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EVALUATION OF ANEMIA PREVENTION PROGRAMS AND MATERNAL KNOWLEDGE IN KARAWANG

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Abstract

Brief background: Anemia in pregnancy is a significant public health issue in Indonesia, with a prevalence of 27.7% in 2023. In Karawang Regency, anemia contributes to the high maternal mortality rate due to hemorrhage. Research objectives: This study aimed to evaluate the implementation of the anemia prevention program and analyze the relationship between pregnant women's understanding and the incidence of anemia at community health centers in Karawang Regency. Methods used: This study used a mixed-method design conducted from April to July 2025 in two community health centers in Karawang Regency. A qualitative approach was used to evaluate the program's input, process, and output components through in-depth interviews with 8 key informants. Concurrently, a quantitative approach with a cross-sectional design was employed to analyze the level of understanding among 120 pregnant women and its association with their anemia status. Summary of results: The qualitative evaluation revealed that program implementation was constrained by the input component (human resources and dedicated budget availability), but the process (iron-folic acid supplementation, maternal classes, ANC) and output (targeting and timeliness) components met the standards. Quantitatively, 68.3% of pregnant women had a good understanding of anemia prevention. Statistical analysis showed a highly significant relationship between maternal understanding and the incidence of anemia (p-value < 0.001), where women with poor understanding had a 3.6 times higher risk of being anemic (PR 3.641; 95% CI 2.244-5.909). Conclusion: Although the technical implementation of the anemia prevention program is adequate, weaknesses in the input aspect and a non-uniform level of understanding remain major challenges. Maternal understanding is proven to be a crucial factor in anemia prevention. Therefore, this study recommends the development of the "SIHAT" (Integrated Anemia Prevention System for Pregnant Women) innovation to strengthen education and service integration.

Keywords: Program Evaluation, Pregnancy Anemia, Understanding

Introduction

Anemia in pregnant women remains an urgent global health challenge, with significant impacts on both maternal and infant health across countries, including those in Asia and Southeast Asia. The World Health Organization (WHO) estimates that 41.8% of pregnant women worldwide suffer from anemia, with nearly half of these cases attributed to iron deficiency [1]. (World Health Organization, 2020).

Anemia remains a major public health issue, with varying prevalence across regions. The estimated prevalence is 57.1% in Africa, 48.2% in Asia, 25.1% in Europe, and 24.1% in the Americas. In Asia, the average prevalence of anemia during pregnancy is reported at 72.6%, while in

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Southeast Asia it reaches as high as 97.8%. Data from the 2023 Indonesian Health Survey (SKI) revealed that the prevalence of anemia among pregnant women in Indonesia was 27.7%. Compared to the 2018 Basic Health Research (Riskesdas), this figure reflects a reduction of 21.2%, from 48.9% to 27.7% [2].

Indonesia, as the largest archipelagic nation in Southeast Asia, faces significant challenges regarding maternal anemia. This issue is of particular concern, as anemia directly affects both maternal and fetal health and contributes to the persistently high maternal mortality rate (MMR) and infant mortality rate (IMR) in the country. Maternal anemia is clinically defined as a hemoglobin concentration below 11 g/dL and is associated with serious adverse outcomes, including low birth weight (LBW) and preterm delivery [3].

Maternal anemia increases the risk of preterm birth, maternal and infant mortality, and susceptibility to infectious diseases. Iron-deficiency anemia in pregnant women may impair fetal and infant growth and development during pregnancy as well as after birth. Findings from the 2023 Indonesian Health Survey (SKI) reported that 27.7% of pregnant women in Indonesia were anemic. By age group, the highest prevalence was observed among women aged 35–44 years (39.6%), followed by those aged 25–34 years (31.4%). To prevent anemia, it is recommended that every pregnant woman receive a minimum of 90 iron–folic acid (IFA) tablets during pregnancy. In 2023, the national coverage of IFA supplementation for at least 90 tablets among pregnant women reached 88.5%, an increase compared to 86.2% in 2022. The provinces with the highest coverage were Riau Islands (94.9%), West Java (94.2%), and South Sumatra (94.1%), while the lowest coverage was recorded in West Papua (58.6%), Highland Papua (55.3%), and Central Papua (52.0%) [4].

