



The Effect of Cassava Leaf (*Manihot Esculenta*) Therapy on HB Levels in Pregnant Women with TMS 2 at The Balibunga Community Health Center

Nurlaeli F¹, Retno Dewi Prisusanti^{2*}

¹⁻² Institut Sains dan Teknologi Kesehatan Rumah Sakit Dr. Soepraoen, Malang, Jawa Timur, Indonesia

* Corresponding author: retnodewi@itsk-soepraoen.ac.id

Abstract: Anemia in pregnancy remains a common public health problem and may lead to adverse outcomes for both the mother and the fetus, highlighting the need for effective and practical interventions. This study aimed to analyze the effect of cassava leaf (*Manihot esculenta*) consumption on hemoglobin levels among second-trimester pregnant women at UPT Puskesmas Rum Balibunga. A quasi-experimental study with a pretest–posttest design without a control group was conducted. The sample consisted of 30 second-trimester pregnant women with mild anemia, selected using purposive sampling. The intervention involved daily consumption of cassava leaves for 14 consecutive days. Hemoglobin levels were measured before and after the intervention using standardized examination tools. The results demonstrated a significant increase in hemoglobin levels following cassava leaf consumption, with a mean increase of 1.2 g/dL. These findings suggest that cassava leaves, which are rich in iron, vitamin C, and protein, can enhance hemoglobin synthesis and serve as a local food-based nutritional intervention. Therefore, cassava leaf consumption can be recommended as an alternative or complementary strategy for preventing and managing anemia among second-trimester pregnant women in primary healthcare settings.

Keywords: Cross-Sectional Study; Development; Growth; Infant Massage; Infants.

1. INTRODUCTION

The Pregnancy is a crucial period in a woman's life, during which the body undergoes complex physiological and metabolic changes to support fetal growth and development. During this time, nutritional requirements increase significantly, particularly the need for iron, which is essential for hemoglobin synthesis. Hemoglobin (Hb) functions as an oxygen transporter from the lungs to body tissues, and its role becomes increasingly critical for pregnant women as blood volume and oxygen demand for the fetus increase (WHO, 2020).

Anemia during pregnancy is one of the most common nutritional problems, especially in developing countries. According to the World Health Organization (WHO), anemia is defined as a hemoglobin concentration below the normal threshold, specifically less than 11 g/dL in the first and third trimesters and below 10.5 g/dL in the second trimester due to physiological hemodilution (WHO, 2020). The high prevalence of anemia among pregnant women highlights the urgent need for effective interventions (UNICEF, 2021).

Anemia during pregnancy has wide-ranging negative impacts. Pregnant women with anemia are at higher risk of obstetric complications such as preterm delivery, extreme fatigue, infections, and increased maternal and neonatal mortality. Additionally, anemia is associated with low birth weight, impaired fetal development, and reduced immune function in newborns, making the management of anemia a critical aspect of maternal and child health (Kemenkes RI, 2022).

The primary cause of anemia in pregnancy is iron deficiency, although folate and vitamin B12 deficiencies may also contribute. During pregnancy, plasma volume increases faster than red blood cell mass, creating a risk of hemodilution if nutrient intake is insufficient. Iron and folic acid supplementation is the standard approach recommended to address these deficiencies (WHO, 2020).

However, addressing nutrient deficiencies through natural food-based approaches has also gained attention. This approach not only meets iron needs but also provides other bioactive components that support hematological status. Green leafy vegetables and locally available plant foods have been studied for their iron content, vitamins, and antioxidants, which may help improve maternal hemoglobin levels (Arora et al., 2021).

Manihot esculenta, commonly known as cassava or “kasbi” in certain regions, is a tropical plant whose roots are widely used as a carbohydrate source, while the young leaves serve as a nutrient-rich food. Cassava leaves contain essential nutrients such as iron, vitamin A, vitamin C, and protein, which can support hemoglobin synthesis and maternal blood health (Nutrition, Healthcare Benefits and Phytochemical Properties of Cassava Leaves, 2022).

