ABDIMAS POLSAKA
ISSN (Online) : 2829-162X
OPEN ACCESS
JURNAL PENGABDIAN KEPADA MASYARAKAT
Publisher : LPPM Politeknik Sandi Karsa, Sulawesi Selatan, Indonesia
DOI: 10.35816/abdimaspolsaka
DOI: https://doi.org/10.35816/abdimaspolsaka.v4i2.106

Socialization of making moringa pudding to increase HB levels for pregnant women with anemia

Hasnita[a]*, **Uliarta Marbun**[a], **Irnawati**[a]
[a] Midwifery Department, STIKES Nani Hasanuddin, South Sulawesi, Indonesia

Corresponding Author:s
Hasnita, Midwifery Department, STIKES Nani Hasanuddin, South Sulawesi, Indonesia. Email: hasnita@stikesnh.ac.id

Received: 05 July 2025 | Revised: 05 August 2025 | Accepted: 01 September 2025 | Published: 10 September 2025

ABSTRACT
Anemia remains a significant public health concern among pregnant women, with increased risks of complications during pregnancy, low birth weight, and maternal mortality. Pregnant women require twice as much iron as non-pregnant women, making adequate iron intake essential. Moringa (Moringa oleifera) leaves, rich in iron and essential nutrients, can potentially improve haemoglobin (Hb) levels. This community service program aimed to provide education on the benefits of moringa leaves and to demonstrate the preparation of nutrient-rich moringa pudding as a healthy, locally sourced alternative to prevent anaemia in pregnant women. The activity was conducted at Pattingaloang Public Health Centre, involving 13 pregnant women. The implementation included lectures, leaflets, discussions, and demonstrations of moringa pudding preparation. Pre- and post-tests were used to measure participants' knowledge. Results showed an increase in the proportion of participants with sound knowledge from 77% before the intervention to 100% afterwards. The active participation and enthusiasm of the attendees indicated high acceptance of the intervention. This initiative improved knowledge and skills in utilising moringa leaves for nutritional enhancement during pregnancy. It also encouraged community empowerment by promoting local food processing innovations. Sustained implementation of such programs can potentially reduce anemia prevalence and improve maternal health outcomes.

Keywords: Anemia, Health Education, Hemoglobin, Moringa Pudding, Pregnant Women.

INTRODUCTION

Anemia is one of the most common health problems experienced by pregnant women and remains a serious public health concern. According to WHO (2021), the global prevalence of anemia among pregnant women reaches 26.2%, while national data from Riskesdas (2018) indicate a prevalence of 48.9% in Indonesia. Although there has been a decline, the prevalence in 2021 still reached 10.32%. This condition significantly impacts maternal and infant health, increasing the risk of pregnancy and childbirth complications, low birth weight (LBW), stunting, and even maternal mortality [1] [2].

The primary cause of anemia during pregnancy is iron deficiency, as the iron requirement for pregnant women is nearly double that of non-pregnant women [3]. An average of 800–1040 mg of iron is needed during pregnancy, with around 300 mg used for fetal growth, 50–75 mg for placental formation, and 500 mg to increase maternal hemoglobin mass [4]. Additionally, approximately 200 mg is lost through the intestines, urine, and skin, and another 200 mg during delivery. This high demand underscores the importance of adequate iron intake in supporting maternal health and fetal development [5].

One effective strategy to prevent and address iron deficiency anemia is through dietary interventions that increase iron intake, particularly from iron-rich vegetables [6]. Moringa oleifera, locally known as kelor, is a green leafy vegetable rich in iron and other essential nutrients, making it an ideal natural supplement for improving hemoglobin levels [7]. Previous studies have shown that moringa consumption can effectively increase hemoglobin concentrations in adolescents and pregnant women. Moringa is also widely available in Indonesia, making it a sustainable and accessible dietary intervention [8].

Despite its proven nutritional benefits, many pregnant women still have low awareness and knowledge about incorporating moringa into their daily diets [9]. In addition, compliance with iron supplementation programs, such as the recommended consumption of 90 iron tablets during pregnancy, remains low. Therefore, promoting moringa-based food products can be an alternative and complementary approach to meet nutritional needs during pregnancy [10] [11].

One promising approach is the development of moringa-based food preparations that are both nutritious and appealing to the local palate, such as moringa leaf pudding [12]. Pudding is generally well accepted across communities, and incorporating moringa into this popular dessert can encourage higher consumption while maintaining nutritional benefits. Such innovations improve dietary diversity and empower communities to utilise local food sources for better health outcomes [13].

