anemia and there were 6 respondents (83.3%) who were anemic. Based on statistical tests using the *chi square* test, the *p value* = 0.003 was obtained, which means that there is a relationship between early marriage and the incidence of anemia in pregnant women at the Padang Guci Hilir Health Center, Kaur Regency, with an OR (*Odd Ratio*) value = 25.0, which means that respondents with early marriage have a 25 times chance of anemia.

Table 3. Relationship between Education and the Incidence of Anemia in Pregnant Women at the Padang Guci Hilir Health Center, Kaur Regency

Education	**Incidence of Anemia**				**Total**		***OR* (95%CI)**	**P *value***
	Not Anemia		Anemia					
	F	%	F	%	F	%		
Low	24	92,3	2	7,7	26	100	15.4	0,001
High	7	43,8	9	56,2	16	100		
Total	31	73,8	11	26,2	42	100		

The results of statistical tests on early marriage variables with the incidence of anemia obtained the results of respondents with low education 24 respondents (92.3%) who did not experience anemia and there were 2 respondents (7.7%) who were anemic. Of the 16 respondents with higher education, 7 respondents (43.8%) did not experience anemia and there were 9 respondents (56.2%) who were anemic.

Based on statistical tests using the *chi square* test, the *p value* = 0.003 was obtained, which means that there is a relationship between education and the incidence of anemia in pregnant women at the Padang Guci Hilir Health Center, Kaur Regency, with an OR (*Odd Ratio*) value = 15.4, which means that respondents with low education have a 15.4 times chance of anemia.

Table 4. Relationship Between Knowledge and the Incidence of Anemia in Pregnant Women at the Padang Guci Hilir Health Center, Bengkulu city.

Pengetahuan	**Kejadia Anemia**				**Total**		*OR* (95%CI)	p
	Tidak Anemia		Anemia					
	F	%	F	%	F	%		
Baik	30	90,9	3	9,1	33	100	8,1	0,000
Kurang	1	11,1	8	88,9	9	100		
Total	31	73,8	11	26,2	42	100		

It can be seen that the results of statistical tests on early marriage variables with the incidence of anemia showed that 30 respondents with good knowledge (90.9%) did not experience anemia and there were 3 respondents (9.1%) who were anemic. Of the 9 respondents with poor knowledge, there was 1 respondent (11.1%) who did not experience anemia and there were 9 respondents (88.9%) who were anemic and p value 0.000 means there is a relationship between knowledge and anemia, mothers with poor knowledge are 8 times at risk of anemia (OR = 8.1).

Conclusion

In this study, the sample selection was based on specific criteria to ensure the relevance and reliability of the findings. The inclusion criteria required participants to be pregnant women who were willing to participate as respondents. On the other hand, the exclusion criteria eliminated pregnant women who were not domiciled in the working area of the Padang Guci Hilir Health Center, Kaur Regency, or those who were unwilling to participate as respondents. These criteria were established to ensure that the study focused on the intended population and maintained the integrity of the research data.

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