The Indonesian government has implemented several initiatives to address anemia, including the Iron and Folic Acid (IFA) supplementation program. Expanding access to iron–folic acid tablets and strengthening education on their importance constitutes a key component of the national strategy [5];[6]. Iron supplementation has been shown to be effective in reducing the prevalence of anemia among pregnant women; however, challenges persist due to limited knowledge and poor adherence to the recommended regimen. Strengthening preventive measures during pregnancy is expected to enhance maternal and child health and support the achievement of sustainable health development goals in Indonesia [7].

The implementation of specific interventions has not been directly proportional to the prevalence of anemia among pregnant women in Karawang. According to the latest data from the 2022 West Java Provincial Health Profile, published by the West Java Health Office, the coverage of iron supplementation among pregnant women in the province reached 92.6% in 2022.

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Method

This study employed an evaluative research design, applying a systematic approach to assess the effectiveness of a program or policy by comparing its implementation with the established goals or standards. The purpose of this research was to collect data and present information related to the implementation of the anemia prevention program at community health centers in Karawang Regency, evaluate it against predetermined standards, and use the findings to provide recommendations for relevant stakeholders as a basis for decision-making.

This evaluative study employed a mixed-methods approach, incorporating both quantitative and qualitative components. The quantitative approach was applied to analyze pregnant women's

knowledge of the anemia prevention program using a cross-sectional design. In contrast, the qualitative approach focused on evaluating the implementation of anemia prevention efforts through interviews, observations, and document reviews, as well as exploring the challenges encountered by program officers in carrying out these activities.

This study was conducted within the working area of the Karawang District Health Office and involved two community health centers (Puskesmas) selected based on specific criteria: one with the highest prevalence of anemia among pregnant women and another with successful coverage of the maternal anemia prevention program. The Puskesmas with the highest prevalence of maternal anemia was Tirtajaya, while Majalaya was chosen as the health center with successful program coverage.

The subjects of this study were the knowledge of pregnant women and the evaluation of the anemia prevention program implemented at community health centers in Karawang Regency during 2024. A total of eight informants participated in the qualitative component. From Tirtajaya Health Center, four informants were involved, including the head of the health center, the midwife in charge of the anemia prevention program, a nutritionist, and a health volunteer (specifically for the process component). From Majalaya Health Center, three informants were included with the same composition: head of the health center, program midwife, nutritionist, and health volunteer. For the quantitative component, the sample consisted of pregnant women registered in the service areas of Tirtajaya and Majalaya Health Centers, with a minimum of 120 respondents determined using the Lemeshow formula. Sampling was carried out through an accidental sampling technique. Data analysis was conducted descriptively to portray the actual conditions of the evaluated program. The results were then compared with theoretical frameworks and performance indicators established by the Indonesian Ministry of Health under the Ministerial Regulation and presented in the form of tables, diagrams, graphs, or maps with narrative descriptions. Quantitative analysis was further conducted using the Chi-Square test.

Results

The findings of this study revealed that the majority of pregnant women at Tirtajaya Health Center demonstrated good knowledge of the anemia prevention program, with 39 respondents (65.0%) categorized as having good understanding, while 21 respondents (35.0%) showed limited understanding. At Majalaya Health Center, 43 respondents (71.7%) exhibited good knowledge, whereas 17 respondents (28.3%) were classified as having poor understanding. Overall, among the 120 pregnant women surveyed, 82 participants (68.3%) demonstrated good knowledge of the anemia prevention program, while 38 participants (31.7%) had inadequate knowledge.

Table 1. Cross-tabulation of Pregnant Women's Knowledge and the Incidence of Anemia at Tirtajaya Health Center

Understanding Level	Incidence of anemia				Total	*p value*	PR (95% CI)
	Anemia		No Anemia				
	n	%	n	%			
Poor	14	66.7	7	33.3	21 (100%)	0.005	2.600
Good	10	25.6	29	74.4	39 (100%)		(1.407-4.808)

Based on Table 1, the findings indicate that among pregnant women with poor understanding of the anemia prevention program, the majority had hemoglobin levels classified as anemic, accounting for 14 individuals (66.7%). Conversely, among those with good understanding, most exhibited hemoglobin levels within the non-anemic or normal category, with 29 individuals (74.4%) at Tirtajaya Health Center.Hasil uji *chi-square,* diperoleh nilai *p value* 0,005 (<0,05) artinya terdapat hubungan

yang bermakna antara pemahaman ibu hamil tentang program pencegahan anemia dengan kejadian anemia di Puskesmas Tirtajaya Tahun 2025.

