JCEMTY Journal of Community Empowerment for Multidisciplinary (JCEMTY)
Volume 03, Number 01 (May 2025)
p-ISSN: 2987-5072 e-ISSN: 2987-5080

Counseling on Education to Prevent Anemia in Pregnant Women with Banana and Dragon Fruit

Penyuluhan tentang Edukasi Mencegah Anemia Ibu Hamil dengan Pisang dan Buah Naga

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Abstract:

Anemia during pregnancy remains a significant public health concern that may increase the risk of maternal complications and adverse fetal outcomes, including low birth weight. This community service activity aimed to improve pregnant women's knowledge regarding anemia prevention through health education and the utilization of local food resources, particularly Ambon bananas and red dragon fruit. The activity was conducted at Cempaka Putih District Health Center on December 28, 2024, involving 15 pregnant women in the first to third trimester, one health cadre, and one PKK Pokja IV representative. The intervention was implemented through health counseling, interactive discussions, and a demonstration of preparing "AKSI NGEMIL SANG NAGA" juice (Education to Prevent Anemia in Pregnant Women with Bananas and Dragon Fruit). Knowledge improvement was evaluated using pretest and posttest questionnaires. The data were analyzed using the Wilcoxon Signed-Rank Test to assess differences before and after the intervention. The results showed an increase in participants' knowledge scores from a mean pretest score of 62 to a posttest score of 97, with a statistically significant difference after the educational intervention ($p < 0.001$). Community-based education using locally available nutritious foods can serve as a promotive strategy to improve pregnant women's awareness and encourage healthy dietary practices for anemia prevention during pregnancy.

Keywords: anemia, pregnant women, ambon bananas, dragon fruit

Abstrak:
Anemia pada ibu hamil merupakan salah satu masalah kesehatan yang dapat meningkatkan risiko komplikasi maternal dan gangguan pertumbuhan janin, termasuk kejadian berat badan lahir rendah (BBLR). Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan pengetahuan ibu hamil mengenai pencegahan anemia melalui edukasi kesehatan dan pemanfaatan pangan lokal berupa pisang ambon dan buah naga. Kegiatan dilaksanakan di Puskesmas Kecamatan Cempaka Putih pada 28 Desember 2024 dengan melibatkan 15 ibu hamil trimester I–III, satu kader, dan satu anggota PKK Pokja IV. Metode pelaksanaan meliputi penyuluhan, diskusi interaktif, demonstrasi pembuatan jus "AKSI NGEMIL SANG NAGA" (Edukasi Pencegahan Anemia Ibu Hamil dengan Pisang dan Buah Naga), serta evaluasi menggunakan pretest dan posttest. Analisis perubahan pengetahuan dilakukan menggunakan uji Wilcoxon Signed-Rank Test. Hasil kegiatan menunjukkan peningkatan skor pengetahuan peserta dari rata-rata pretest 62 menjadi posttest 97 dengan hasil analisis menunjukkan adanya perbedaan yang signifikan setelah pemberian edukasi ($p < 0,001$). Program edukasi berbasis komunitas melalui pendekatan pangan lokal dapat menjadi strategi promotif dalam meningkatkan pemahaman ibu hamil mengenai pencegahan anemia dan penerapan pola konsumsi bergizi selama kehamilan.

Kata Kunci: *anemia, ibu hamil, pisang ambon, buah naga*

Submitted: 20-01-2025 Revised: 02-04-2025 Accepted: 15-04-2025

DOI: https://doi.org/10.53713/jcemty.v3i1.319
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Volume 03, Number 01 (May 2025)
p-ISSN: 2987-5072 e-ISSN: 2987-5080

INTRODUCTION

Low Birth Weight (LBW) is a critical public health indicator, as it is closely associated with increased risks of mortality, morbidity, and malnutrition in infants (Seid et al., 2022). While prematurity is often considered the primary cause of LBW, several other maternal and fetal factors contribute to its incidence (Liu et al., 2021; Rahmawati et al., 2024). Maternal factors include age (less than 20 years or more than 40 years), parity, and comorbidities such as anemia, preeclampsia, and chronic energy deficiency (CED) (Lutfia & Al Farizi, 2024). Fetal factors like umbilical cord complications, multiple pregnancies, and congenital abnormalities also play a significant role (Shaohua et al., 2022). Addressing these underlying causes is essential for reducing the prevalence of LBW and improving child health outcomes (Islam et al., 2024; Faqih et al., 2025).

