Simulation of Orange Fruit Use and Small Group Discussions in a Village with Extreme Poverty to Mitigate Anemia in Pregnant Women: A Community Program Report in Indonesia

Astri Nurdiana[1*], Eni Kurniati[2], Hansrizka Raisna[3], Ketie Salmah Ginarti[4], Riska Setiawati[5], Wina Ramanda Sari[6], Yulfitriani Solehati[7], Rukmaini[8]

[1,2,3,4,5,6,7,8]Universitas Nasional

ABSTRACT:

Introduction: Haemorrhage remains one of the leading causes of maternal mortality in Indonesia. One significant factor contributing to bleeding is the prevalence of anemia among pregnant women. Early detection of anemia is crucial in preventing this condition, but the limited knowledge among pregnant women can impede successful treatment of anemia in Indonesia.

Objective: The purpose of this community service project is to enhance pregnant women's understanding of anemia during pregnancy and enhance their mindset so that they recognize the significance of avoiding and treating anemia during pregnancy.

Research Method: The study involved conducting a simulation that utilized citrus fruit and organizing small group discussions about anemia. The participants were 30 pregnant women residing in impoverished areas in the Karawang district.

Results: The minimal knowledge score showed a significant rise between before and after the activity, rising from a minimum score of 7 to a minimum score of 13. Similarly, the maximum knowledge score climbed from 80 to 100. The majority of respondents expressed a strong consensus that anemia poses a significant risk to pregnancy. Consequently, respondents also strongly concurred on the need for concerted measures to address this issue. To prevent anemia, it is important to take iron supplement tablets and maintain a diet that is rich in nutritious food.

Conclusion: Engaging in positive activities outside of pregnancy check-ups with healthcare professionals can serve as a platform for receiving support and fostering mutual sharing among pregnant women. This has the potential to enhance the knowledge and attitudes of pregnant women towards preventing anemia throughout pregnancy.

KEYWORDS: pregnancy-related anemia, pregnancy, iron supplements, community health, orange fruit

1. BACKGROUND

The health system in Indonesia continues to face difficulties in enhancing maternal welfare and health, as evidenced by the persistently high maternal death rate in the country (Sari et al., 2022) (Figure 1).

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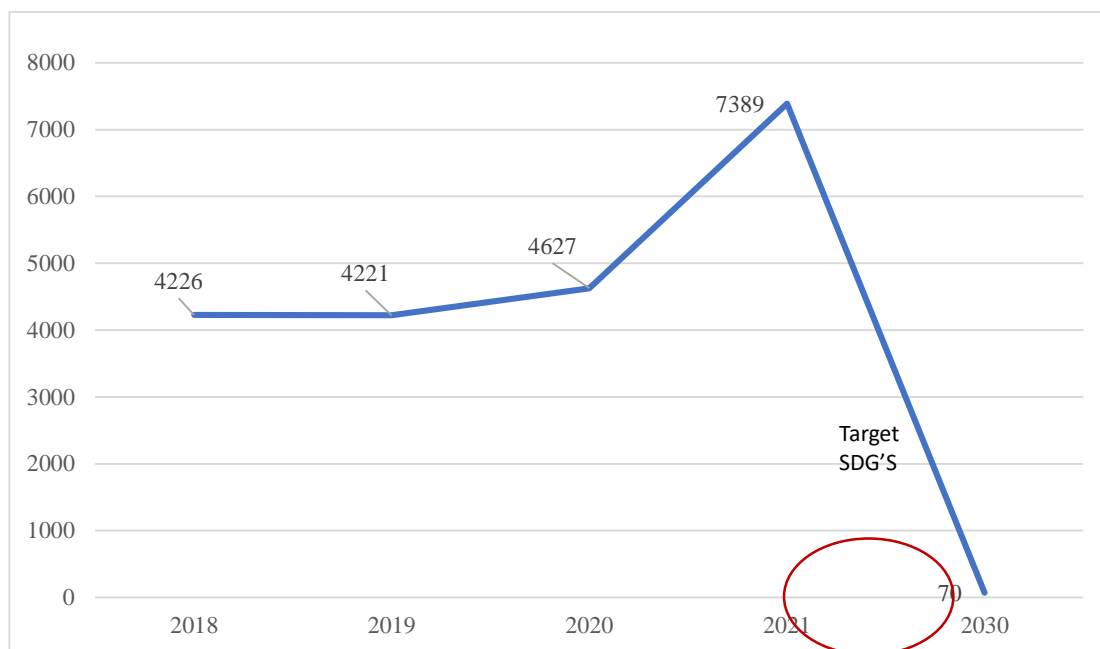
Gambar 1. Indonesia Maternal Mortality Number
Source : (Bapennas, 2017; Kemenkes RI, 2022; Sari et al., 2022)

