

Health Education on Anemia Among Pregnant Women

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ABSTRACT

Anemia during pregnancy remains a significant public health problem that increases the risk of maternal and fetal complications. Although the prevalence in Jakarta is lower than the national average, anemia among pregnant women remains common in the Menteng Community Health Center, Central Jakarta. This condition is associated with limited knowledge of balanced nutrition, poor adherence to iron supplementation, and inadequate participation in routine antenatal care. This community service activity aimed to improve pregnant women's knowledge and awareness regarding anemia prevention through health education. The program included a baseline survey to assess participants' knowledge and behavior, interactive health education on balanced nutrition, iron supplementation, and regular antenatal care, followed by a post-education evaluation using a questionnaire. The expected outcomes were improved knowledge and positive behavioral changes in maintaining a healthy diet, regularly consuming iron tablets, and attending routine antenatal care. In conclusion, health education is an effective promotive and preventive strategy to enhance anemia prevention among pregnant women.

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INTRODUCTION

Anemia among pregnant women remains a major public health problem at both the global and national levels. According to the World Health Organization, approximately 35.5% of pregnant women worldwide experience anemia, with the highest prevalence reported in South Asia and Sub-Saharan Africa. The World Health Organization defines anemia during pregnancy as a hemoglobin concentration below 11 g/dL, which is primarily caused by iron deficiency anemia, folate deficiency, and blood loss resulting from parasitic infections or certain obstetric conditions. This condition contributes to increased maternal and neonatal morbidity and mortality, including preterm birth, low birth weight, and impaired child growth and development. The World Health Organization emphasizes that anemia during pregnancy is largely associated with iron and folate deficiencies, which are closely related to nutritional status and access to healthcare services (World Health Organization, 2025).

The prevalence of anemia among pregnant women in Indonesia reaches 48.9%, which remains considerably high compared with the Sustainable Development Goals target of reducing anemia

prevalence to below 20%. This situation indicates that stronger interventions are required, particularly in nutrition education, iron supplementation, and increasing public awareness of the importance of routine antenatal care. Therefore, the Indonesian government recommends that every pregnant woman receive 90 iron tablets throughout pregnancy to prevent anemia (Statistics Indonesia, 2024). In the Special Capital Region of Jakarta, the prevalence of anemia among pregnant women also requires serious attention. Approximately 35.8% of pregnant women are affected by anemia, with the highest distribution occurring in densely populated urban areas such as Central Jakarta. Contributing factors include unbalanced dietary patterns, fatigue due to high daily activity, and delayed initiation of antenatal care (Statistics Indonesia, 2025).

Sulung et al. (2022) reported that the occurrence of anemia among pregnant women is influenced by several factors, including educational level, nutritional knowledge, parity, birth spacing, adherence to iron supplementation, and the consumption of animal-source protein. These factors are interrelated and significantly affect maternal health status. Pregnant women with lower educational attainment and limited nutritional knowledge are less likely to understand the importance of adequate iron intake during pregnancy, making them more vulnerable to anemia. This limited awareness presents a major challenge for anemia prevention, particularly among communities with restricted access to health information and healthcare services.

In addition to knowledge-related factors, adherence to iron supplementation plays a critical role. Erryca et al. (2022) found that many pregnant women do not regularly consume iron tablets because of side effects such as nausea, vomiting, and constipation. Limited understanding of the correct method of iron tablet consumption, including the appropriate timing and the importance of combining iron supplements with vitamin C-rich foods, further reduces adherence. Regular iron supplementation is one of the most effective strategies for preventing anemia. Therefore, continuous educational interventions are essential to improve pregnant women's understanding of the importance of maintaining adequate hemoglobin levels for both maternal and fetal health.

Furthermore, Wahyuningsih et al. (2023) reported that the risk of anemia increases significantly among pregnant women who do not undergo regular hemoglobin examinations. Hemoglobin screening enables early detection of anemia, allowing timely preventive and therapeutic interventions. However, many pregnant women are reluctant to undergo hemoglobin testing because they perceive themselves as healthy or consider the examination unnecessary. This condition highlights the need for healthcare professionals to strengthen health education and continuous monitoring so that pregnant women become more proactive in maintaining their health throughout pregnancy.

The consequences of anemia during pregnancy are extensive and serious, affecting both mothers and their babies. According to Sitepu et al. (2021), anemia may lead to obstetric complications such as postpartum hemorrhage, prolonged labor, and an increased risk of maternal mortality. It also weakens the maternal immune system, making women more susceptible to infections and excessive fatigue during pregnancy and the postpartum period. In addition, fetuses of anemic mothers have a higher risk of low birth weight, preterm delivery, and impaired cognitive development due to insufficient oxygen and nutrient supply throughout pregnancy.