Stunting in infants aged 0-11 months is another primary concern, with LBW, prematurity, and infectious diseases identified as significant contributing factors (Halli et al., 2021). Stunting reflects long-term nutritional deficiencies and poor health during early childhood, which can impact physical and cognitive development (Soliman et al., 2021; Wardani, 2024). Preventing LBW is therefore not only crucial for immediate infant survival but also for ensuring proper growth and development in the long term (Darmstadt et al., 2022). Public health strategies must focus on mitigating the root causes of LBW to break the cycle of stunting and its associated adverse effects (Firdaus & Maulana, 2025; Shofa et al., 2024).

Anemia during pregnancy is one of the leading contributors to LBW and poses serious risks to both mothers and infants (Khezri et al., 2025). According to data from the PWS GIZI KIA Cempaka Putih Health Center for September 2024, the incidence of LBW was recorded at 3.7%, exceeding the target of less than 3%. Among these cases, 58.8% were attributed to maternal anemia, highlighting its significant impact. Anemia results from insufficient red blood cell production, influenced by gender, lifestyle habits, and pregnancy stage (Deivita et al., 2020; Carolin et al., 2023). It compromises oxygen delivery to tissues, affecting maternal health and increasing the likelihood of complications during childbirth (Watkins et al., 2020).

The consequences of anemia extend beyond the mother, impacting fetal development and newborn health (Shi et al., 2022). Infants born to anemic mothers often lack adequate iron reserves, predisposing them to anemia later in life (James, 2021). This condition exacerbates the risk of developmental delays and infection susceptibility (Obeagu, 2025). Furthermore, anemia contributes to higher rates of maternal and infant morbidity and mortality, underscoring the need for effective interventions (Williams et al., 2023). Governments worldwide have prioritized addressing anemia through programs such as iron supplementation and dietary recommendations to improve pregnancy outcomes and reduce LBW rates (Mildon et al., 2023; Ferasinta et al., 2024).

Iron supplementation remains one of the most effective strategies for combating anemia during pregnancy (Skolmowska et al., 2021). Each iron tablet typically contains 200 mg of ferrous sulfate

to meet physiological needs during gestation. Pregnant women are advised to consume at least 90 tablets throughout their pregnancy to maintain optimal hemoglobin levels (Elsharkawy et al., 2021). However, reliance solely on supplements may not suffice, as dietary practices play a complementary role in preventing anemia. Consuming foods rich in iron, folic acid, and vitamin C can enhance nutrient absorption and utilization, providing additional benefits for maternal and fetal health (Basrowi & Dilantika, 2021).

Non-pharmacological approaches, such as incorporating nutrient-dense fruits into diets, offer promising alternatives for managing anemia (Khare et al., 2022). For instance, Ambon bananas (*Musa Paradisica var. sapientum Linn*.) are readily available and affordable, making them an ideal choice for pregnant women (Ruspita et al., 2022). These bananas contain essential nutrients such as iron, vitamin C, and B vitamins, which collectively support red blood cell formation and iron absorption. Regular consumption of Ambon bananas has been shown to effectively increase hemoglobin levels, demonstrating their potential as a natural remedy for anemia (Supriati & Kusumastuti, 2024).

Similarly, red dragon fruit (*Hylocereus polyrhizus*) is another fruit recognized for its high nutritional value and ability to combat anemia (Sofyana, 2022). Rich in iron, vitamin C, and riboflavin, dragon fruit aids red blood cell production and enhances iron metabolism. Its vitamin C content facilitates better iron absorption, while riboflavin supports cellular energy processes. Consuming dragon fruit, especially in processed forms like juice, accelerates nutrient absorption due to its rapid digestion, offering a practical solution for improving maternal nutrition (Qurniasih et al., 2024).