The labor and postpartum phase accounts for around 76% of maternal deaths, with 24% happening during pregnancy, 36% during childbirth, and 40% thereafter. Hospitals account for about 62% of maternal and newborn mortality cases. The availability of referral health service facilities for the community is highly satisfactory (Kemenkes RI, 2022).

The International Conference on Population and Development, the Millennium Development Goals, and the Sustainable Development Goals (SDGs) all emphasize the need of prioritizing the enhancement of maternal health and well-being (Sari et al., 2022). The endeavor to enhance maternal health by averting maternal mortality is a matter of apprehension at both the domestic and international scale, as maternal health is pivotal to the future welfare of the child (Sari et al., 2022) nevertheless, while examining the explanation of the factors contributing to maternal fatalities in 2021, it becomes apparent that a significant number of these deaths are still attributed to infectious and non-communicable ailments encountered by expectant moms (Gambar 1).

Gambar 2. Causes of maternal mortality in Indonesia in 2021
Source: (Bapennas, 2017; Kemenkes RI, 2022; Sari et al., 2022)

To prevent maternal mortality during birth and postpartum, it is crucial to enhance maternal services throughout pregnancy (Sari et al., 2022), One of the leading causes of maternal death in Indonesia is bleeding, which remains in the top three causes. Anemia in pregnant women is a significant factor contributing to bleeding. Early detection of anemia through pregnancy checks is crucial in

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preventing this condition. However, previous research has identified multiple determinants that hinder the optimal implementation of pregnancy care In their study, Sebayang, Efendi and Astutik (2019) investigated the relationship between women's empowerment and the utilization of pregnancy care facilities in Southeast Asia. The findings revealed a substantial association between women's empowerment and the frequency of antenatal visits. Denny et al. (2022) asserted that many factors, such as age, marital status, education level, parity, and economic situation, might significantly impact the frequency of pregnancy visits. In their study, Nurdiana and Nurlailasari (2020) Nurdiana and Nurlailasari (2020) investigated the quality of pregnancy care delivered by midwives in Karawang Regency. Their findings revealed a necessity to enhance the quality of care due to the inadequate adherence of midwives in measuring the mother's height and weight, administering blood supplement tablets, and monitoring the duration of care. A counselling session often lasts for under 10 minutes.

In their study conducted in Indonesia, Andriani et al. (2022) reported that the sustainability of maternal and child health care is frequently compromised due to factors such as socio-economic status, parity, and maternal access to health service facilities. According to Wulandari, Laksono and Rohmah (2021), the location of mothers' residence in Indonesia, whether in rural or urban areas, is a significant factor influencing the frequency of prenatal visits. According to Downe et al. (2019), the decision to seek prenatal care is influenced by individuals' evaluation and beliefs regarding pregnancy as either a healthy or risky state, as well as their emotional responses to pregnancy and the societal norms surrounding pregnancy care. Given this context, it is necessary to implement supplementary initiatives aimed at disseminating knowledge on preventing anemia during pregnancy. This endeavour has the potential to mitigate maternal and new-born mortality rates in Indonesia.

2. RESEARCH QUESTIONS

The activity took place in Segaran Village, located in Batujaya District, Karawang Regency, West Java Province. Segaran Village falls within the jurisdiction of the Batu Jaya health center. In December 2023, there were a total of 168 pregnant women in the village, with 24% of them experiencing complications. Segaran Village is classified as an extremely impoverished village, with the average income of its residents falling below the minimum wage set by the district (BPS, 2022; Karawang Central Statistics Agency, 2020)

According to the data obtained from the Batu Jaya Community Health Center in December 2023, a total of 235 pregnant women encountered problems and were subsequently referred to a hospital. Additionally, there were 71 cases of anemia reported among pregnant women in their first trimester, and 81 cases in the third trimester.