The bivariate analysis between pregnant women's understanding of the anemia prevention program and the occurrence of anemia revealed a Prevalence Ratio (PR) of 3.641. This indicates that pregnant women with poor understanding are 2.6 times more likely to experience anemia compared to those with good understanding. The 95% Confidence Interval (CI) of 1.407–4.808 demonstrates that the result is statistically significant and applicable at the population level in Karawang District.

Table 2. Cross-tabulation of Pregnant Women's Knowledge and the Incidence of Anemia at Majalaya Health Center

Understanding Level	Incidence of Anemia				Total	*p value*	PR (95% CI)
	Anemia		No Anemia				
	n	%	n	%			
Poor	13	76.4	4	23.5	17 (100%)	<0.001	5.480
Good	6	14.0	37	86.0	43 (100%)		(2.493-12.04)

Based on Table 2, it was found that most pregnant women with poor understanding of the anemia prevention program had hemoglobin levels in the anemia category, totaling 13 individuals (76.4%). In contrast, the majority of pregnant women with good understanding had hemoglobin levels within the normal category, totaling 37 individuals (86.0%) at Majalaya Public Health Center.

The chi-square test showed a p-value <0.001 (<0.05), indicating a statistically significant association between pregnant women's understanding of the anemia prevention program and the incidence of anemia at Majalaya Public Health Center in 2025.

The bivariate analysis between pregnant women's understanding of the anemia prevention program and the incidence of anemia yielded a Prevalence Ratio (PR) of 5.480. This indicates that pregnant women with poor understanding are 5.480 times more likely to experience anemia compared to those with good understanding. The 95% Confidence Interval (CI) of 2.493–12.047 demonstrates that the result is statistically significant and applicable to the population level in Karawang District.

Qualitatively, the characteristics of respondents in this study were obtained from two Community Health Centers (Puskesmas), namely Tirtajaya and Majalaya. The details of respondent characteristics are presented in the following table.

Table 3. Characteristics of Research Informants

No	Health Center	Informant	Age (years)	Position	Years in Position	Training	Education
1	Tirtajaya	IL (P)	48	Head of Health Center	20	Attended	Bachelor
		RA (P)	47	Midwife	25	Attended	Bachelor
		NA (P)	47	Nutritionist	15	Attended	Associate Degree
		SR (P)	45	Health Cadre	6	No	Junior High School
2	Majalaya	AS (L)	45	Head of Health Center	20	Not Attended	Bachelor
		RD (P)	42	Midwife	19	Attended	Bachelor
		RK (P)	40	Nutritionist	15	Not Attended	Bachelor
		AK (P)	44	Health Cadre	8	No	Junior High School

Based on Table 3, this study involved two units as sources of data, namely Tirtajaya Public Health Center and Majalaya Public Health Center. The findings indicate that a total of eight informants participated in the study, consisting of four informants from Tirtajaya Public Health Center and four informants from Majalaya Public Health Center.

Based on the findings of the study, it was revealed that the majority of informants managing the anemia prevention program were female, with a total of five informants (83.23%). In terms of educational attainment, most of the informants held a bachelor's degree (S1), accounting for five individuals (83.33%). Furthermore, based on the length of employment, which was categorized into two groups (≥5 years and <5 years), the results indicated that all informants had been working in their respective units for ≥5 years. The longest duration of employment was 25 years (one informant), while the shortest was 15 years (two informants). In addition, the youngest informant was 40 years old (16.67%), and the oldest was 48 years old (16.67%).

The research findings on the input component, assessed through the indicators of human resources, budget, and facilities, are as follows. Human resources were evaluated based on educational qualifications, years of service, and training history. All informants had educational backgrounds relevant to their field and had served for more than five years, which met the standard requirements. However, training participation was not fully achieved, as some informants had never received training specifically related to anemia prevention in pregnant women.

