

## Article

# The correlation between family role and anemia prevention in pregnancy

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## Abstract

**Introduction:** It is important to reduce the high incidence of anemia in pregnancy globally. Pregnant women need the support of their families to face any difficulties in order to prevent anemia.

**Design and Methods:** This study aims to determine the correlation between family role and anemia prevention in pregnancy. This cross-sectional study was conducted in August 2021 among 60 pregnant women who went for check-ups at two primary healthcare centers in Surabaya, Indonesia, and received iron supplements. Additionally, it was discovered that family role and anemia prevention in pregnancy were evaluated using questionnaires.

**Result:** The Spearman test was used as a test for significance and the results showed that there was a correlation between family role and anemia prevention in pregnancy ( $r = 0.318$ ;  $P = 0.013$ ). Also, it was found that informational, emotional, and affirmational support, as well as having a role model were significantly correlated with anemia prevention at ( $r = 0.311$ ;  $p = 0.015$ ), ( $r = 0.265$ ;  $p = 0.041$ ), ( $r = 0.400$ ;  $p = 0.002$ ), and ( $r = 0.353$ ;  $p = 0.006$ ), respectively.

**Conclusions:** There was a relationship between family role and anemia prevention in pregnancy, as well as adequate nutrition, adherence to iron supplements, and prevention of worms. Therefore, there is the need for health promotion to the families of pregnant women in order to increase the understanding of anemia prevention in pregnancy.

## Introduction

Anemia is a major problem for pregnant women all over the world, which is mostly characterised by iron deficiency. Furthermore, it is mostly associated with iron deficiency, which occurs when there is an insufficient balance of iron intake, storage, and loss from the body to support normal erythrocyte production.<sup>1</sup> One of the leading causes of maternal morbidity and mortality is anemia during pregnancy.<sup>2</sup> During pregnancy, mothers are considered anemic when their hemoglobin (Hb) level is less than 11 g/dL.<sup>3</sup> There is a high prevalence of anemia in a number of countries, specifically in pregnant women, which ranged between 20% to 50% based on previous report from WHO in 2017. Meanwhile, the prevalence of anemia in Indonesian pregnant women was 41.98%, where more than half of the mothers were anemic.<sup>4</sup> There

was a slightly lower mean birth weight in babies born to anemic mothers compared to those born to nonanemic mothers.<sup>5</sup>

Subsequently, there is a relationship between anemia during pregnancy and poor maternal and child health, as well as an increased risk of maternal and perinatal mortality. The negative effects of anemia in mothers include fatigue, reduced work capacity, impaired immune function, an increased risk of heart disease, and death. Several studies showed that anemia in pregnancy accounts for 23% of all indirect causes of maternal death in developing countries.<sup>6</sup> According to the previous study conducted in Karnataka, India by Rajashree in 2015, there are multiple factors that contribute to the Low Birth Weight (LBW) in babies, such as blood hemoglobin (Hb) levels.<sup>7</sup> Furthermore, a 2016 study in India found that anemia in pregnant women was associated with low birth weight and perinatal mortality.<sup>8</sup>

Anemia can be influenced by several factors, which may be both internal and external to the mother. Several studies found that family factors have a significant impact on the prevention of anemia in pregnant women.<sup>9,10</sup> However, prospective fathers play an important role in ensuring maternal health and a safe delivery. The involvement of husbands in health education should be recognized and addressed due to its potential benefits to maternal and child health. This has significant implications for health policy and practice since health systems and maternal health interventions must be modified to ensure appropriate and effective inclusion of prospective fathers.<sup>10</sup> The social support of the husband is the most important factor that affects the occurrence of anxiety in pregnant women from the time of conception until delivery. Pregnant women require good service, transportation, funds or consulting fees, and accompaniment during consultations with doctors or midwives. Husbands should also be aware of pregnancy complications and must pay attention to the needs of their pregnant wife.<sup>11</sup> There is no study concerning the relationship between family role and methods of anemia prevention, such as nutritional adequacy, adherence to iron supplements, and intestinal worm prevention. Therefore, this study aims to determine the relationship between family role and anemia prevention during pregnancy.