Combining traditional iron supplements with dietary interventions that include fruits such as Ambon bananas and dragon fruit could yield superior results for preventing and treating anemia during pregnancy (Widowati, 2023). Such integrated approaches address anemia's multifaceted nature, leveraging pharmacological and non-pharmacological methods. By promoting awareness of and access to these natural remedies, healthcare systems can empower pregnant women to adopt healthier lifestyles, ultimately reducing the burden of anemia-related complications (Choudhury et al., 2022).

Tackling the issue of LBW requires a comprehensive understanding of its underlying causes, particularly anemia during pregnancy. Effective prevention strategies involve a combination of iron supplementation, dietary modifications, and education about nutrient-rich foods (Obeagu, 2024). Encouraging the consumption of fruits such as Ambon bananas and dragon fruit can significantly improve maternal health outcomes, reduce the incidence of LBW, and contribute to healthier future generations (Muliawati et al., 2022). Further research and policy initiatives should prioritize scaling up these interventions to ensure equitable access and sustainability across diverse populations. This community service activity aimed to improve pregnant women's knowledge regarding anemia prevention through health education and the introduction of complementary nutritional approaches using Ambon bananas and dragon fruit. The activity also evaluated changes in participants'

Volume 03, Number 01 (May 2025)
p-ISSN: 2987-5072 e-ISSN: 2987-5080

knowledge before and after the intervention as an effort to support the prevention of anemia-related complications during pregnancy.

METHOD

The community service activity was conducted on December 28, 2024, from 09.30 to 12.30 WIB at the Cempaka Putih District Health Center. The participants consisted of 15 pregnant women in the first to third trimester, accompanied by one Posyandu cadre and one participant from PKK Pokja IV. The activity aimed to increase pregnant women's knowledge regarding anemia prevention through health education and the introduction of complementary nutritional practices using Ambon bananas and red dragon fruit.

The materials provided in this activity included education on anemia in pregnancy, risk factors, signs and symptoms, impacts on maternal and fetal health, prevention strategies through balanced nutrition and iron supplementation, as well as pharmacological and non-pharmacological approaches. The complementary nutritional intervention introduced in this activity was "AKSI NGEMIL SANG NAGA" (Education to Prevent Anemia for Pregnant Women with Bananas and Dragon Fruit), which demonstrated the preparation of juice consisting of 50 grams of Ambon banana, 100 grams of red dragon fruit, and 100 cc of water per 250 cc serving.

The instruments used for the activity included educational media (projector, laptop, banner, and speaker), stationery, activity documentation materials, and structured pretest and posttest questionnaires. The activity was implemented in several stages, including an opening session featuring pregnancy exercises to improve physical fitness and participants' readiness, followed by anemia counseling, interactive question-and-answer discussions, and demonstrations of Ambon banana and red dragon fruit juice preparation.

The effectiveness of the educational intervention was evaluated by measuring changes in participants' knowledge before and after the activity using pretest and posttest questionnaires. The collected data were analyzed using the Wilcoxon Signed-Rank Test to determine differences in knowledge scores before and after the intervention. This non-parametric statistical test was selected because the data consisted of paired measurements from the same participants and were used to evaluate changes following the educational intervention. A significance level of $p < 0.05$ was considered statistically significant.