Safitri and Rahmika (2022) reported that anemia among pregnant women is closely associated with adherence to iron supplementation, dietary habits, and birth spacing. Their findings showed that pregnant women who did not regularly consume iron tablets had a 3.2-fold greater risk of developing anemia compared with those who adhered to supplementation. Furthermore, short birth intervals of less than two years increase the risk because maternal iron stores have not fully recovered from the previous pregnancy. The study emphasizes the importance of continuous supervision and support from healthcare providers to ensure regular iron tablet consumption and provide education regarding optimal birth spacing to maintain adequate maternal iron reserves.

Similarly, Elvira et al. (2023) demonstrated that nutritional intake and maternal knowledge regarding anemia play significant roles in the occurrence of anemia during pregnancy. Their survey involving 120 respondents revealed that 62% of pregnant women with poor knowledge of iron-rich foods experienced anemia. In addition, 44% of respondents rarely consumed animal-source foods such as red meat, chicken liver, or fish, which are the richest and most bioavailable sources of heme

iron. Economic status also emerged as an important determinant, as women from lower-income households were more likely to replace animal protein with plant-based protein sources that contain less absorbable iron.

Farhan and Dhanny (2021) concluded that anemia during pregnancy affects not only maternal health but also has long-term consequences for infants. Babies born to mothers with severe anemia are twice as likely to experience low birth weight and impaired cognitive development. Reduced oxygen delivery caused by low hemoglobin levels limits the supply of nutrients to the fetus, thereby disrupting organ formation and central nervous system development. In addition, maternal anemia may reduce breast milk production, negatively affecting infant nutritional status after birth. Therefore, anemia prevention should be implemented continuously from the preconception period through the postpartum stage by providing health education and nutritional monitoring.

A literature review conducted by Koerniawati (2022) identified socioeconomic status, parity, and the habit of drinking tea and coffee as additional factors contributing to anemia among pregnant women. Tannins contained in tea and coffee are known to inhibit the absorption of non-heme iron by up to 60%, particularly when consumed together with meals or iron supplements. Moreover, women with high parity (more than three deliveries) are at greater risk of anemia because of repeated blood loss and increased iron requirements that are not adequately compensated by nutritional intake. The review emphasizes the importance of behavioral interventions, including encouraging the consumption of iron-rich foods together with vitamin C to enhance iron absorption and reducing tea and coffee consumption during pregnancy.

IMPLEMENTATION METHOD

The health education program on anemia among pregnant women at the Menteng Community Health Center, Central Jakarta, was implemented through several stages, beginning with the planning phase. This phase included preparing the activity proposal, determining the educational theme, scheduling the implementation, and aligning the program with the routine activities of the Menteng Community Health Center. During this stage, the implementation team coordinated with the health center to ensure the readiness of the venue, participants, and the facilities and equipment required to support the activity. The planning process began in October 2025 to ensure that the program would be implemented effectively and meet the needs of the target population. The second stage was the preparation phase, which involved developing educational materials on anemia during pregnancy, producing educational media such as leaflets, posters, and presentation slides, and designing pre-test and post-test questionnaires to evaluate participants' knowledge before and after the intervention. The team also prepared administrative documents and documentation materials to facilitate the implementation of the program. The health education session is scheduled to take place on 6 November 2025 at the Menteng Community Health Center, Central Jakarta, using an interactive and participatory face-to-face educational approach. The program will begin with an opening session by representatives of the health center, followed by the delivery of educational materials by the speaker, an interactive question-and-answer session, and the distribution of educational leaflets.

The target participants of this program are 22 pregnant women residing within the service area of the Menteng Community Health Center, Central Jakarta. Following the implementation of the program, participants' knowledge and preventive behaviors regarding anemia during pregnancy will be evaluated to assess the effectiveness of the health education intervention. The activity schedule, implementation method, instruments, and persons in charge are described as follows: the opening activities will include a welcome greeting followed by an ice-breaking session to encourage participant engagement and create a comfortable learning environment. The session will employ a game-based interactive method to promote active participation among pregnant women. The primary instrument used during this session will be the participant attendance list for registration and documentation purposes. Educational media supporting the activity will include a laptop, liquid crystal display projector, sound system, and microphone to facilitate effective communication and presentation throughout the session.