Consequently, the questions were formulated in the following manner:

a. What is the level of awareness among pregnant women in Segaran Village regarding anemia in pregnancy, both before and after participating in educational activities?

b. What is the pregnant women's disposition in Segaran Village prior to and following educational interventions regarding anemia during pregnancy?

3. LITERATURE REVIEW

Pregnancy is the biological phenomenon in which the union of egg cells and sperm cells occurs. Each month, approximately 5-15 egg cells undergo maturation and develop several follicles. However, out of this pool of 5-15 eggs, on average only 1 egg reaches the stage of readiness for fertilization. (Stone & Eddleman, 2015). Various factors in both sperm and egg cells might contribute to a slower conception process. For instance, men who engage in smoking, alcohol consumption, certain drugs, obesity, exposure to heat, and specific chemicals may see a drop in both the quality and quantity of their sperm. Concurrently, the quality of eggs in women will diminish beyond the age of 35 years, while the consumption of tobacco and alcohol might inflict harm upon eggs (Stone & Eddleman, 2015).

During pregnancy, women may experience a range of symptoms including morning sickness, fatigue, stress incontinence, headaches, hemorrhoids, ligament pain, excessive saliva, nosebleeds, flatulence, heartburn, difficulty breathing, insomnia, back pain, constipation, varicose veins, and leg cramps. These grievances can be surmounted by medical intervention, as well as the administration of pharmaceuticals and herbal remedies (Stone & Eddleman, 2015).

Pregnancy in women over the age of 35 carries a higher risk due to the likelihood of developing gestational diabetes, hypertension, and pre-eclampsia, as indicated by research findings. Consequently, expectant moms in this age group should undergo more frequent medical checkups (Stone & Eddleman, 2015).

In addition, pregnant women with a history of asthma, previous adverse health events including miscarriages, and previous pregnancies with difficulties such as early labor, need to be closely monitored according to their present pregnancy state (Stone & Eddleman, 2015).

In addition to the impact of the mother's age, pregnancy can also pose risks if a male fertilizes after the age of 40, as this can lead to chromosomal abnormalities in the infant. This is subsequently associated with the presence of autism, schizophrenia, and Down syndrome issues (Stone & Eddleman, 2015).

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## 3.1.	Pregnancy Related Anemia

Anemia is a medical illness characterized by a decrease in the concentration of hemoglobin (Hb) and/or a low number of red blood cells in the body, resulting in insufficient oxygen supply to the tissues necessary for normal bodily processes Anemia is categorized into three types: Microcytic Anemia, Normocytic Anemia, and Macrocytic Anemia. Microcytic anemia refers to anemia characterized by Mean Corpuscular Volume (MCV) levels below 80 fL. This type of anemia is typically caused by a lack of iron. Normocytic anemia, on the other hand, is anemia that is caused by a chronic condition. Macrocytic anemia can be further classified into two types: megaloblastic anemia and non-megaloblastic anemia. Megaloblastic anemia is identified by the excessive division of neutrophils and the presence of abnormally large oval-shaped red blood cells in the outer layer of the bloodstream. This condition arises due to abnormalities in the production of RNA and DNA. Non-megaloblastic anemia does not exhibit these morphological defects. Folate and Vitamin B12 deficiency are the primary causes of microcytic anemia (Newhall et al., 2020).

Anemia during pregnancy is characterized by a deficiency of erythrocytes in the maternal body. This deficiency can be attributed to various factors, including inadequate dietary intake of iron leading to iron deficiency in pregnant women, prolonged infections, insufficiency of vitamins A, B12, and folic acid, or underlying health conditions affecting blood and kidney function resulting in blood loss. Anemia during pregnancy can be considered normal as it is a purposeful mechanism that tries to enhance blood flow to the placenta by decreasing the thickness of the mother's blood and to improve the delivery of oxygen and nutrients to the fetus by increasing the number of red blood cells (Wiesenack et al., 2023).