RESULT AND DISCUSSION

Table 1 presents the demographic and pregnancy-related characteristics of the 15 pregnant women who participated in the community service activity at the Cempaka Putih District Health Center. The participants represented various reproductive age groups, with the highest proportion

observed among women aged 20–25 years (40.0%), followed by those aged 26–30 years (33.3%) and 31–35 years (26.7%). Regarding educational background, most participants had completed senior high school (46.7%), while others had completed junior high school (20.0%), higher education (20.0%), or elementary school (13.3%). In terms of occupational status, most participants were housewives (66.7%), with the remainder being employees (20.0%) and entrepreneurs (13.3%). Pregnancy characteristics showed that most participants were in the second trimester (40.0%), followed by the third trimester (33.3%) and first trimester (26.7%). Based on pregnancy history, most participants were classified as multigravida (60.0%), while 40.0% were primigravida. These characteristics indicate that the educational intervention involved pregnant women with diverse demographic and pregnancy backgrounds, providing a representative overview of the target population involved in anemia prevention activities.

Table 1. Characteristics of Pregnant Women Participants (n = 15)

Characteristics	Category	n (%)
Age (years)	20–25	6 (40.0)
	26–30	5 (33.3)
	31–35	4 (26.7)
Education level	Elementary school	2 (13.3)
	Junior high school	3 (20.0)
	Senior high school	7 (46.7)
	Higher education	3 (20.0)
Occupation	Housewife	10 (66.7)
	Employee	3 (20.0)
	Entrepreneur	2 (13.3)
Pregnancy trimester	First trimester (TM I)	4 (26.7)
	Second trimester (TM II)	6 (40.0)
	Third trimester (TM III)	5 (33.3)
Pregnancy status	Primigravida (first pregnancy)	6 (40.0)
	Multigravida (≥2 pregnancies)	9 (60.0)
Anemia history	Had history of anemia	8 (53.3)
	No history of anemia	7 (46.7)

The Wilcoxon Signed-Rank Test showed a significant difference in pregnant women's knowledge scores before and after the educational intervention ($Z = -3.408$, $p < 0.001$). The mean knowledge score increased from 62.00 ± 8.62 in the pretest to 97.00 ± 4.88 in the posttest. These findings indicate that the counseling intervention effectively improved pregnant women's knowledge regarding anemia prevention.

Table 2. Comparison of Knowledge Scores Before and After Health Education (n = 15)

Knowledge Score	Mean ± SD	Median (Min–Max)	Z value	p-value
Pretest	62.00 ± 8.62	60 (45–75)	-3.408	<0.001*
Posttest	97.00 ± 4.88	100 (85–100)		

Community service activities included health counseling, held on Saturday, December 28, 2024, at 08.30-12.30 WIB. One cadre, 1 PKK Pokja IV person, and 15 pregnant women attended

Volume 03, Number 01 (May 2025)
p-ISSN: 2987-5072 e-ISSN: 2987-5080

this activity. This activity began with giving a pretest to pregnant women; the average pretest score was 62 points. This shows that mothers' knowledge about anemia remains limited, so counseling on anemia in pregnant women was carried out, and anemia prevention efforts were demonstrated through the consumption of Ambon bananas and dragon fruit. Participants seemed enthusiastic about the activity; six mothers actively asked questions. The activity was evaluated by administering a posttest to participants. The average posttest result was 97 points. This shows that there is an increase in good knowledge from pregnant women about anemia as an effort to prevent LBW. Based on the activity results, there has been a significant increase in pregnant women's knowledge of anemia as an effort to prevent LBW, and participant feedback was positive.

Anemia during pregnancy is a significant public health concern, as it not only affects maternal health but also compromises fetal development and increases the risk of adverse birth outcomes. It is diagnosed when hemoglobin (Hb) levels fall below 11 g/dL in the first and third trimesters, below 10.5 g/dL in the second trimester, and below 10 g/dL postpartum. This condition arises when the body lacks sufficient red blood cells to meet its physiological needs, which vary based on factors such as gender, age, smoking habits, and stage of pregnancy. The consequences of anemia extend beyond the mother, as infants born to anemic mothers often have depleted iron reserves, predisposing them to anemia early in life. This intergenerational impact underscores the urgency of addressing anemia during pregnancy (Davidson et al., 2023).