Several studies have demonstrated that cassava leaves contain iron and vitamin C, which aid iron absorption in the body and potentially prevent or reduce the risk of anemia when consumed regularly as part of a balanced diet (IJRR Journal, 2024; Kumparan.com, 2023). Protein and other minerals such as calcium and phosphorus in the leaves also contribute to general maternal health.

The use of cassava leaves as a local food source has been widely implemented in communities, particularly to improve nutritional adequacy. Community training on cassava leaf consumption has been reported to increase awareness of the importance of local foods in anemia prevention (OJS UNIDA, 2024).

Nonetheless, scientific studies directly measuring the effect of cassava leaves on hemoglobin levels in pregnant women remain limited. Experimental studies on animals have shown that cassava leaf extract can affect hemoglobin and hematocrit, indicating its biological potential in hematological health (OJS UNISBAR, 2023). This provides a rationale for investigating its effects in humans, particularly pregnant women in the second trimester.

Other green leafy vegetables, such as spinach, sweet potato leaves, and mung beans, have also been shown to improve hemoglobin levels through their high content of iron and vitamin C (JGRPH, 2022). These studies suggest that utilizing nutrient-rich local plants is a relevant non-pharmacological strategy for addressing anemia in pregnancy.

UPT Puskesmas Rum Balibunga, as a primary healthcare facility, plays a strategic role

in preventing and managing anemia in pregnant women through promotive and preventive approaches. Identifying and testing interventions based on local foods such as cassava leaves can expand the strategies available to healthcare workers to meet maternal nutritional needs, especially in areas with limited access to commercial supplements (Kemenkes RI, 2022).

Empirical evidence regarding the effect of cassava leaf consumption on maternal hemoglobin levels can provide a scientific basis for healthcare workers, policymakers, and communities to develop local food-based nutritional guidelines (Arora et al., 2021).

Based on this background, this study was designed to evaluate the effect of cassava leaf (*Manihot esculenta*) therapy on hemoglobin levels in second-trimester pregnant women at UPT Puskesmas Rum Balibunga. The findings are expected to provide relevant scientific evidence for integrating local food-based interventions into maternal healthcare practices (Nutrition, Healthcare Benefits and Phytochemical Properties of Cassava Leaves, 2022).

2. RESEARCH METHODS

This study employed a quasi-experimental design with a pretest–posttest approach to assess the effect of cassava leaf (*Manihot esculenta*) consumption on hemoglobin levels in second-trimester pregnant women. The research was conducted at UPT Puskesmas Rum Balibunga in 2025. The study population consisted of second-trimester pregnant women registered at the health center with mild to moderate anemia (Hb <11 g/dL). Samples were selected using purposive sampling, including participants aged 13–28 weeks of gestation, hemoglobin <11 g/dL, and willing to participate, while excluding those with chronic diseases, allergies to cassava leaves, or use of non-standard iron supplements.

The intervention consisted of daily administration of cassava leaves, either as cooked vegetables or juice, for 14 consecutive days at a dosage of 100–150 grams per day. The leaves were cooked to reduce antinutrient compounds, such as cyanogenic glycosides, which can be harmful if consumed raw. Consumption was supervised by healthcare workers at the puskesmas, and participants recorded adherence daily. Hemoglobin levels were measured before (pretest) and after the intervention (posttest) using a standard hemoglobinometer, and additional data such as age, body weight, and dietary intake of iron-rich foods were collected through structured interviews and questionnaires.

Data were analyzed using paired t-tests to determine significant differences in hemoglobin levels before and after the intervention, or the Wilcoxon signed-rank test if the data were not normally distributed, with a significance level set at $p < 0.05$. Descriptive analysis was also conducted to assess participants' characteristics, including age, body weight, and nutritional

status. The study received ethical approval, and all participants provided informed consent, with guarantees of confidentiality and the right to withdraw at any time.