## Design and Methods

The study was conducted using a descriptive cross-sectional approach in August 2021. The respondents were pregnant women

### Significance for public health

*The role of the family is an important factor that can increase the willingness of pregnant women to prevent anemia. This can be developed through health education delivered to families and pregnant women. This study aims to explain the relationship between the role of the family and the prevention of anemia in pregnancy.*

who attended antenatal care at two primary healthcare centres (Puskesmas) in Surabaya, East Java, Indonesia. The sample population included 60 women based on the inclusion criteria, which included those who received iron supplementation from primary healthcare centres. Meanwhile, the exclusion criteria included pregnant women with complications or severe concomitant diseases that required specific medical treatment. The data was collected using a questionnaire on sociodemographic characteristics, family roles, and anemia prevention. The questions on sociodemographic characteristics were based on age, gestation age, parity, education, and income. However, the family role was focused on four areas, which included informational support, emotional support, affirmational support, and possession of a role model. There were eight questions on the questionnaire and each item was converted into a Likert scale with the following options: always, frequently, occasionally, rarely, and never. The total scores for this section ranged from 0 to 32, with higher scores indicating higher levels of family role. The validity of the questionnaire in this study had a Cronbach's  $\alpha$  of 0.951. The questionnaire on anemia prevention was divided into three sections, which included nutritional adequacy and adherence to iron supplementation with five questions each, as well as intestinal worm prevention with six questions. Also, each item was converted into a Likert scale with the following options: always, frequently, occasionally, rarely, and never. The correlations between family roles and anemia prevention were determined using Spearman's rho values. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to describe sociodemographic characteristics, family roles, and anemia prevention. In all statistical analyses using SPSS, a p-value < 0.05 was considered significant.

## Results and Discussions

Table 1 showed that most women in the population ( $n = 43$ , 71.7%) were aged between 26-35 years. Also, most respondents ( $n = 27$ , 45%) were between their second and third trimester, while others ( $n = 2$ , 33.3%) were multigravida. The majority of the

women ( $n = 42$ , 70%) have completed secondary education, while others ( $n = 50$ , 83.3%) were from families with incomes below Rp 4,300,000, as shown in Table 1. The results in Table 2 showed that the highest score among the eight items in the questionnaire was 'My husband promotes me to always eat nutritious food' at a significance of  $3.82 \pm 0.43$ , while the lowest score was observed in 'My husband compliments me if I take iron supplements regularly' at a significance of  $2.98 \pm 1.16$ . There was a significant correlation between anemia prevention in pregnancy and Informational support, emotional support, affirmational support, and role model at significance values of ( $r = 0.311$ ;  $p = 0.015$ ), ( $r = 0.265$ ;  $p = 0.041$ ), ( $r = 0.400$ ;  $p = 0.002$ ), and ( $r = 0.353$ ;  $p = 0.006$ ), respectively, as shown in Table 3. As shown in Table 4, of the five nutritional adequacy questions, 'eat meat, chicken liver, or eggs every day', received the lowest score ( $2.85 \pm 0.99$ ). Of the five items on iron supplementation adherence, 'I take iron supplements before going to bed', received the lowest score ( $2.43 \pm 1.49$ ), and of the six items on worm prevention, 'When I leave the house, I wear footwear.'