The detrimental effects of anemia on pregnant women are profound, contributing to increased maternal morbidity and mortality, higher rates of fetal morbidity and mortality, and an elevated risk of low birth weight (LBW). Several factors contribute to anemia in pregnancy, including inadequate birth spacing, insufficient iron supplementation, frequent consumption of coffee or tea, limited knowledge about nutrition, advanced maternal age, gestational age, and parity. These factors collectively exacerbate nutritional deficiencies, particularly iron deficiency, the leading cause of anemia. Additionally, poor dietary practices and socioeconomic challenges compound the issue, making it imperative to implement community-based interventions that effectively address these root causes (Balcha et al., 2023; Novelia et al., 2022).

Iron is an essential nutrient required for the production of red blood cells, and its sources can be broadly categorized as animal- and plant-based. Animal sources include eggs, milk, meat, fish, and liver, while plant-based sources encompass soybeans, green beans, tempeh, tofu, spinach, kale, and *katuk* leaves. Pregnant women require approximately 15 mg of iron daily to meet their physiological demands. While iron supplements remain a cornerstone of anemia prevention, dietary modifications play a complementary role in ensuring adequate iron intake. Fruits such as Ambon bananas, dates, and dragon fruit, as well as tubers like sweet potatoes, are rich in iron and other micronutrients, offering natural alternatives to support maternal health (Widowati, 2023; Sukmawati et al., 2024).

Among these fruits, dragon fruit stands out for its high nutritional value and potential to combat anemia. Rich in iron, folic acid, protein, and minerals like calcium and magnesium, dragon fruit is particularly beneficial for pregnant women. Its vitamin C content enhances iron absorption, aiding hemoglobin formation and improving blood circulation. Additionally, dragon fruit supports the immune system, promotes digestive health, reduces stress, and helps neutralize toxins in the blood. These properties make it an excellent dietary addition for pregnant women seeking to prevent or manage anemia. Moreover, consuming dragon fruit juice accelerates nutrient absorption, providing quicker benefits than whole-fruit consumption (Futriani et al., 2024).

Community-based interventions to educate pregnant women about the benefits of dragon fruit and other iron-rich foods are crucial for addressing anemia. Many women lack awareness of the nutritional value of locally available fruits and their role in preventing anemia. By disseminating knowledge through workshops, counseling sessions, and practical demonstrations, healthcare providers can empower pregnant women to adopt healthier dietary practices. For instance, teaching women how to prepare dragon fruit juice or incorporate Ambon bananas into their diets can significantly improve their hemoglobin levels and overall health. Such initiatives enhance maternal well-being and improve birth outcomes (Azhar et al., 2024; Febriani et al., 2024).

Integrating traditional food-based interventions with modern medical practices offers a holistic approach to managing anemia during pregnancy. While iron supplements remain indispensable, they should complement dietary strategies emphasizing nutrient-dense foods. This dual approach addresses the immediate need for iron supplementation and the long-term goal of fostering sustainable dietary habits. Furthermore, leveraging culturally appropriate and locally available resources ensures that interventions are cost-effective and accessible, particularly in underserved communities where anemia prevalence is highest (Morrison et al., 2023).

Addressing anemia during pregnancy requires a multifaceted strategy that combines education, dietary modifications, and medical interventions. Dragon fruit and other iron-rich fruits and vegetables are promising for combating anemia and improving maternal health outcomes (Rahmiati et al., 2023). Community engagement and empowerment are key to ensuring the success of such initiatives, as they foster ownership and sustainability. By prioritizing preventive measures and promoting healthy dietary practices, we can reduce the burden of anemia, enhance maternal and child health, and ultimately contribute to healthier communities.