The hemoglobin levels in an individual are subject to variation based on factors such as age, gender, environmental conditions, genetic makeup, racial background, and pregnancy status. Pregnancy hemoglobin levels are categorized into three classifications: non-anemic for values greater than 11 mg/dl, mild anemia for levels between 10 and 10.9 mg/dl, moderate anemia for levels between 7 and 9.9 mg/dl, and severe anemia for levels below 7 mg/dl (Chaparro & Suchdev, 2019; Stanley et al., 2022). Moreover, the classification of anemia diagnosis varies according to each trimester. In the first and third trimesters, anemia is defined as having a hemoglobin (Hb) level below 11g/dl. In the second trimester, anemia is defined as having a Hb level below 10.5g/dl (Newhall et al., 2020; Stanley et al., 2022). In addition to nutritional, environmental, and lifestyle factors, hemoglobin (HB) levels tend to fall throughout the first and second trimesters of pregnancy. This decline is primarily caused by the expansion of blood volume and red blood cell mass in pregnant women's bodies, resulting in a dilution effect (Wiesenack et al., 2023). The dilution effect refers to the heightened plasma volume in the mother's body during pregnancy. This increase in plasma volume outpaces the rise in red blood cell levels in pregnant women, leading to physiological anemia (Stanley et al., 2022). Starting with the sixth week of pregnancy, the volume of plasma in the blood increases more than the number of red blood cells, reaching its highest point around the 24th week of pregnancy. Currently, pregnant women have a plasma volume increase of around 40-50% compared to the first stages of pregnancy. However, the erythrocyte mass only increases by 15-25%, resulting in a fall in Hb values due to the dilution effect (Wiesenack et al., 2023). Hemoglobin levels during pregnancy will progressively rise in the third trimester(Chaparro & Suchdev, 2019; Newhall et al., 2020; Stanley et al., 2022). During pregnancy, there is a 40-50% increase in blood volume compared to the overall blood volume in the body, along with a 15-20% rise in the number of red blood cells (Stanley et al., 2022).

The management of cases with iron deficiency anemia can be divided into two steps: first, a thorough identification of the underlying cause of iron deficiency, and second, the administration of iron supplements either orally or intravenously (Figure 2). The suggested oral supplementation dosage is 100-200 mg daily, aiming for a 2g/L increase in hemoglobin levels within one month. It is advisable to re-evaluate hemoglobin levels 2-4 weeks after starting iron supplementation. If the hemoglobin level is within the normal range, iron supplementation is maintained for a maximum duration of 3 months (Kumar et al., 2022; Newhall et al., 2020), However, intravenous iron delivery is seen more effective than oral treatment. It is advised to administer it after the first trimester(Wiesenack et al., 2023).

### 3.1.1.	Advantages of Oranges in Enhancing Iron Absorption

Health workers must give thorough information regarding the nutritional requirements of pregnant women based on their gestational age, as nutritional aspects play a crucial role during pregnancy. Pregnant women have a total calorie requirement of 2150, which increases by 200 calories during the 3rd trimester, resulting in a total of 2350 calories. (Stone & Eddleman, 2015).

The fundamental dietary requirements during pregnancy include five food and beverage groups: complex carbohydrates, dairy products, meat, fish, and animal protein, vegetables and fruits, and oil, fat, and sugar (Stone & Eddleman, 2015).

The prevention of anemia in pregnancy is closely linked to the administration of blood supplement pills for pregnant women. Therefore, it is crucial to enhance the absorption of iron into the body. One important factor to consider in this regard is the nutritional intake of pregnant women (Von Siebenthal et al., 2023). An established method to enhance iron absorption in the body is by taking iron alongside foods rich in ascorbic acid (AA), such as citrus fruits (Von Siebenthal et al., 2023). Ascorbic acid (AA) found in citrus fruits enhances the absorption of iron by preventing the conversion of ferrous iron to ferric iron in the stomach. However, it is not recommended to eat iron along with coffee due to the inhibitory effect of coffee's polyphenols on iron absorption in the body (Von Siebenthal et al., 2023).