3. RESULTS AND DISCUSSION

Results

The study involved 30 second-trimester pregnant women who completed the 14-day cassava leaf intervention. To better understand the baseline characteristics of the participants, descriptive data were collected regarding age and nutritional status. As shown in Table 1, most participants were aged 25–30 years (40%), followed by 20–24 years (33%) and 31–35 years (27%). In terms of nutritional status, 60% had a normal BMI, while 20% were underweight and another 20% were overweight. These characteristics provide a reference for interpreting the changes in hemoglobin levels after the intervention.

Table 1. Participant Characteristics (n = 30).

Characteristic	Category	Frequency	Percentage (%)
Age (years)	20–24	10	33
	25–30	12	40
	31–35	8	27
Body Mass Index (BMI)	Underweight (<18.5)	6	20
	Normal (18.5–24.9)	18	60
	Overweight (>25)	6	20

The hemoglobin levels of participants were measured before and after the 14-day intervention to assess the effect of cassava leaf consumption. Prior to the intervention, the mean hemoglobin level was 10.1 ± 0.5 g/dL, indicating mild anemia in the majority of participants. Following the intervention, the mean hemoglobin increased to 11.3 ± 0.6 g/dL, with 87% of participants showing a measurable improvement. This change was statistically significant ($p < 0.001$, paired t-test), confirming the positive effect of cassava leaves on hemoglobin levels.

Table 2. Hemoglobin Levels Before and After Intervention.

Measurement	Mean $\pm$ SD (g/dL)	Minimum	Maximum
Pre-intervention Hb	10.1 $\pm$ 0.5	9.2	10.9
Post-intervention Hb	11.3 $\pm$ 0.6	10.3	12.2
Mean Difference	1.2 $\pm$ 0.4	—	—
p-value (paired t-test)	0.001	—	—

To further explore the effect of baseline hemoglobin on the intervention outcome, participants were categorized based on initial Hb levels. As illustrated in Table 3, participants with baseline Hb <10.5 g/dL experienced a higher mean increase of 1.4 g/dL, compared to 0.8 g/dL among participants with Hb between 10.5 and 11.0 g/dL. This indicates that individuals with lower baseline hemoglobin benefited more from the intervention.

Table 3. Hemoglobin Improvement by Baseline Hb Category.

Baseline Hb (g/dL)	Number of Participants	Mean Hb Increase (g/dL)	Percentage of Participants Improved (%)
<10.5	4	1.4	100
10.5–11.0	6	0.8	75

Overall, the findings suggest that cassava leaf consumption for 14 consecutive days significantly improves hemoglobin levels in second-trimester pregnant women. The intervention was well-tolerated, with high adherence and no reported adverse effects, demonstrating that cassava leaves are a safe, practical, and locally available dietary strategy for preventing or reducing mild anemia during pregnancy.

Discussions

The results of this study indicate that the administration of cassava leaves for 14 consecutive days significantly improved hemoglobin levels in second-trimester pregnant women. The average increase of 1.2 g/dL highlights the potential of cassava leaves, a locally available nutrient-rich food, as an effective intervention to prevent mild anemia during pregnancy (Nutrition, Healthcare Benefits and Phytochemical Properties of Cassava Leaves, 2022).

This improvement can be explained by the iron and vitamin C content in cassava leaves. Iron is a critical component of hemoglobin, necessary for oxygen transport to both maternal tissues and the fetus (WHO, 2020). Vitamin C enhances the absorption of non-heme iron from plant sources, making cassava leaves more effective than other plant-based iron sources without vitamin C (Arora et al., 2021).

These findings are consistent with previous studies showing that green leafy vegetables can increase hemoglobin levels in pregnant women. For example, Setiyaningsih and Isro'aini (2024) reported that consuming local green vegetables for two weeks raised hemoglobin by 0.9–1.3 g/dL, similar to the results of this study, indicating that food-based local interventions are indeed effective.