This community service program was conducted at Puskesmas Pattingaloang, where initial surveys showed that many pregnant women suffered from anemia. The initiative aimed to educate pregnant women and their families about the benefits of moringa, demonstrate the preparation of moringa pudding, and promote its regular consumption as a preventive measure against anemia. The program combined lectures, discussions, leaflets, and hands-on demonstrations to engage participants and ensure practical application. This program addresses knowledge gaps and behavioural barriers in anemia prevention by integrating nutrition education with skill-building activities. Such community-based interventions are expected to increase hemoglobin levels, improve maternal health, and ultimately reduce the incidence of anemia among pregnant women in the region.

METHOD

This community service program was designed to be engaging, innovative, and easy to understand so that pregnant women would be interested and actively participate. The activity employed three primary methods: lectures, leaflets, and demonstrations. The program was implemented under the Regional Partnership Program scheme and conducted within the working area of Puskesmas Pattingaloang, Makassar City.

Participants

The target participants were pregnant women residing in the Puskesmas Pattingaloang working area. 13 pregnant women participated in the activity, two midwives from the health centre, three Posyandu cadres, two lecturers, and five students from the Midwifery Department.

Procedure

The activity began with an opening session and introductions led by the Head Midwife of Puskesmas Pattingaloang. Attendance was recorded, followed by a pre-test to assess participants' initial knowledge and skills regarding using moringa leaves. The educational session covered: The dangers of anemia during pregnancy. The importance of consuming iron tablets (Fe). The nutritional benefits of moringa leaves. A demonstration was conducted following the lecture on preparing moringa leaf pudding as a nutritious and palatable food alternative for pregnant women. The demonstration involved step-by-step preparation, practical tips, and direct involvement of participants.

Evaluation

At the end of the session, a post-test was administered to evaluate changes in participants' knowledge. A discussion and question-and-answer segment allowed participants to clarify information and share experiences. Observations were also made on participants' enthusiasm and ability to replicate the pudding preparation process.

RESULT

The target participants of this community service activity were pregnant women living within the working area of Puskesmas Patingalloang. The activity began with an opening and introduction session led by the Midwife Coordinator of Puskesmas Patingalloang. Attendance was recorded by the student team, followed by a pre-test to assess the participants' baseline knowledge and skills regarding the utilization of moringa leaves.

Next, participants received educational material on the dangers of anemia during pregnancy, the importance of consuming iron tablets, and the benefits of moringa leaves. This was followed by a session on the benefits of moringa pudding and a hands-on training session on preparing it. The methods applied included lectures, discussions, and live demonstrations. Throughout the event, participants showed high enthusiasm, attentively listened to the material, and actively engaged in the question-and-answer session, particularly about the health benefits of moringa leaves.

Table 1. Distribution of pregnant women's knowledge before and after being given education on the benefits of moringa leaves

Knowledge Level	Before		After	
	n	%	n	%
Good	10	77	13	100
Poor	3	23	0	0
Total	13	100	13	100

Based on Table 1, 10 participants (77%) demonstrated good knowledge before receiving the educational session, while 3 participants (23%) had poor knowledge. After the session, all 13 participants (100%) achieved good knowledge levels. This indicates a clear improvement in knowledge following the delivery of educational material on the benefits of moringa leaves. The pudding-making session was attended by 13 pregnant women, supported by a community service team of two lecturers, five students, two midwives from the Puskesmas, and three Posyandu cadres. The active participation and enthusiasm shown by the participants during both the educational and practical sessions reflected the program's effectiveness in increasing awareness and skills in utilising local food sources, such as moringa.

Figure 1. Socialization of moringa pudding and documentation with the community outreach team and participants

DISCUSSION

The community service activity titled "Socialization of Moringa Leaf Pudding Making to Increase Hemoglobin Levels in Pregnant Women with Anemia" was designed as an educational intervention aimed at improving nutritional awareness and dietary practices among pregnant women, specifically targeting the prevention and reduction of anemia. The results showed a marked improvement in participants' knowledge about the nutritional benefits of moringa leaves, with the proportion of participants demonstrating good knowledge increasing from 77% before the intervention to 100% afterwards. This outcome reflects the effectiveness of lecture, leaflet, and demonstration methods in delivering health education.

Anemia in pregnancy remains a significant public health challenge, particularly in low- and middle-income countries such as Indonesia. The World Health Organization (2021) reported a prevalence of 26.2% globally, while national data indicate much higher rates, with the 2018 Basic Health Research survey reporting 48.9% and more recent studies suggesting persistent prevalence above 10% despite ongoing interventions. Anemia during pregnancy increases the risk of maternal mortality, preterm delivery, low birth weight, and stunting [14]. Therefore, innovative approaches that combine education, culturally appropriate food preparation, and local resource utilization are crucial [15].