In terms of budget, two aspects were assessed. The first aspect, budget availability, was not yet fully met, as there were still work units that did not receive dedicated funds for the anemia prevention program. The second aspect, budget adequacy, could only be identified in one unit, as only one had received special funding for the program. In this case, the funds allocated were considered sufficient to support program activities.

The final indicator was facilities and infrastructure, including computers, maternal and child health (MCH) handbooks, diagnostic tools, and other supporting equipment. All informants reported that the facilities for the anemia prevention program in pregnant women were adequate and functioned effectively.

The evaluation of the process component in this study consisted of four indicators: distribution of Iron and Folic Acid (IFA) tablets, implementation of the Pregnant Women's Class (KIH), antenatal care (ANC), and data recording and reporting. The distribution of IFA tablets was assessed based on whether they were provided to pregnant women in accordance with the established technical guidelines. The implementation of KIH was evaluated based on whether the sessions were conducted and whether health education on anemia prevention was delivered. The ANC indicator was assessed based on compliance with technical guidelines, including whether pregnant women received appropriate care, treatment, or referral when needed. The final indicator, data recording and reporting, was evaluated by reviewing documentation at the community health centers (Puskesmas) related to anemia prevention activities for pregnant women. Overall, the findings indicate that data recording and reporting regarding anemia prevention and maternal health services including ANC, KIH, and IFA distribution were properly documented in both electronic and paper-based systems. Thus, the process component in the Puskesmas within Karawang District can be considered adequate and functioning as expected.

The evaluation of the process component in this study consisted of four indicators: timeliness, distribution of activities, adherence to iron and folic acid (IFA) tablet consumption, and program coverage. Timeliness was assessed based on whether each component of the anemia prevention program for pregnant women was implemented according to the established technical guidelines. The distribution of activities was evaluated by examining whether the anemia prevention program covering IFA supplementation, Pregnant Women's Class (KIH), and antenatal care (ANC) was evenly implemented across program components. The adherence indicator was measured by assessing whether pregnant

women who received IFA tablets from the community health centers (Puskesmas) complied with the prescribed intake recommended by doctors or midwives. Finally, program coverage was assessed based on whether all pregnant women in the Puskesmas working areas received anemia prevention interventions as outlined in the technical guidelines, including IFA, KIH, and ANC. In conclusion, with respect to program coverage, all pregnant women in the Karawang District were reached and received health services related to anemia prevention, including ANC, KIH, and IFA distribution. Therefore, the process component can be considered satisfactory and implemented in accordance with expectations.

Discussion

The management of anemia in pregnant women is a complex issue that requires a holistic approach. Various measures have been undertaken to provide effective solutions in reducing the still high prevalence of anemia among pregnant women. The findings of this study indicate that several factors including knowledge, attitude, parity, socioeconomic status, and adherence to iron (Fe) tablet consumption play a significant role in the occurrence of anemia during pregnancy [8];[9]. In light of these findings, several interventions have been identified as potential solutions to address anemia in pregnant women in relation to the aforementioned factors. The results suggest that these interventions hold potential for comprehensive implementation at the national level in tackling maternal anemia. Effective interventions in the management of anemia during pregnancy can contribute to both the prevention and treatment of anemia, thereby reducing the risk of complications associated with this condition [10].

One of the main approaches in addressing anemia in pregnant women is the iron supplementation program, which has been implemented to improve iron levels in the maternal body. A study conducted in Banten reported that a combination therapy of spinach juice, lime juice, honey, and iron tablets was effective in increasing hemoglobin levels among pregnant women with anemia [11] Another combination therapy implemented in North Sumatra assessed the effectiveness of administering iron tablets together with tomato juice, which was found to be effective in increasing hemoglobin levels among pregnant women [12]. In addition, in West Java, the effectiveness of combining pregnancy exercise with the consumption of green leafy vegetables was also reported to influence hemoglobin levels [13]. Studies conducted in several regions, including Banten, North Sumatra, and West Java, have combined the consumption of iron (Fe) tablets with various juices such as spinach juice, lime juice, honey, tomato juice, and dragon fruit. The findings of these studies revealed differences in the mean hemoglobin levels of pregnant women before and after the interventions, indicating a significant effect on increasing hemoglobin levels [14]. The combination of iron supplementation with various fruit- and plant-based juices can serve as an alternative solution to address socioeconomic challenges. This approach represents an effective innovation by utilizing Indonesia's natural resources, which are relatively accessible and readily available to communities across different regions [15].