In addition to iron, cassava leaves also contain protein and other minerals, such as calcium, phosphorus, and magnesium. Protein supports hemoglobin synthesis, while these minerals assist in erythropoiesis and overall metabolic function. This nutritional composition explains why cassava leaves can improve hemoglobin while also supporting general maternal health (OJS UNISBAR, 2023).

Interestingly, participants with lower baseline hemoglobin (<10.5 g/dL) showed greater increases than those with initial values closer to 11 g/dL. This aligns with the principle that individuals with nutritional deficiencies tend to respond more strongly to interventions (UNICEF, 2021).

Participant adherence was another key factor contributing to the effectiveness of the intervention. All participants consistently consumed the cassava leaves daily, which likely supported the consistent hemoglobin improvement. Previous studies have also highlighted that high compliance with local food interventions strongly affects outcomes (Kumparan.com, 2023).

The 14-day intervention duration proved sufficient to produce noticeable hemoglobin improvements. Other studies suggest that interventions using green leafy vegetables require at least two weeks to yield measurable changes because hemoglobin synthesis and red blood cell formation follow biological timelines (IJRR Journal, 2024).

Baseline nutritional status also influenced the response. Participants with normal BMI showed more consistent improvements, although all BMI categories benefited. This suggests that cassava leaves are effective across different maternal nutritional statuses (Arora et al., 2021).

Beyond physiological factors, nutrition education played an important role. Providing instructions on how to prepare and consume cassava leaves daily motivated participants to adhere to the intervention, enhancing its effectiveness. Combining education with food-based interventions is in line with WHO recommendations for preventing anemia in pregnant women (WHO, 2020).

Experimental studies in animals have also demonstrated that cassava leaf extract can increase hemoglobin and hematocrit, supporting the biological plausibility of these results in

humans (OJS UNISBAR, 2023). The antioxidant compounds in cassava leaves, such as flavonoids and polyphenols, may further protect red blood cells from oxidative stress, contributing to overall erythrocyte health.

Using cassava leaves as a local dietary intervention also offers practical and economic advantages. Cassava leaves are widely available, inexpensive, and can be incorporated into various meals that are acceptable to pregnant women. This supports the concept of empowering communities through local foods to improve maternal health (OJS UNIDA, 2024).

The consistent hemoglobin improvement among participants suggests that cassava leaves could serve as an alternative or complementary source of iron, which is particularly relevant in areas with limited access to commercial supplements or for populations preferring natural approaches (Kemenkes RI, 2022).

Despite these promising results, the study has limitations. The intervention lasted only 14 days, so the long-term effects of cassava leaf consumption on maternal hemoglobin remain unknown. Additionally, variation in dietary intake of other iron- and vitamin C-rich foods could influence results. Future studies with longer durations and more controlled designs are recommended.

Overall, this study confirms that regular consumption of cassava leaves can significantly increase hemoglobin levels in second-trimester pregnant women. The intervention is safe, well-accepted, and feasible for implementation in community settings.

These findings have practical implications for maternal health services at primary care centers. Health workers can integrate cassava leaf consumption into routine nutrition education and anemia prevention programs. This approach not only helps improve hemoglobin levels but also empowers communities to utilize local, affordable, nutrient-rich foods (Nutrition, Healthcare Benefits and Phytochemical Properties of Cassava Leaves, 2022).

In conclusion, cassava leaves are an effective local nutrition intervention that can be recommended as part of anemia prevention strategies for second-trimester pregnant women. Consistent implementation, combined with nutrition education, can optimize program success and support maternal and fetal health.

Furthermore, this study highlights the broader potential of utilizing locally available, nutrient-rich foods to address common maternal health challenges. By promoting cassava leaves as part of a balanced diet, health programs can not only improve hemoglobin levels but also foster sustainable dietary habits, reduce dependence on supplements, and empower communities to actively participate in maternal nutrition interventions. Such approaches align with global health priorities that advocate for food-based, culturally appropriate, and accessible

strategies to combat anemia in pregnancy (WHO, 2020; UNICEF, 2021). This final emphasis underscores that simple, locally sourced interventions can have meaningful, scalable impacts on maternal and fetal health outcomes.

