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Empowering Pregnant Women Through Beetroot and Red Guava Juice Utilization for Anemia Prevention at Jamilah Independent Midwifery Practice South Jakarta

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Abstract

Background: Anemia during pregnancy remains a major public health concern associated with an increased risk of adverse maternal and fetal outcomes. Prevention strategies should not rely solely on Iron and Folic Acid (IFA) supplementation, but also on adequate nutritional intake. Beetroot (*Beta vulgaris*) and red guava (*Psidium guajava*) are rich in iron-supporting nutrients, vitamin C, folate, and antioxidants, making them potential dietary complements for anemia prevention.

Objective: This community service program aimed to improve pregnant women's knowledge and practical skills regarding anemia prevention through health education and demonstrations on preparing beetroot and red guava juice.

Methods: The program was conducted at Jamilah Independent Midwifery Practice, South Jakarta, Indonesia, involving 15 pregnant women. The intervention consisted of health education, demonstrations and hands-on practice in preparing beetroot and red guava juice, interactive discussions, individual consultations, distribution of educational leaflets, and evaluation using pre-test and post-test questionnaires. Participants' practical skills were also assessed through direct observation.Results: The educational intervention resulted in a marked improvement in participants' knowledge. The mean knowledge score increased from 61.7 in the pre-test to 87.7 in the post-test, representing an average increase of 26.0 points (42.1%). In addition, 14 participants (93.3%)

successfully prepared beetroot and red guava juice independently according to the demonstrated procedures. Participants also understood that beetroot and red guava juice should be consumed as part of a balanced diet and serves as a dietary complement rather than a substitute for routine Iron and Folic Acid (IFA) supplementation recommended during pregnancy.

Conclusion: This community service program effectively improved pregnant women's knowledge and practical skills related to anemia prevention through the utilization of beetroot and red guava juice. Integrating nutrition education with practical demonstrations may strengthen healthy dietary behaviors among pregnant women and support ongoing efforts to reduce the risk of anemia during pregnancy.

Keywords: Anemia prevention, Pregnant women, Beetroot (*Beta vulgaris*), Red guava (*Psidium guajava*), Community service.

Introduction

Anemia during pregnancy remains one of the most prevalent public health problems worldwide and is associated with adverse maternal and neonatal outcomes. The World Health Organization (WHO) defines anemia in pregnancy as a hemoglobin concentration of less than 11.0 g/dL. Maternal anemia has been linked to an increased risk of maternal fatigue, impaired immune function, postpartum hemorrhage, preterm birth, low birth weight, and perinatal mortality, particularly in low- and middle-income countries (World Health Organization [WHO], 2025).

Globally, approximately 37% of pregnant women are affected by anemia, making it one of the leading nutritional disorders during pregnancy (WHO, 2025). In Indonesia, maternal anemia continues to be a major public health concern despite national efforts to improve antenatal care and nutritional interventions. The Ministry of Health recommends routine Iron and Folic Acid (IFA) supplementation, nutrition counseling, and regular antenatal care as key strategies for preventing anemia during pregnancy (Ministry of Health of the Republic of Indonesia, 2020).

Iron deficiency is the primary cause of anemia during pregnancy because maternal iron requirements increase substantially to support fetal growth, placental development, and

expansion of maternal blood volume. Other contributing factors include folate deficiency, vitamin B12 deficiency, parasitic infections, chronic diseases, and inadequate dietary intake (Cunningham et al., 2022). Although IFA supplementation is considered the cornerstone of anemia prevention, dietary improvement remains essential because adequate nutrient intake enhances hematopoiesis and supports optimal maternal nutritional status (Pavord et al., 2020).

Increasing attention has been directed toward food-based approaches that complement iron supplementation. Beetroot (*Beta vulgaris*) contains folate, vitamin C, iron, polyphenols, and dietary nitrates that may support erythropoiesis and improve vascular function. In addition, its antioxidant properties may contribute to better maternal health (Clifford et al., 2015). Red guava (*Psidium guajava* L.) is recognized as an excellent source of vitamin C, which enhances the absorption of non-heme iron and improves iron bioavailability, making it a valuable dietary component in anemia prevention (Nair et al., 2018).