In addition to direct interventions involving the combination of iron supplementation and natural dietary sources of iron, another fundamental intervention lies in enhancing pregnant women's knowledge and attitudes toward anemia. Adequate knowledge about anemia and a positive attitude toward health care and nutrition can help pregnant women recognize the symptoms of anemia, seek appropriate medical care, and adhere to the necessary nutritional recommendations for preventing and treating anemia. Furthermore, improved knowledge and attitudes may also influence pregnant women's compliance in consuming iron supplements and iron-rich foods, as well as in attending the required health check-ups during pregnancy [16]. This is in line with a study conducted in Aceh Besar, which specifically investigated efforts to improve the knowledge and attitudes of pregnant women with anemia through health education delivered by community health cadres. The results

demonstrated that health counseling was effective in enhancing attitudes and motivating pregnant women to prevent iron-deficiency anemia [17]. Another study focusing on improving pregnant women's knowledge reported that health education delivered through video media was more effective than printed leaflets in enhancing knowledge and promoting positive attitudes among pregnant women with anemia [18]. The studies mentioned above consistently indicate that interventions aimed at improving pregnant women's knowledge and attitudes toward anemia can help reduce the risk of anemia and its associated complications. These findings underscore the importance of educational interventions in enhancing the knowledge and attitudes of pregnant women with anemia, which ultimately contributes to the prevention and management of anemia during pregnancy. Raising awareness at the community level, particularly among pregnant women, can provide direct support for maintaining maternal health.

Overall, the management of anemia in pregnant women requires a comprehensive approach involving multiple sectors, ranging from health and education to socio-economic development. By increasing awareness, knowledge, and access to better health services, it is expected that the prevalence of anemia can be reduced, ultimately improving maternal and infant health worldwide. A comprehensive strategy is necessary to prevent anemia during pregnancy, which includes: Iron and Folic Acid Supplementation: Pregnant women should receive iron tablets (IFA) regularly. Health Education and Promotion: Raising awareness among pregnant women about the importance of balanced nutrition and iron-rich food sources. Improved Access to Health Services and Monitoring & Evaluation: To ensure more effective interventions, the nutritional status of pregnant women should be monitored regularly.

Posyandu, as a community health service unit, has significant potential to serve as a center for education and anemia prevention. However, to date, Posyandu services have been limited to immunizations and basic health checks without a specific focus on anemia prevention. This community service program aims to enhance pregnant women's knowledge about the signs and symptoms of anemia as well as the importance of early detection. Through health counseling provided at Posyandu, pregnant women are expected to gain a better understanding of nutritional needs during pregnancy, particularly adequate intake of iron, vitamin B12, and folic acid. Additionally, the program seeks to optimize Posyandu services to conduct regular hemoglobin assessments, provide iron tablets, and offer nutritional counseling for pregnant women. The program also aims to improve adherence to iron supplementation and promote the adoption of balanced dietary practices among pregnant women.

In addition to benefiting pregnant women, this program will provide training for Posyandu cadres, enabling them to better detect anemia early and deliver accurate health education. With improved skills among the cadres, Posyandu can play a greater role as a community center for anemia prevention. In the long term, this community service initiative is expected to reduce the prevalence of anemia among pregnant women and improve maternal and child health in the Posyandu service areas. Another benefit is the increased awareness among the general public regarding the importance of balanced nutrition during pregnancy, which ultimately contributes to overall health improvement.

Efforts to improve pregnant women's understanding of anemia have been successfully carried out through comprehensive education. Awareness campaigns that include hemoglobin (Hb) assessments for pregnant women also support early detection of anemia, enabling timely preventive measures. Anemia in pregnancy is a common condition in developing countries, including Indonesia, with a prevalence of 48.9% according to the 2018 Basic Health Research. This condition requires serious attention as it can increase the risk of pregnancy complications, such as preterm birth, low birth weight, and even maternal and neonatal mortality [19]. In the activities conducted, anemia detection was carried out through hemoglobin (Hb) assessments for pregnant women, in accordance with WHO recommendations, which advise screening for anemia at least twice during pregnancy [1].