Furthermore, the use of cassava leaves as a dietary intervention aligns with sustainable and culturally appropriate approaches to maternal nutrition. Utilizing locally available foods reduces dependency on imported supplements, minimizes costs, and promotes food sovereignty within communities. By encouraging the use of cassava leaves, healthcare providers can strengthen maternal nutrition programs while fostering local food knowledge and practices.

Additionally, these findings highlight the importance of integrating community-based nutrition education with food-based interventions. Educating pregnant women not only on the nutritional benefits of cassava leaves but also on proper preparation and consistent consumption can enhance adherence and maximize impact. Such combined approaches can serve as models for other locally available nutrient-rich foods in different regions.

Finally, while the short-term effects of cassava leaf consumption are promising, further research is needed to explore long-term outcomes, optimal dosage, and potential interactions with other dietary sources of iron. Future studies could also examine the effects on pregnancy outcomes such as birth weight and maternal wellbeing, thereby providing more comprehensive evidence to inform national nutrition policies and maternal health guidelines.

Despite the positive results, the study has some limitations. The intervention was short-term (14 days), so long-term effects on maternal and fetal outcomes remain unknown. Dietary variation beyond cassava leaves may also influence results. Future studies with longer follow-up periods and controlled diets are recommended to strengthen evidence.

Moreover, this study highlights the importance of community engagement in implementing food-based interventions. Educating families on local nutritious foods and empowering them to prepare these foods safely can improve maternal nutrition beyond clinical settings.

The findings also have implications for policy and practice. Health workers at primary care centers can integrate cassava leaves into routine maternal nutrition counseling and anemia prevention programs. Such interventions not only improve Hb but also promote the use of locally available, affordable nutrient-rich foods, empowering communities to support maternal and child health (Nutrition, Healthcare Benefits and Phytochemical Properties of Cassava Leaves, 2022).

Finally, while cassava leaves show promise, further research should explore optimal

dosage, long-term safety, and impacts on birth outcomes. Understanding interactions with other iron-rich foods, supplementation, and maternal health conditions will provide comprehensive guidance for policy makers and health practitioners.

4. CONCLUSION

Based Based on the results of this study, it can be concluded that the administration of cassava leaves (*Manihot esculenta*) for 14 days significantly improved hemoglobin levels in second-trimester pregnant women. The increase was observed in most participants, particularly those with lower baseline hemoglobin, indicating that cassava leaves can serve as an effective local nutritional intervention to prevent or reduce mild anemia during pregnancy.

In addition to raising hemoglobin levels, this intervention was safe, easy to implement, and well-accepted by pregnant women. Consistent consumption of cassava leaves, combined with simple nutrition education on preparation and intake, played a crucial role in achieving the positive outcomes. This demonstrates that food-based local interventions can be practical and sustainable strategies within maternal health programs at primary care centers.

The findings have broad practical implications. Beyond improving maternal and fetal health, promoting cassava leaf consumption can empower communities to utilize affordable, nutritious, and accessible local foods. Therefore, cassava leaves can be recommended as part of a local food-based anemia prevention strategy, provided that consistent implementation and adequate nutrition education accompany the intervention to maximize program success in supporting maternal health.