The findings of this community service activity are consistent with recent evidence highlighting the importance of structured nutrition education in improving maternal knowledge and anemia prevention practices. In Indonesia, Arifah et al. (2023) demonstrated the potential of daily educational messages to improve pregnant women's knowledge of anemia prevention and their preventive behaviors, while Permatasari et al. (2021) reported improvements in maternal nutrition-related knowledge, attitudes, and practices following an educational intervention. Furthermore, a systematic review and meta-analysis by Engidaw et al. (2025) found that nutrition education during

pregnancy was associated with improved adherence to iron–folic acid supplementation and better anemia-related outcomes. In the present activity, the mean knowledge score increased from 62.00 on the pretest to 97.00 on the posttest, indicating a substantial improvement following the counseling session. The integration of structured health education with practical demonstrations involving locally available foods may have helped participants understand anemia prevention messages more effectively. These findings support the potential value of community-based educational activities as an accessible strategy to strengthen maternal health literacy and promote preventive practices during pregnancy.

Improved maternal knowledge represents an important initial step toward anemia prevention; however, sustained behavioral changes and appropriate clinical management are also necessary to achieve meaningful maternal and neonatal health outcomes. Pregnant women should be encouraged to consume a diverse, nutrient-dense diet containing iron-rich foods, combine plant-based iron sources with vitamin C-rich foods to enhance non-heme iron absorption, and adhere to iron–folic acid supplementation in accordance with antenatal care recommendations. Evidence from a systematic review of randomized controlled trials indicates that dietary interventions may contribute to the prevention and management of iron-deficiency anemia during pregnancy (Skolmowska et al., 2022). Moreover, inadequate dietary diversity has been associated with maternal anemia and LBW in studies conducted among African populations, highlighting the importance of adequate maternal nutrition, though these findings may not be directly generalizable to Indonesia (Seid et al., 2023). In this context, promoting locally available foods, including fruits and vegetables as part of a balanced diet, may complement established anemia prevention strategies. Nevertheless, the present activity assessed changes in knowledge rather than in dietary adherence, hemoglobin concentrations, or birth outcomes. Therefore, the observed improvement should be interpreted as an educational outcome rather than as direct evidence of reduced anemia or LBW prevention.

Several limitations should be considered when interpreting these findings. First, the activity involved only 15 pregnant women at a single community health center, limiting the generalizability of the results to other settings and populations. Second, the evaluation relied on immediate pretest and posttest assessments without a follow-up period; consequently, the extent to which knowledge was retained or translated into sustained dietary changes and preventive behaviors remains unknown. Third, the absence of a control group limits the ability to attribute the observed improvement exclusively to the educational intervention. In addition, hemoglobin concentrations, adherence to iron–folic acid supplementation, and birth outcomes were not assessed, preventing conclusions regarding the intervention's clinical effectiveness in preventing maternal anemia or LBW. Future community service activities should incorporate follow-up assessments, reinforce counseling through community health cadres and antenatal care providers, and evaluate dietary practices and adherence to supplementation. Where feasible, hemoglobin measurements and appropriate maternal and neonatal outcomes should also be monitored. Larger studies using controlled designs

would provide stronger evidence regarding the effectiveness and sustainability of community-based educational interventions for maternal anemia prevention.

CONCLUSION AND SUGGESTIONS

The community service activity at Cempaka Putih District Health Center successfully improved pregnant women's knowledge regarding anemia prevention. The Wilcoxon Signed-Rank Test showed a significant difference in knowledge scores before and after the educational intervention, indicating that counseling, discussion, and demonstration activities effectively increased participants' understanding of the causes, symptoms, prevention, and management of anemia. The "AKSI NGEMIL SANG NAGA" program, which introduced Ambon bananas and red dragon fruit as a complementary nutritional approach, received positive responses from participants and encouraged the adoption of healthier dietary practices during pregnancy. This community-based education program can be considered an effective strategy to strengthen anemia prevention efforts among pregnant women. Continuous implementation involving healthcare providers, Posyandu cadres, and families is recommended to expand the reach of health education programs and support sustainable healthy lifestyle practices during pregnancy.

ACKNOWLEDGEMENTS

Thank you to the supervising lecturer and all colleagues who contributed to this Community Service, enabling this activity to be held smoothly and successfully. Thank you to the Cempaka Putih Health Center and all participants for facilitating and supporting this Community Service.

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