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4. METHOD

The community service initiative involved the implementation of simulations and focus group talks to address the prevention of anemia in pregnant women by promoting the consumption of citrus fruits. The intended participants consisted of pregnant women residing in Segaran Village, Batujaya District, Karawang Regency, located in the West Java Province. Maternal knowledge was assessed through the completion of questionnaires both before and after counseling. These questionnaires focused on understanding of anemia and hypertension, as well as maternal attitudes towards these conditions during pregnancy. Figure 3 provides a comprehensive summary of the procedures involved in community service activities.
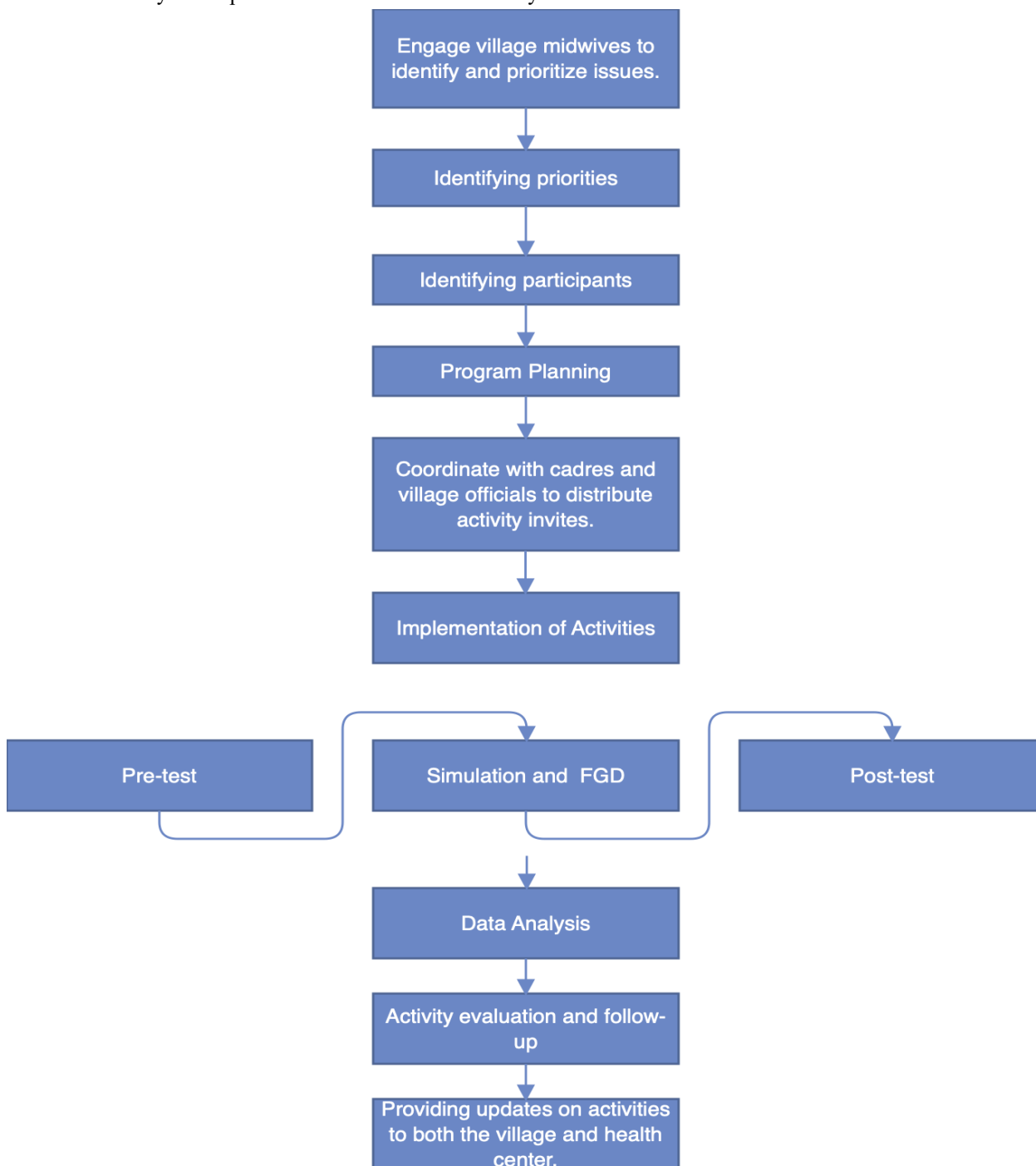

Figure 3. Community Service Flow

4.1. INSTRUMENT

A questionnaire about pregnancy related anemia prevention was used to obtain pre- and post-test knowledge data. Apart from information, mothers' attitudes toward anemia during pregnancy were examined.

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5.   ACTIVITY TIMING AND LOCATION
On December 19, 2023, from 08.00-12.00, the Segaran Village office in Karawang Regency, West Java Province hosted this community service activity.