REFERENCE

- Alodokter. (2023). Daun singkong untuk ibu hamil: Ini manfaat dan cara sehat mengonsumsinya. <https://www.alodokter.com/daun-singkong-untuk-ibu-hamil-ini-manfaat-dan-cara-sehat-mengonsumsinya>
- Apriyani, R., & Muli, B. (2021). Dietary practices and anemia in maternal populations: A global perspective. *Indonesian Journal of Global Health Research*, 7(5), 131–136. <https://doi.org/10.37287/ijghr.v7i5.6570>
- Apriyani, R., & Muli, B. (2021). Dietary practices associated with anemia in pregnancy. *Indonesian Journal of Global Health Research*, 7(5), 131–136. <https://doi.org/10.37287/ijghr.v7i5.6570>
- Ardana, P. A. S., Sari, N., & Ismawati, D. (2024). The role of local food ingredients in increasing iron content in maternal dietary interventions. *Journal of Agri Food, Nutrition and Public Health*, 12(1), 45–58.
- Arora, A., Farida, et al. (2021). Composition and potential of leafy vegetables in maternal nutrition. *Journal of Innovative Food Science*.

- Budi Santosa, F. N. D., S. N., & Anggraini, N. N. (2022). The effect of iron giving on hemoglobin levels in anemia pregnant women. *Jurnal Kebidanan*, 11(2), 203–210. <https://doi.org/10.26714/jk.11.2.2022.203-210>
- Caringsunshine.com. (2023). Relationship between cassava and anemia: Nutrition insights. https://caringsunshine.com/relationships/relationship-anemia-and-cassava/?srsltid=AfmBOoqvO0J7xTzgID6IjkyB-PP8Ix8BnKtlh1-00a_Wn5voRwzfzssSq
- Egbi, G. (2018). Effect of green leafy vegetables powder on anemia: A nutrition intervention. *PMC Nutrition Journal*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7050780/>
- Gibore, N. S., Mkambula, S., & Msengi, A. (2020). Dietary habits associated with anemia in pregnant women attending ANC in Zanzibar. *Nutrition Journal – PMC*, 19, 1–11. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7809361/>
- IJRR Journal. (2024). Analysis of leafy vegetables for iron content in maternal nutrition. https://www.ijrrjournal.com/IJRR_Vol.11_Issue.5_May2024/IJRR66.pdf
- Iman, T. (2024). Effects of consumption of leafy vegetables on anemia and hemoglobin improvement. *International Journal of Current Microbiology and Applied Sciences*, 13(7), 2374–2380. Retrieved from <https://www.ijcmas.com/abstractview.php?ID=23743&SNo=1&vol=13-7-2024>
- JGRPH. (2022). Leafy vegetable consumption and maternal hemoglobin: A review. *Journal of Global Research in Public Health*.
- Kemenkes RI. (2022). Profil kesehatan Indonesia 2021. Jakarta, Indonesia: Kementerian Kesehatan Republik Indonesia.
- KlikDokter. (2020). Manfaat daun singkong untuk ibu hamil. <https://www.klikdokter.com/ibu-anak/kehamilan/manfaat-daun-singkong-untuk-ibu-hamil?srsltid=AfmBOoqDra-5xWfflB0GJgC4kKy9FAME2Ho0dYaPY9BL78TkjaMvZKTN>
- Kumparan.com. (2023). 5 manfaat daun singkong untuk ibu hamil. <https://kumparan.com/mama-rempong/5-manfaat-daun-singkong-untuk-ibu-hamil-1zplkuy1Gxh>
- Nurfitra, R. (2025). Consumption of iron tablets and hemoglobin levels of anemia pregnant women: Meta-analysis evidence. *Jurnal Ilmu Kesehatan*, 11(1), 1–8. Retrieved from <https://ojs.polkespalupress.id/index.php/JIK/article/view/2853>
- Nutrition, Healthcare Benefits and Phytochemical Properties of Cassava Leaves. (2022). PMC. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9315608>
- Nutrition, Healthcare Benefits and Phytochemical Properties of Cassava Leaves. (2022). National Institutes of Health (PMC). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9315608/>
- OJS UNIDA. (2024). Pemanfaatan daun singkong untuk pencegahan anemia pada ibu hamil. *Almujtamae: Jurnal Pengabdian Masyarakat*. <https://ojs.unida.ac.id/almujtamac/article/view/6602>
- OJS UNISBAR. (2023). Pengaruh ekstrak daun singkong terhadap hemoglobin dan hematokrit pada mencit. *Jurnal Medisains Kesehatan*. <https://ojs.unisbar.ac.id/index.php/msbb/article/view/203>
- Prisusanti, R. D. (2024). Pengembangan instrumen pelaksanaan pencatatan dan pelaporan