**Table 1. Sociodemographic characteristics in participants (n=60).**

Indicator	Category	n (%)
Age	< 25 years	9 (15.0)
	26-35years	43 (71.7)
	>35 years	8 (13.3)
Gestation age	First Trimester (1-13 weeks)	6 (10)
	Second Trimester (14-27 weeks)	27 (45)
	Third Trimester (28-40 weeks)	27 (45)
Parity	1	15 (25)
	2	20 (33.3)
	3	18 (30.0)
	4	7 (11.7)
Education	Elementary	7 (11.7)
	Secondary	42 (70)
	University	11 (18.3)
Income	< Rp 4,300,000	50 (83.3)
	> Rp 4,300,000	10 (16.7)

**Table 2. Item analysis of family role.**

Parameter	Questions	Mean (SD)	Percentage of women choosing strongly agree
Informational support	My husband reminds me to take iron supplements regularly	3.27 (1.01)	32 (53.3)
	My husband reminds me to eat nutritious food	3.77 (0.43)	46 (76.7)
Emotional support	My husband takes the time to listen to my health complaints	3.67 (0.60)	44 (73.3)
	My husband encourages me to always eat nutritious food	3.82 (0.43)	50 (83.3)
Affirmational Support	My husband compliments me if I want to eat nutritious food regularly	3.12 (0.99)	28 (46.7)
	My husband compliments me if I take iron supplements regularly	2.98 (1.16)	26 (43.3)
Role model	My husband gives an example of healthy living by eating nutritious food	3.53 (0.75)	40 (66.7)
	My husband gives an example of healthy living by always maintaining personal and environmental hygiene	3.65 (0.61)	43 (71.7)

\*Range 1-4; SD: standard deviation.

**Table 3. Correlation matrix among the parameters of family role and the prevention of anemia during pregnancy.**

Variable	Mean	SD	Min-max	r	p
Informational support	7.03	1.15	4-8	0.311	0.015
Emotional support	7.48	0.81	5-8	0.265	0.041
Affirmational support	6.10	2.06	1-8	0.400	0.002
Role model	7.18	1.21	4-8	0.353	0.006
Anemia prevention	66.78	15.49	44-92	-	-

received the lowest score ( $3.25 \pm 1.37$ ). (Table 4). The mean score for the role of family was 27.80, and the mean score for anemia prevention was 66.78. The role of the family ( $r = 0.318$ ;  $P = 0.013$ ) was found to be significantly related to the prevention of anemia during pregnancy, as shown in Table 5.

The role of the family has a strong influence on the behaviour of pregnant women in preventing anemia. The promotion of health practices by health workers should be directed toward families in order to increase their role in providing support for pregnant women. This study found that the role of family in the prevention of anemia during pregnancy is significantly related to informational support, emotional support, affirmational support, and tangible support. The highest score based on family role was observed when husband promoted their pregnant wives to always eat nutritious food. This demonstrated that the family was aware of the importance of eating nutritious foods while pregnant. Adequate maternal nutrition is important for the progression of a normal pregnancy, optimal foetal development, and normal foetal birth weight. Therefore, a proper diet should be consumed during pregnancy in order to provide the mother and child with the necessary amount of energy as well as all of the essential nutrients such as protein, fat, carbohydrates, vitamins, and minerals.<sup>12</sup> Enough energy is required for optimal growth during pregnancy. Protein is also crucial because it serves as the structural foundation for all new cells and tissues in the mother and foetus. Meanwhile, vitamins and minerals participate in biochemical reactions that result in the formation of amino acids, which are then used to create new proteins and maintain the structural and functional properties of cells.<sup>13</sup> Iron supplementation is widely used to prevent iron deficiency and anemia in at-risk populations (e.g., pregnant women and young children), as well as to improve the haemoglobin status of people who already have anemia. For oral supplementation, four different iron preparations are commonly used: ferrous sulphate, ferrous gluconate, and ferrous fumarate. Iron supplementation may benefit populations at high risk of anemia, for example, supplementation during pregnancy may reduce the risk of maternal anemia and iron deficiency, however, the benefits to the baby, such as a lower risk of being born prematurely or with low birth weight, are less clear.<sup>14</sup> The CDC recommends that all pregnant women start taking 30 mg of iron per day at their first prenatal visit, while the World Health Organization recommends 60 mg of iron supplements per day for all pregnant women.<sup>15</sup>