6.   RESULT AND DISCUSIION
6.1.   Result
6.1.1.   Respondence Characteristics
Table 1. Characteristics of Participants

Characteristics	n	%
Age		
<20-year-old	1	3.3
20–35-year-old	24	80
>35-year-old	5	16.7
Education		
Elementary School	7	23.3
Junior High School	9	30
Senior High School	14	36.7
Parity		
0-2	28	93,3
>2	2	6.7
Gestational Age		
1st Trimester	3	10
2nd Trimester	16	53.3
3rd Trimester	11	36.7
Total	30	100

6.1.2.   Participants' Knowledge
Table 2. Frequency Distribution of Participants' Knowledge

Participants	Before	After	Trend
1.	40	13	Decrease
2.	7	27	Increase
3.	60	73	Increase
4.	60	80	Increase
5.	27	53	Increase
6.	73	87	Increase
7.	67	73	Increase
8.	80	100	Increase
9.	60	73	Increase
10.	33	53	Increase
11.	67	87	Increase
12.	40	53	Increase
13.	47	73	Increase
14.	60	80	Increase
15.	47	73	Increase
16.	33	33	Increase
17.	40	47	Increase
18.	53	80	Increase
19.	33	80	Increase
20.	53	87	Increase
21.	60	100	Increase
22.	40	40	Unmoving

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Participants	Before	After	Trend
23.	60	67	Increase
24.	33	53	Increase
25.	60	67	Increase
26.	47	87	Increase
27.	60	67	Increase
28.	53	60	Increase
29.	80	87	Increase
30.	47	73	Increase
Total	1520	2027	
Minimum	7	13	
Maximum	80	100	
Mean	51	68	

6.1.3. Attitude about Anemia

Table 3. Frequency Distribution of Respondents' Answers Based on Attitudes About Anemia Before and After Activity

Statement	Pre/Post	f (%)					Total	Mean %	Interprets
		1	2	3	4	5			
I believe that anemia has the potential to negatively impact my pregnancy.	Pre	3.3	16.7	10	43.3	26.7	100	74.6	Agree
	Post	3.3	6.7	0	70	20	100	79.4	Extremely Agree
I must exert diligent efforts to proactively prevent the occurrence of anemia during my pregnancy.	Pre	3.3	0	0	66.7	30	100	84	Extremely Agree
	Post	0	0	0	66.7	33.3	100	86	Extremely Agree
To mitigate the occurrence of anemia I will consistently consume blood supplement tablets.	Pre	3.3			53.3	4.,3	100	86	Extremely Agree
	Post	0	0	0	66.7	33.3	100	88	Extremely Agree
In addition to taking blood supplement tablets, I will incorporate iron-rich vegetables and fruits into my diet.	Pre	3.3			46.7	50	100	88	Extremely Agree
	Post	0	0	0	50	50	100	90	Extremely Agree

6.2 DISCUSSION

The knowledge quiz has 15 inquiries pertaining to the etiology of anemia, common symptoms of anemia, diagnostic procedures for anemia, the efficacy of blood supplement tablets, their proper consumption, and preventive measures against anemia during pregnancy.

According to Table 2, most participants in the activity shown a gain in knowledge following the instruction on preventing anemia in pregnant women. Only one individual's knowledge remained unchanged, and it actually reduced after the activity.

Furthermore, there was a substantial rise in the minimum knowledge score observed before and after the activity. The lowest score rose from 7 to 13, while the maximum score improved from 80 to 100.

In addition to assessing respondents' knowledge of anemia, this exercise also examined their attitudes towards anemia. This was done by asking four attitude questions using a Likert scale, which included options such as strongly agree, agree, neutral, disagree, and strongly disagree. The inquiries investigated pertained to the respondents' attitudes. It is crucial to prevent anemia during pregnancy since it might pose a risk to the pregnancy. This can be achieved by taking blood supplement tablets and maintaining a

healthy diet. According to Table 3, most participants exhibited a shift in their attitude about anemia following the educational intervention. The majority of respondents expressed a strong consensus regarding the detrimental impact of anemia on pregnancy. Furthermore, they strongly advocated for proactive measures to prevent anemia, such as the consumption of blood supplement pills and maintaining a diet of high nutritional value.

7. CONCLUSSION

Anemia is a significant issue during pregnancy in Indonesia. Engaging pregnant women in socialization activities, such as simulations and small group conversations with comparable groups, has been demonstrated to enhance the understanding and attitudes of pregnant women towards anemia, hence preventing its occurrence. Engaging in activities outside of regular prenatal visits can serve as a means of receiving support and fostering communication among pregnant women. However, the active involvement of healthcare professionals is necessary for the success of these activities.

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