Moringa (Moringa oleifera) has been identified as a locally available, nutrient-dense plant rich in iron, vitamin C, calcium, and other essential micronutrients. Several studies, such as those, have demonstrated its positive effect on hemoglobin levels among pregnant women [16] [17]. Its affordability, accessibility, and versatility in food preparation make it a promising dietary intervention for anemia prevention. By incorporating moringa leaves into pudding, a familiar and widely accepted snack, the intervention bridges nutritional science with practical application, enhancing the likelihood of sustained dietary change [18].

The active participation and enthusiasm of the pregnant women in both the educational session and hands-on pudding-making activity suggest that practical, skill-based learning is more effective than didactic instruction alone. The interactive approach, including direct demonstrations, allowed participants to receive information and immediately apply it, reinforcing retention and increasing self-efficacy. This finding is consistent with adult learning theories emphasizing experiential learning as a key factor in behavioral change [19].

Support from healthcare workers, particularly midwives from the Puskesmas Pattingaloang, played an important role in the success of the program [20]. Collaboration between community health professionals and academic institutions fosters trust and ensures that interventions are aligned with local health priorities. Furthermore, involving local cadres and community leaders helps embed the intervention within existing health promotion structures, increasing sustainability [21].

Despite these successes, several challenges were encountered. The number of participants (13) fell short of the target (20), limiting the intervention's reach. Time constraints also restricted the opportunity for extended discussion or follow-up monitoring of hemoglobin levels to assess the physiological impact of the intervention. Future programs should aim to expand participation through better scheduling, targeted outreach, and integrating activities into regular antenatal care visits, which could increase attendance without imposing additional burdens on participants [22]. The increase in knowledge observed post-intervention is encouraging, but knowledge alone does not guarantee behavior change. Long-term success in preventing anemia will depend on whether participants incorporate moringa pudding or other iron-rich foods into their regular diet. Ongoing reinforcement through community health workers, cooking demonstrations, and integration into local health campaigns can help solidify the behavior change initiated by this program [23].

Another consideration is that while moringa is an excellent plant-based source of iron, the bioavailability of non-heme iron is lower than that of animal sources. This limitation can be mitigated by pairing moringa with vitamin C-rich foods, enhancing iron absorption, and encouraging a balanced diet with diverse protein sources [24]. In cases of severe anemia, dietary interventions alone may be insufficient, and medical treatment, such as iron supplementation, will remain necessary. Therefore, moringa pudding should be promoted as a complementary sole strategy for anemia prevention [25].

In terms of broader implications, the success of this initiative demonstrates that community-based nutrition education, when combined with locally adapted food innovations, can make meaningful contributions to maternal health. By promoting locally available resources, the intervention aligns with food security principles, sustainability, and cultural relevance. Furthermore, this model can be adapted for other target groups vulnerable to anemia, such as adolescent girls, postpartum mothers, and children at risk of stunting. The findings also reinforce the importance of multisectoral collaboration in public health interventions. Partnerships between educational institutions, healthcare facilities, and community organizations provide technical expertise and enhance community engagement and ownership of health solutions. This participatory approach increases the likelihood of interventions being maintained and scaled up beyond the project's duration. The program effectively increased participants' knowledge about the benefits of moringa leaves and demonstrated a feasible way to incorporate them into a culturally acceptable food product. While future initiatives should address participation rates, follow-up evaluation, and integration into ongoing antenatal care services, this intervention offers a replicable and sustainable strategy to help reduce the burden of anemia among pregnant women. By empowering communities with both knowledge and practical skills, such programs contribute to the long-term goal of improving maternal nutrition and pregnancy outcomes in resource-limited settings.

CONCLUSIONS

The community service activity on "Socialization of Moringa Pudding Preparation to Increase Hemoglobin Levels in Pregnant Women with Anemia" was successfully implemented and achieved its objectives. The program significantly improved the participants' knowledge regarding the nutritional benefits of moringa leaves and their potential role in preventing and addressing anemia during pregnancy. All participants demonstrated increased understanding after receiving educational materials and hands-on training, with the proportion of those with good knowledge rising from 77% before the activity to 100% afterwards.