The core educational session, entitled "Prevention and Management of Anemia in Pregnant Women," will be led by Ni Nyoman Sri A.D., M.Keb and Baharika Suci Dwi Aningsih, S.Keb., Bd.,

M.Keb. The educational content will cover the definition of anemia during pregnancy, its causes, signs and symptoms, risk factors, potential maternal and fetal complications, the importance of consuming iron and folic acid supplements, balanced nutrition, strategies for preventing anemia, and the importance of regular antenatal care. The session will conclude with an interactive question-and-answer discussion to encourage participant engagement and clarify any concerns. A lecture and discussion approach will be employed, supported by PowerPoint presentations and educational leaflets as both instructional media and educational materials.

The closing activities will include the administration of a post-test questionnaire to evaluate participants' knowledge following the health education session and to assess the effectiveness of the educational intervention. This will be followed by the distribution of door prizes to encourage participant engagement and appreciation for their active participation. The session will be conducted using a lecture-based approach, with a questionnaire as the primary evaluation instrument and supported by a sound system to facilitate communication throughout the closing activities.

RESULTS AND DISCUSSION

The Community Service Program (CSP), consisting of a health education session on anemia during pregnancy, was successfully conducted face-to-face at the Maternal and Child Health Clinic of the Menteng Community Health Center. The program targeted 22 pregnant women residing in the Menteng District. The event commenced with an opening ceremony, followed by an official welcome address from the principal investigator and the introduction of the Community Service Program team members, including midwifery students. After participant registration through the attendance list, the activity proceeded with the baseline evaluation. Each participant was asked to complete a pre-test consisting of seven questions via Google Forms using their mobile phones. Approximately five minutes were allocated for this assessment to measure the participants' baseline knowledge before the delivery of the main health education session.



Figure 1. Registration of Participants Attending the Health Education Session

A total of 22 pregnant women participated in the health education program, representing a wide range of maternal ages and gestational ages, which highlights the need for health education across all stages of pregnancy. The youngest participant was 20 years old, while the oldest was 41 years old. Most participants (18 women; 81.8%) were between 24 and 30 years of age, representing the optimal reproductive age group. However, one participant was 41 years old, which falls into the category of advanced maternal age, a high-risk pregnancy requiring closer monitoring and more intensive education regarding anemia prevention and management.

Regarding gestational age, participants represented all three trimesters of pregnancy, indicating that the educational content needed to address the specific needs of each stage. There were three participants in the first trimester, four in the second trimester, and fourteen in the third trimester (63.6%). Women in the third trimester have the highest iron requirements because of the increased maternal blood volume and the greater nutritional demands of the growing fetus, placing them at a higher risk of anemia. Therefore, providing education during this stage is particularly important. In

contrast, participants in the first and second trimesters received greater emphasis on early prevention strategies and the importance of adherence to iron and folic acid supplementation (iron tablets). One participant was reported to be eight months pregnant (approximately 32–35 weeks of gestation), which is also classified as the third trimester. This diversity in gestational age demonstrates the importance of providing educational materials that are relevant and applicable throughout pregnancy.

The health education session focused on the prevention and management of anemia during pregnancy and was delivered by two midwifery students. The session began with a brainstorming activity to assess participants' initial understanding of the topic. The educational content included the definition of anemia as a condition in which the hemoglobin (Hb) concentration is below the normal level, as well as the standard classification of normal hemoglobin values and the severity of anemia (mild, moderate, and severe) according to gestational age, based on the World Health Organization (2024) guidelines. The presenters also explained why pregnant women are particularly susceptible to anemia, emphasizing the physiological hemodilution that occurs during pregnancy due to a greater increase in plasma volume than in red blood cell mass. Additional topics included the signs and symptoms of anemia, its causes, potential maternal and fetal complications, preventive measures, and the importance of iron and folic acid supplementation. The comprehensive and relevant educational materials were well understood by the participants, as reflected in their active participation during the discussion session, where several pregnant women asked questions to obtain further clarification on the topics presented.



Figure 2. Delivery of Health Education Materials

After the educational session was completed, participants were asked to complete a post-test to evaluate their knowledge following the intervention. Both the pre-test and post-test consisted of seven questions, and participants were able to complete the post-test within approximately five minutes. The post-test results were used to assess the effectiveness of the health education program in improving participants' knowledge regarding the prevention and management of anemia during pregnancy.

Overall, the average pre-test score of the 22 participants was 5.45 out of 7 questions (70.1%), indicating a moderately good level of baseline knowledge, although considerable variation was observed among participants. Seven participants (31.8%) achieved a perfect score (100% correct), demonstrating excellent prior knowledge or familiarity with all of the topics covered. In contrast, two participants (Participants No. 10 and No. 20) answered only 3 out of 7 questions correctly (42.9%), indicating limited knowledge and a greater need for educational intervention.