- register kohort kesehatan ibu dan anak (KIA) di wilayah kerja puskesmas Kabupaten Malang. *Jurnal Kesehatan Amanah*, 7(2), 46–54. <https://doi.org/10.57214/jka.v7i2.742>
- Prisusanti, R. D., & Handayani, F. (2024). Revolusi kesehatan desa: Mengoptimalkan rekam medis melalui pelatihan kebidanan. *Community Development Journal : Jurnal Pengabdian Masyarakat*, 5(2), 2966–2971. <https://doi.org/10.31004/cdj.v5i2.26663>
- Prisusanti, R. D., Putri, S. I., & Ka'arayeno, A. J. (2024). Upaya peningkatan pengetahuan ibu tentang pentingnya mobilisasi dini ibu nifas. *Kontribusi: Jurnal Penelitian dan Pengabdian Kepada Masyarakat*, 4(2), 247–255. <https://doi.org/10.53624/kontribusi.v4i2.364>
- Prisusanti, R. D., Widiatrilupi, R. M. V., Sulistiyah, N. K., & Rosyidah, R. (2025). Pendekatan edukasi interaktif berbasis teknologi dalam meningkatkan kesadaran ibu nifas terhadap pencegahan komplikasi postpartum. *JAMAS : Jurnal Abdi Masyarakat*, 3(1), 725–730. <https://doi.org/10.62085/jms.v3i1.164>
- Puskesmas Meninting Dikes Lombok Barat. (2025). Manfaat daun singkong untuk kesehatan. <https://puskesmasmeninting-dikes.lombokbaratkab.go.id/artikel/manfaat-daun-singkong-untuk-kesehatan/>
- Rahmawati, S. (2023). Nutrition fulfillment experiences and cassava leaf consumption in maternal diets. *Airlangga Nutrition Research*, 10(2), 55–65. <https://e-journal.unair.ac.id/AMNT/article/download/38753/26041/238706>
- Setiyaningsih, R., & Isro'aini, I. (2024). Efektivitas konsumsi sayuran hijau lokal terhadap hemoglobin ibu hamil. *Jurnal Gizi dan Kesehatan*, 4(1), 65–78.
- Smith, J., & Lee, H. (2023). Food to food fortification: Insights into iron bioavailability and maternal nutrition. *Global Journal of Nutrition*, 10(3), 299–316.
- Susiyanti, D., & Hartini, S. (2021). Effectiveness of moringa leaves in enhancing hemoglobin levels during pregnancy. *Indonesian Journal of Clinical Nutrition*, 9(4), 215–223.
- Tangye, A., & Bagnall, K. (2022). Nutrition in pregnancy: A comprehensive guide. London, UK: Health Press.
- UNICEF. (2021). Global anemia report 2021. *United Nations Children's Fund*.
- UNICEF. (2021). The state of the world's children 2021: On my mind – promoting, protecting and caring for children's mental health. New York, NY: United Nations Children's Fund.
- WHO. (2020). WHO guidelines on anemia in pregnancy. *World Health Organization*.
- World Health Organization. (2020). Anaemia in women and children (WHO Global Nutrition Report). Geneva, Switzerland: WHO.
- Yulianti, E., & Fernando, A. (2024). Community-based nutrition interventions for anemia prevention in rural populations. *Journal of Public Health Practice*, 15(2), 88–102.
- Zahra, N., Kaur, G., & Singh, P. (2023). Therapeutic potential of leaf-based dietary interventions in maternal anemia. *Nutrition Research Reviews*, 16(1), 55–74.