The lowest score based on family role was observed when the husband complimented the pregnant mother concerning the regular intake of iron supplements, which could be due to his lack of understanding on the importance of taking iron supplements. Several studies demonstrated the importance of iron supplements in pregnant women with anemia, which is caused by a dramatically increased need for iron in pregnancy to cover the additional needs of the mother (expansion of erythrocyte volume) and the foetus

(skeleton formation, CNS, and foetal erythrocyte mass). In cases of mild IDA and iron deficiency without anemia, oral iron administration is the recommended first line of treatment in pregnancy.<sup>16</sup>

However, it was difficult for pregnant women to find the right balance when it comes to iron intake since too little or too much iron can be harmful. High doses of iron supplements can cause adverse effects in the gastrointestinal tract (stomach and intestine), such as constipation, nausea, vomiting, and diarrhea, even though the body can store extra iron. Additionally, they can cause stomach lining damage when high doses of iron are taken on an empty stomach. It is widely assumed that oral iron supplements cause unpleasant GI side effects, which are somewhat similar to the physiological changes in pregnancy. However, some pregnant women attribute these complications to iron compounds and discontinue its use.<sup>17</sup> Many pregnant women do not take their iron supplements on a regular basis due to the side effects and difficulties that they women experience. Subsequently, this has led to a high incidence of anemia in pregnant women around the world. Furthermore, emotional support from husbands is essential for pregnant women in order to promote them to take iron supplements on a regular basis. The side effects that are feared by pregnant women include nausea and vomiting. They think it will be difficult for them. In addition to the discomfort caused by nausea, vomiting will also cause the food they have eaten to be wasted, so that the baby's nutrition will be reduced.

The husband's role in preventing anemia includes providing information, emotional support, affirmational support, and serving as a role model. The prevention of anaemia in pregnancy through informational support involves the provision of the needed information to pregnant women in order to avoid the condition, such as eating an iron-rich diet, taking iron supplements on a regular basis, and avoiding intestinal worms.

The addition of an iron-containing substance to a food product's recipe, either as an isolated compound (for example, iron salts or chelates) or as an iron-rich ingredient, is referred to as fortification (for example, meat or its derivatives). Because the dosage used in iron fortification is lower than in supplementation, the body's iron level rises much more slowly, however, fortification may be a safer intervention.<sup>17</sup> Ferritin is a protein that can absorb large amounts of iron and can be used by plants and animals as a natural reservoir for iron. Phytoferritin is found in protein-rich foods such as legumes (beans, lentils, etc.).<sup>18</sup> Iron is found in two forms in foods: heme and non-heme. Heme iron is primarily obtained from the consumption of meat, poultry, and fish, while non-heme is obtained from cereals, beans, nuts, fruits, and vegetables.<sup>19</sup> Preventing worm infection is also important in preventing anemia in pregnant women. According to study, there is a link between worm infections and anemia. Most hookworm loads result in extracorporeal iron loss, and interventions to treat hookworm infections have resulted in significant haemoglobin improvements.

**Table 4. Lowest score in item analysis of anemia prevention.**

Parameters	Items	Mean (SD)
Nutritional adequacy	Eat meat or chicken liver or eggs every day	2.85 (0.99)
Adherence to iron supplementation	I always take iron supplements at night before going to bed	2.43 (1.49)
Prevention of worms	Always use footwear when going out of the house	3.25 (1.37)

**Table 5. Correlation matrix among the role of family and anemia prevention variable.**

	Mean	SD	Min-max	r	p
Family roles	27.8	3.98	18-32	0.318	0.013
Anemia prevention	66.78	15.49	44-92		