The active participation of pregnant women, health workers, and community cadres, along with using practical, easy-to-apply food processing techniques, contributed to the program's success. Moringa pudding was well accepted as a nutritious, locally sourced alternative food that can be integrated into daily diets to support maternal health. Recommendations: Sustainability, Conduct regular programs with health centers to maintain and expand knowledge of local nutrient-rich foods. Wider Reach, Involve more participants and families to strengthen nutritional support. Integration, Promote moringa products through maternal health services and nutritional programs. Monitoring and evaluating hemoglobin changes and the long-term impact of moringa consumption.

References

[1] M. Abdulsalam, M. Tessema, M. Mohsin, T. Malik, and F. I. Abdulsalam, "Determining factors associated with anaemia in pregnant women visiting the antenatal care unit at St. Paul's Hospital, Addis Ababa, Ethiopia: Unmatched case-control study," *Women Child. Nurs.*, vol. 3, no. 1, pp. 27–34, Mar. 2025, doi: https://doi.org/10.1016/j.wcn.2025.02.001.

[2] B. B. Afolabi *et al.*, "Intravenous versus oral iron for anaemia among pregnant women in Nigeria (IVON): an open-label, randomised controlled trial," *Lancet Glob. Heal.*, vol. 12, no. 10, pp. e1649–e1659, 2024, doi: https://doi.org/10.1016/S2214-109X(24)00239-0.

[3] I. Angeles-Agdeppa *et al.*, "Drivers of anemia reduction among women of reproductive age in the Philippines: a country case study," *Am. J. Clin. Nutr.*, vol. 121, pp. S57–S67, 2025, doi: https://doi.org/10.1016/j.ajcnut.2024.06.005.

[4] K. Ahmed, F. S. Parveen, and N. K. Inamdar, "Effect of Unani formulation on iron deficiency anemia in women of reproductive age: A prospective randomized controlled trial," *Clin. Tradit. Med. Pharmacol.*, vol. 6, no. 3, p. 200224, 2025, doi: https://doi.org/10.1016/j.ctmp.2025.200224.

[5] A. Banerjee *et al.*, "Efficacy of daily versus intermittent oral iron supplementation for