At the end of the community service program, participants completed a post-test to evaluate the effectiveness of the health education session. The results demonstrated a significant improvement in participants' knowledge, with the average score increasing to 6.27 out of 7 questions (89.6%), placing the overall level of knowledge in the excellent category after the intervention. Three questions (P1, P2, and P7) achieved a 100% correct response rate, indicating that all participants had mastered the fundamental concepts assessed by these items. The question with the lowest correct response rate during the pre-test (P5) showed remarkable improvement, increasing from 50.0% to 90.9%, suggesting that the educational intervention successfully addressed this knowledge gap. However, Question P6 remained the most challenging item, with a correct response rate of 68.2%,

showing no improvement from the pre-test. This finding indicates that the topic assessed by P6 may require greater emphasis and more detailed explanation in future health education programs to further enhance participants' understanding.

Based on the pre-test and post-test results obtained from the community service program, a comparison of the participants' average scores is presented in Table 1.

Table 1. Comparison of Pre-Test and Post-Test Results	
Category	Percentage of Correct Answers
<i>Pre-Test</i>	70.1%
<i>Post-Test</i>	89.6%
Improvement (Effectiveness Gain)	19.5%

CONCLUSION

The health education program on anemia among pregnant women at the Menteng Community Health Center was successfully implemented and effectively improved participants' knowledge. This was demonstrated by the increase in the average score from 70.1% on the pre-test to 89.6% on the post-test, representing an improvement of 19.5%. The educational materials were well received by all 22 participants, who represented various age groups and stages of pregnancy, with the majority being in the third trimester, a period associated with a higher risk of anemia. The program contributed to increasing pregnant women's understanding of the importance of iron and folic acid supplementation, routine hemoglobin screening, and maintaining a balanced diet as key strategies for preventing anemia during pregnancy.

REFERENCES

- [1] Badan Pusat Statistik. (2024). Maternal and Child Health Profile
- [2] Badan Pusat Statistik. (2025). DKI Jakarta Provincial Health Profile
- [3] Safitri, M. E., & Rahmika, P. (2022). Factors associated with the incidence of anemia among pregnant women. *Journal Healthy Purpose*, 1(2), 42–48. <https://doi.org/10.56854/jhp.v1i2.127>
- [4] Elvira, Nurvinanda, R., & Sagita, A. (2023). Factors associated with the incidence of anemia among pregnant women. *Citra Delima: Jurnal Ilmiah STIKES Citra Delima Bangka Belitung*, 6(2), 111–118. <http://jurnalilmiah.stikescitradelima.ac.id/index.php/>
- [5] Erryca, P., Suratiah, S., & Surinati, D. A. K. (2022). Overview of anemia prevention efforts among pregnant women. *Jurnal Gema Keperawatan*, 15(2), 275–288. <https://doi.org/10.33992/jgk.v15i2.1982>
- [6] Farhan, K., & Dhanny, D. R. (2021). Maternal anemia during pregnancy and its effects on infants. *Muhammadiyah Journal of Midwifery*, 2(1), 27–33. <https://doi.org/10.24853/myjm.2.1.27-33>
- [7] Ministry of Health of the Republic of Indonesia. (2022). Anemia during pregnancy.
- [8] Ministry of Health of the Republic of Indonesia. (2023). Pocketbook on anemia prevention among pregnant women. Ministry of Health of the Republic of Indonesia.
- [9] Koerniawati, R. D. (2022). Literature review: Factors influencing anemia among pregnant women. *Jurnal Gizi Kerja dan Produktivitas*, 3(1), 45–50.
- [10] Sitepu, S. A., Purba, T. J., Sari, N. M., Sitepu, M. S., & Hayati, E. (2021). The impact of anemia on pregnancy and childbirth. *Jurnal Pengabdian Masyarakat Putri Hijau*, 1(4), 47–53. <https://doi.org/10.36656/jpmph.v1i4.728>
- [11] Sulung, N., Najmah, Flora, R., Nurlaili, & Slamet, S. (2022). Factors associated with the incidence of anemia among pregnant women. *Journal of Telenursing (JOTING)*, 4(1), 28–35.
- [12] Wahyuningsih, E., Hartati, L., & Dewi Puspita, W. (2023). Risk analysis of anemia among pregnant women. *Professional Health Journal*, 4(2), 303–313. <https://doi.org/10.54832/phj.v4i2.388>
- [13] World Health Organization. (2025). Anemia in women and children. The Global Health Observatory.