Despite the nutritional potential of beetroot and red guava, awareness among pregnant women regarding their health benefits and appropriate preparation methods remains limited. Previous studies have demonstrated that nutrition education significantly improves maternal knowledge, dietary practices, and adherence to anemia prevention strategies during pregnancy (Ghaffar et al., 2022; Omer et al., 2021). Educational interventions that combine health counseling with practical demonstrations are more effective than conventional lectures because they improve both knowledge acquisition and practical skills.

Based on these considerations, a community service program entitled "Empowering Pregnant Women Through Beetroot and Red Guava Juice Utilization for Anemia Prevention" was implemented at Jamilah Independent Midwifery Practice, South Jakarta, Indonesia. The program aimed to improve pregnant women's knowledge and practical skills regarding anemia prevention through health education, demonstrations of beetroot and red guava juice preparation, and guidance on healthy dietary practices during pregnancy. It is expected that this intervention will encourage healthier nutritional behaviors and contribute to reducing the risk of anemia among pregnant women.

Method

This community service program was conducted at Jamilah Independent Midwifery Practice, South Jakarta, Indonesia, involving 15 pregnant women as participants. The program employed an educational, participatory, and demonstration-based approach to improve pregnant women's knowledge and practical skills regarding anemia prevention through the utilization of beetroot (*Beta vulgaris*) and red guava (*Psidium guajava* L.) juice.

The program consisted of three phases: preparation, implementation, and evaluation. During the preparation phase, the community service team coordinated with the collaborating midwife, developed educational materials and leaflets, prepared pre-test and post-test questionnaires, and organized the equipment and ingredients required for the juice preparation demonstration.

The implementation phase began with a pre-test to assess participants' baseline knowledge regarding anemia during pregnancy, the importance of routine Iron and Folic Acid (IFA) supplementation, and the nutritional benefits of beetroot and red guava in supporting anemia prevention. This was followed by an interactive health education session covering the causes, risk factors, consequences, and preventive measures of anemia during pregnancy. Participants also received information on the nutritional value of beetroot and red guava and their role as complementary foods to support hemoglobin formation.

Following the educational session, participants attended a live demonstration and hands-on practice on preparing beetroot and red guava juice using hygienic and safe food preparation techniques. Interactive discussions, question-and-answer sessions, individual consultations, and the distribution of educational leaflets were incorporated to reinforce participants' understanding and encourage healthy dietary practices during pregnancy.

Program effectiveness was evaluated using a pre-test and post-test design. Knowledge improvement was assessed by comparing the mean scores obtained before and after the educational intervention. In addition, participants' practical skills in preparing the juice were evaluated through direct observation using a standardized observation checklist. The findings were analyzed descriptively and presented as mean scores and percentages to describe changes in participants' knowledge and practical skills following the

intervention.

Results

The community service program was successfully conducted at Jamilah Independent Midwifery Practice, South Jakarta, Indonesia, involving 15 pregnant women. All planned activities were completed, including health education on anemia during pregnancy, demonstrations and hands-on practice in preparing beetroot (*Beta vulgaris*) and red guava (*Psidium guajava* L.) juice, interactive discussions, distribution of educational leaflets, and evaluation using pre-test and post-test assessments.

Participants actively engaged in the educational sessions and practical activities. Based on direct observation, 14 participants (93.3%) were able to independently prepare beetroot and red guava juice according to the demonstrated procedures, while one participant (6.7%) required additional assistance.

Table 1. Comparison of Participants' Knowledge Scores Before and After the Educational Intervention

Assessment	Mean Score	Mean Difference	Percentage Increase
Pre-test	61.7	–	–
Post-test	87.7	26.0	42.1%

The pre-test and post-test assessments demonstrated an improvement in participants' knowledge regarding anemia prevention. The mean knowledge score increased from 61.7 before the intervention to 87.7 after the intervention, representing an increase of 26.0 points (42.1%) (Table 1).