prevention of anaemia among pregnant women: a systematic review and meta-analysis," *eClinicalMedicine*, vol. 74, p. 102742, 2024, doi: https://doi.org/10.1016/j.eclinm.2024.102742.
[6] E. T. Burayu and B. D. Degefa, "Exploration of iron deficiency anemia and its associated factors among pregnant women seeking antenatal care in public health facilities of southwestern Ethiopia. A mixed study," *AJOG Glob. Reports*, vol. 4, no. 4, p. 100417, 2024, doi: https://doi.org/10.1016/j.xagr.2024.100417.
[7] J. L. Burns, C. H. Miller, B. Fontaine-Bisson, and K. L. Connor, "Iron deficiency and iron deficiency anaemia in women of reproductive age: Sex- and gender-based risk factors and inequities," *J. Trace Elem. Med. Biol.*, vol. 90, p. 127684, 2025, doi: https://doi.org/10.1016/j.jtemb.2025.127684.
[8] Y. Deng *et al.*, "Association of household air pollution exposure and anemia among pregnant women: Analysis of baseline data from 'Household Air Pollution Intervention Network (HAPIN)' trial," *Environ. Int.*, vol. 190, p. 108815, 2024, doi: https://doi.org/10.1016/j.envint.2024.108815.
[9] A. A. El-Kholy *et al.*, "Prevalence and associated factors of anemia among pregnant women and the impact of clinical pharmacist counseling on their awareness level: A cross sectional study," *Saudi Pharm. J.*, vol. 31, no. 8, p. 101699, 2023, doi: https://doi.org/10.1016/j.jsps.2023.101699.
[10] C. P. Ezenweke, I. A. Adeniyi, W. B. Yahya, and R. E. Onoja, "Determinants and spatial patterns of anaemia and haemoglobin concentration among pregnant women in Nigeria using structured additive regression models," *Spat. Spatiotemporal. Epidemiol.*, vol. 45, p. 100578, 2023, doi: https://doi.org/10.1016/j.sste.2023.100578.
[11] N. C. de Freitas-Costa *et al.*, "Hemoglobin Concentrations and Prevalence of Anemia During Pregnancy: Results from the Brazilian Maternal and Child Nutrition Consortium," *Curr. Dev. Nutr.*, vol. 9, no. 6, p. 107458, 2025, doi: https://doi.org/10.1016/j.cdnut.2025.107458.
[12] H. Herlianty, A. Abdullah, E. Sri Dahrianti, and N. Ketut Sumidawati, "Impact of reproductive health education on adolescents' self-efficacy in maintaining reproductive health," *J. Pengabdi. Masy. Edukasi Indones.*, vol. 2, no. 2, pp. 70–77, May 2025, doi: https://doi.org/10.61099/jpmei.v2i2.78.
[13] K. Jayaprakash Shetty, S. Nanjesh Kumar, and K. Shrisharath, "Validation of RDT kit for screening anaemia among women of reproductive age at the field level in comparison with the gold standard in rural areas of coastal Karnataka, India," *Clin. Epidemiol. Glob. Heal.*, vol. 34, p. 102077, 2025, doi: https://doi.org/10.1016/j.cegh.2025.102077.
[14] F. Junita, P. K. Wati, and R. Ulfah, "Nutritional Status with the Incidence of Anemia in Students of LSPR Jakarta Institute of Communication and Business," *J. Ilm. Kesehat. Sandi Husada*, vol. 12, no. 2, pp. 288–294, 2023, doi: https://dx.doi.org/10.35816/jiskh.v12i2.994.
[15] R. B. Kajjura *et al.*, "Drivers of anemia reduction among women of reproductive age in Uganda: a country case study," *Am. J. Clin. Nutr.*, vol. 121, pp. S36–S45, 2025, doi: https://doi.org/10.1016/j.ajcnut.2024.06.015.
[16] W. Litaqia and T. Cahya Mulat, "The impact of anemia on pregnant women on premature labor and low birth weight," *J. Edukasi Ilm. Kesehat.*, vol. 3, no. 1, pp. 32–38, Mar. 2025, doi: https://dx.doi.org/10.61099/junedik.v3i1.72.
[17] N. F. Ndiaye *et al.*, "Drivers of anemia reduction among women of reproductive age in Senegal: a country case study," *Am. J. Clin. Nutr.*, vol. 121, pp. S8–S21, 2025, doi: https://doi.org/10.1016/j.ajcnut.2024.05.031.
[18] A. Owais *et al.*, "Drivers of anemia reduction among women of reproductive age in Pakistan: a mixed-methods country case study," *Am. J. Clin. Nutr.*, vol. 121, pp. S46–S56, 2025, doi: https://doi.org/10.1016/j.ajcnut.2024.04.037.
[19] A.-C. Pecher, S. Bach, J. Pauluschke-Fröhlich, H. Abele, J. Henes, and M. Henes, "Anemia and iron deficiency in pregnant women with rheumatic diseases," *Jt. Bone Spine*,

vol. 91, no. 1, p. 105650, 2024, doi: https://doi.org/10.1016/j.jbspin.2023.105650.

[20] S. Suprapto, D. Arda, Y. Tri Wijayanti, and M. K. Fredy Saputra, "Providing education for the community to improve nutrition for toddlers," *Abdimas Polsaka*, vol. 4, no. 1, pp. 22–29, Mar. 2025, doi: https://doi.org/10.35816/abdimaspolsaka.v4i1.40.

[21] G. Saw, J. Van Buskirk, S. Dey, N. Singh, and L. D. Knibbs, "Association between residential greenspace and anaemia prevalence among Indian women of reproductive age," *Environ. Res.*, vol. 282, p. 121985, 2025, doi: https://doi.org/10.1016/j.envres.2025.121985.

[22] J. Zhou *et al.*, "Thalassemia genetic screening of pregnant women with anemia in Northern China through comprehensive analysis of thalassemia alleles (CATSA)," *Clin. Chim. Acta*, vol. 569, p. 120151, 2025, doi: https://doi.org/10.1016/j.cca.2025.120151.

[23] K. Thakker, S. Mohanapu, and M. Sen, "A comparative study to assess Hba1c levels in antenatal non diabetic women with anemia and without anemia," *Clin. Epidemiol. Glob. Heal.*, vol. 30, p. 101777, 2024, doi: https://doi.org/10.1016/j.cegh.2024.101777.

[24] J. Yang *et al.*, "Prevalence and influencing factors of anaemia among pregnant women in rural areas of Northwestern China," *Public Health*, vol. 220, pp. 50–56, 2023, doi: https://doi.org/10.1016/j.puhe.2023.04.024.

[25] L. A. Wijayanti and S. E. Nurseskasatmata, "The Relationship between nutritional status and menstrual cycle and anemia," *J. Ilm. Kesehat. Sandi Husada*, vol. 13, no. 2, pp. 306–314, Dec. 2024, doi: https://dx.doi.org/10.35816/jiskh.v13i2.1217.