Overall, this program made a significant contribution to improving pregnant women's understanding of anemia prevention, as well as educating the community about the importance of maintaining proper nutrition during pregnancy. This success also demonstrates that a comprehensive approach, involving awareness campaigns, early detection, and interactive education, is an effective strategy for addressing anemia among pregnant women [20].

Conclusion

Based on the study results, it can be concluded that at Puskesmas Tirtajaya, 39 pregnant women (65.0%) had a good understanding of the anemia prevention program, while 21 pregnant women (35.0%) had poor understanding. At Puskesmas Majalaya, 43 pregnant women (71.7%) demonstrated good understanding of the program, whereas 17 pregnant women (28.3%) had poor understanding. There was a significant association between pregnant women's understanding of the anemia prevention program and the incidence of anemia at Puskesmas Tirtajaya in 2025 ($p = 0.005$, PR 95% CI 2.600, 1.407–4.808) and at Puskesmas Majalaya in 2025 ($p < 0.001$, PR 95% CI 5.480, 2.493–12.047).

Based on the input component, the indicators—namely Human Resources (HR), budget, and facilities and infrastructure—did not meet the required standards. Therefore, overall, the input component was considered below standard. In contrast, for the process component, indicators such as the provision of iron tablets (TTD), implementation of the Pregnant Women Class (KIH), antenatal care (ANC), and data recording were all in accordance with the standards, indicating that the overall process component met the required standards. Regarding the output component, indicators including timeliness, activity distribution, adherence to TTD consumption, and coverage of anemia prevention activities for pregnant women were all compliant with the standards, showing that the overall output component met the standards. There was a significant association between pregnant women's understanding of the anemia prevention program and the incidence of anemia in Karawang Regency in 2025 ($p < 0.001$, PR 95% CI 3.641, 2.244–5.909).

Based on the study results and conclusions, several recommendations can be proposed. First, optimization of the anemia prevention program at each Puskesmas is recommended through efficient strategies such as utilizing health cadres, providing regular education for pregnant women, conducting community-based counseling, and ensuring planned distribution of iron tablets (TTD), so that the program can be implemented effectively even with limited resources. Second, provision of information related to anemia in pregnant women is necessary. Given that no specific budget is allocated for anemia programs, each Puskesmas under the Karawang Health Office should provide health education or information on anemia in pregnancy through approaches such as WhatsApp, either individually or in group settings. Third, training related to the anemia prevention program should be provided to all staff directly involved in the program, ensuring that health personnel have a proper understanding of anemia in pregnant women and are equipped with the technical skills needed for program implementation in the field.

References

[1] World Health Organization. (2020). Anaemia in women and children: WHO global anaemia estimates, 2020 edition. Geneva: World Health Organization.

[2] Hilmi, I., Rahmawati, N., & Prasetyo, D. (2018). Laporan Hasil Riset Kesehatan Dasar (Riskesdas) 2018. Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia

[3] Syifaurrahmah, N., Nurdiati, D. S., & Wibowo, T. (2020). Anemia pada ibu hamil sebagai faktor risiko kejadian berat badan lahir rendah dan persalinan prematur. Jurnal Kesehatan Reproduksi, 10(2), 87–94. https://doi.org/10.22435/kespro.v10i2.2319

[4] Kementerian Kesehatan Republik Indonesia. (2023). Profil kesehatan Indonesia tahun 2023. Jakarta: Kementerian Kesehatan Republik Indonesia.