Iron deficiency anemia is a common cause of long-term morbidity due to chronic intestinal blood loss caused by hookworm infection. Blood loss is caused primarily by the parasite's release of coagulase, which causes persistent blood loss in the stool, rather than the parasite's actual ingestion of blood.<sup>20,21</sup> One of the factors that contribute to intestinal worm infection in pregnant women is their lack of knowledge about the cleanliness of the food they consume. For example, how to clean, wash, and cook food. The greater pregnant women's awareness of the importance of hygiene, the lower their risk of contracting intestinal worms.<sup>22</sup>

Pregnant women who want to avoid anemia need their husbands' help. Emotional support, affirmational support, and role model support are all forms of assistance that can be provided. In terms of emotional support from the husband, this can be provided by listening to the mother's health complaints during pregnancy. Pallor, shortness of breath, palpitations, hair loss, headache, vertigo, leg cramps, cold intolerance, dizziness, and irritability are all symptoms of iron deficiency anemia in pregnant women. IDA can also cause postpartum hypothermia, fatigue, poor concentration, decreased work capacity, decreased maternal milk production, and depletion of maternal iron stores.<sup>23</sup> As a result, emotional support from the husband can be beneficial because he can recognize the warning signs if his pregnant wife exhibits any of the above-mentioned symptoms.

Affirmational support can be provided by the husband by expressing gratitude when their pregnant wife consumes nutritious foods, takes iron supplements, and maintains personal hygiene. Appreciation is important because it boosts the mother's confidence in her ability to accomplish difficult tasks. Good self-efficacy increases the mother's ability to practice good self-care during pregnancy, as a result, the mother's pregnancy process can proceed smoothly until delivery.<sup>24</sup> The husband can serve as a role model by demonstrating good behaviour such as eating habits and personal hygiene. Pregnant women will mimic the positive behaviour of their husbands. In addition, the husband can consume nutritious food on a daily basis and maintain good personal and environmental hygiene. This will be able to motivate the mother to imitate her husband's good habits. The best way to avoid pregnancy anemia is to eat well, take iron supplements, and avoid worms by practicing good personal and environmental hygiene. The results on nutritional adequacy showed that the habit of eating meat, chicken liver, or eggs every day produced the lowest mean score. This can be influenced by a lack of knowledge about iron-rich foods, as well as a low income. According to the data, most of the respondents had an income less than Rp 4,300,000 and completed secondary school. Pregnant women who take iron supplements at night before going to bed had the lowest mean score on the iron supplement adherence questionnaire, which could be due to a lack of knowledge about how to drink properly. The purpose of drinking at night was to reduce the side effects. According to previous studies, the most common side effects of iron supplements are problems with the gastrointestinal tract (stomach and intestines), such as constipation, nausea, vomiting, and diarrhea. The lowest score on the questionnaire about preventing intestinal worms was on 'If I go out of the house, I use footwear.' This can be caused by pregnant women who are still accustomed to their pre-gestation behaviours. Personal hygiene had a close relationship with intestinal infections caused by worms, and was also important in preventing the transmission of worms that could cause anemia in pregnant women.<sup>22</sup> Evidence suggests that the severity of hookworm infection is related to lower hemoglobin levels in pregnant women. Chronic intestinal blood loss caused by hookworm infection results in iron deficiency anemia. Intestinal parasitic infection in pregnant women is common and has a negative impact on hematological profiles.

Some hematological profiles of pregnant women infected with intestinal parasites deteriorated, leading to anemia. Therefore, it is important to deworm before pregnancy, as well as to maintain good personal and environmental hygiene in order to reduce maternal anemia during pregnancy.<sup>25</sup>

## Conclusions

Anemia prevention in pregnancy was associated with informational support, emotional support, affirmational support, and the presence of a role model. Also, there is the need for the development of health education in order to raise awareness of the role of families in anemia prevention in pregnant women. Families must continue to educate themselves about anemia in pregnancy to provide the necessary support for pregnant women. Pregnant women can prevent anemia through diet, adherence to iron supplements, and maintaining good personal hygiene.

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