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Discussion

The present community service program demonstrated that integrating health education with practical demonstrations effectively improved pregnant women's knowledge regarding anemia prevention. Participants' mean knowledge score increased from 61.7 before the intervention to 87.7 after the intervention, representing an improvement of 42.1%. This finding suggests that combining educational sessions with hands-on practice can enhance participants' understanding and facilitate the acquisition of practical skills related to healthy dietary practices during pregnancy.

The improvement in knowledge may be attributed to the interactive educational approach adopted in this program. In addition to lectures, participants were actively involved in demonstrations, practical juice preparation, interactive discussions, and individual consultations. Active learning strategies encourage participants to engage directly in the learning process, thereby improving knowledge retention and promoting behavioral change. Similar findings have been reported in previous studies showing that nutrition education significantly improves pregnant women's knowledge, dietary practices, and adherence to anemia prevention strategies (Ghaffar et al., 2022; Omer et al., 2021).

In addition to improving knowledge, the practical component of the program successfully enhanced participants' skills. The observation results showed that 93.3% of participants were able to independently prepare beetroot and red guava juice following the demonstration. Practical demonstrations allow participants to directly observe and apply the recommended procedures, making educational messages easier to understand and implement in daily life. This finding supports previous evidence that experiential

learning approaches are more effective than passive educational methods in developing practical health-related skills (Ghaffar et al., 2022).

The educational materials emphasized that anemia prevention during pregnancy requires a comprehensive approach combining routine Iron and Folic Acid (IFA) supplementation with a balanced and nutritious diet. Beetroot (*Beta vulgaris*) contains folate, iron, vitamin C, dietary nitrates, and antioxidant compounds that may support erythropoiesis and vascular health (Clifford et al., 2015). Meanwhile, red guava (*Psidium guajava* L.) is an excellent source of vitamin C, which enhances the intestinal absorption of non-heme iron and improves iron bioavailability (Nair et al., 2018). Therefore, beetroot and red guava juice may serve as a nutritious dietary complement to support anemia prevention. However, participants were clearly informed that this beverage should complement rather than replace routine Iron and Folic Acid (IFA) supplementation, which remains the standard recommendation during pregnancy (World Health Organization [WHO], 2016; Ministry of Health of the Republic of Indonesia, 2020).

The findings of this program are consistent with previous studies reporting that nutrition education contributes to improved maternal knowledge and encourages healthier dietary behaviors during pregnancy (Ghaffar et al., 2022; Omer et al., 2021). Although improved knowledge does not necessarily translate into immediate behavioral change, it represents an important first step toward increasing adherence to healthy eating practices and routine IFA supplementation, both of which are essential for rducing the risk of maternal anemia.

This program has several limitations. First, the number of participants was relatively small (n = 15), limiting the generalizability of the findings. Second, knowledge was evaluated immediately after the educational intervention; therefore, long-term knowledge retention and behavioral changes could not be assessed. Third, no clinical indicators, such as hemoglobin concentration, were measured before or after the intervention. Future community-based programs should incorporate larger sample sizes, longer follow-up periods, and clinical outcome measurements to evaluate the sustainability and effectiveness of nutrition education interventions for anemia prevention during pregnancy.

Overall, this community service program demonstrated that integrating health education

with practical food preparation activities is a feasible and acceptable strategy for improving pregnant women's knowledge and practical skills related to anemia prevention. Such community-based educational interventions may complement existing maternal health programs aimed at reducing the burden of anemia during pregnancy.

Conclusion

This community service program successfully improved pregnant women's knowledge and practical skills regarding anemia prevention through health education and demonstrations on preparing beetroot (*Beta vulgaris*) and red guava (*Psidium guajava* L.) juice. Integrating nutrition education with practical demonstrations may serve as an effective community-based strategy to promote healthy dietary practices. Future programs should involve larger sample sizes, longer follow-up periods, and clinical outcome measurements, such as hemoglobin levels, to evaluate the long-term effectiveness of the intervention.

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