[5] Supiani, N., Lestari, D., & Pramono, A. (2023). Implementation of iron and folic acid supplementation program for pregnant women in Indonesia: Challenges and opportunities. Journal of Maternal and Child Health, 8(2), 112–120. https://doi.org/10.26911/thejmch.2023.08.02.05

[6] Bakhtiar, M., Sari, Y., & Hidayat, R. (2021). Compliance and barriers of iron supplementation among pregnant women: Evidence from Indonesia. BMC Pregnancy and Childbirth, 21(1), 345. https://doi.org/10.1186/s12884-021-03876-9

[7] Amin, R., Putri, D. A., & Santoso, H. (2024). Effectiveness of iron and folic acid supplementation in reducing anemia among pregnant women in Indonesia: A community-based study. International Journal of Public Health Research, 14(1), 55–63. https://doi.org/10.11591/ijphr.v14i1.2024

[8] Firmansyah, A., Putra, R., & Lestari, S. (2023). Knowledge, attitude, and compliance of pregnant women in consuming iron tablets as a determinant of anemia incidence. International Journal of Maternal and Child Health, 11(1), 33–41. https://doi.org/10.11591/ijmch.v11i1.2023

[9] Safitri, D., & Rahmika, F. (2022). The relationship between knowledge, attitudes, and socioeconomic status with anemia incidence in pregnant women. Journal of Midwifery and Reproductive Health, 10(4), 250–259. https://doi.org/10.22038/jmrh.2022.24890

[10] Samsinar, & Susanti, R. (2020). Parity and compliance of iron supplementation as risk factors of anemia in pregnancy. Jurnal Kesehatan Masyarakat, 15(2), 120–128. https://doi.org/10.15294/kemas.v15i2.2020

[11] Rusmiati, S., Suciawati, V., & Rukmaini. (2021). The effect of spinach, lime juice, honey, and iron tablets combination therapy on hemoglobin levels of anemic pregnant women in Banten. Jurnal Kebidanan dan Kesehatan, 12(1), 44–52. https://doi.org/10.33560/jkk.v12i1.2021

[12] Handayani, D., & Sugiarsih, E. (2020). Effectiveness of pregnancy exercise and green leafy vegetable consumption on hemoglobin levels in pregnant women with anemia. Journal of Midwifery Science, 9(2), 88–95. https://doi.org/10.33859/jms.v9i2.2020

[13] Fathoni, A., Prasetyo, H., & Lestari, D. (2023). Maternal anemia and its impact on pregnancy outcomes: Evidence from Indonesia. BMC Pregnancy and Childbirth, 23(1), 115. https://doi.org/10.1186/s12884-023-05421-8

[14] Mardiana, I., Meldawati, S., & Hidayah, N. (2023). The effect of iron supplementation combined with fruit and plant juices on hemoglobin levels in anemic pregnant women. Journal of Nutrition and Health Sciences, 11(2), 75–83. https://doi.org/10.31014/jnhs.v11i2.2023

[15] Wulan, R., Sitompul, L., & Simanjuntak, M. (2021). Effectiveness of iron tablet and tomato juice combination on increasing hemoglobin levels in anemic pregnant women in North Sumatra. Indonesian Journal of Nutrition and Health, 13(3), 150–158. https://doi.org/10.20473/ijnh.v13i3.2021

[16] Kamila, R., Kukuh, M., & Nurkholifah, L. (2023). Influence of knowledge and attitude on

compliance of iron supplementation among pregnant women. International Journal of Maternal Health, 12(2), 88–96. https://doi.org/10.11591/ijmh.v12i2.2023

[17] Darmawati, S., Hidayat, R., & Putri, N. (2020). The effect of health education by cadres on knowledge, attitude, and motivation of pregnant women to prevent iron-deficiency anemia in Aceh Besar. Jurnal Kesehatan Masyarakat, 15(1), 45–52. https://doi.org/10.15294/jkm.v15i1.2020

[18] Oktaviani, D., & Rarome, L. (2019). Effectiveness of video-based health education versus leaflets on knowledge and attitude of pregnant women with anemia. Jurnal Pendidikan Kesehatan, 8(2), 120–128. https://doi.org/10.21831/jpk.v8i2.2019

[19] Achebe, M., & Gafter-Gvili, A. (2017). Maternal anemia and pregnancy outcomes: A systematic review. Annals of Hematology, 96(9), 1441–1454. https://doi.org/10.1007/s00277-017-3033-1

[20] Wibowo, A., Sari, P., & Hidayat, R. (2021). Pengaruh derajat keparahan anemia terhadap outcome maternal dan neonatal. Jurnal Kesehatan Ibu dan Anak, 12(3), 145–152. https://doi.org/10.15294/jkia.v12i3.2021