Journal of Health Care and Dietetics

Volume 1 No. 1 (2025): XX-XX
E-ISSN: 0000-0000 (On line)
Published by Indonesian Scholar Publication Media
Journal homepage: https://journalmpci.com/index.php/jhcd

Standardized Nutritional Care for Pregnant Women with Anemia: Efforts to Increase Protein and Iron Intake at the Biru Community Health Center

Sohani [1,2*], Suriani Rauf [2], Manjilala [2], Fachriani [3]

Correspondence email : nadimin@poltekkes-mks.ac.id
[1] *Tenriawaru Hospital District Bone, South Sulawesi, Indonesia*
[2] *Department of Nutrition, Health Polytechnic of Makassar, Indonesia*
[3] *Blue Health Centers, Bone Regency, South Sulawesi, Indonesia*

ABSTRACT

Anemia remains a critical public health issue among pregnant women, particularly in rural areas. This report investigates the nutritional care provided to pregnant women at Public Health Center Biru, Bone District, focusing on interventions to improve protein intake and prevent anemia. Using a standardized nutritional care process—assessment, diagnosis, intervention, and evaluation—five antenatal care patients were observed between May 26–31, 2025. Results indicated that 60% of participants were anemic, with inadequate daily intake of protein and iron. Dietary prescriptions included balanced meals rich in protein (eg, poultry, meat, fish) and iron, alongside education on healthy eating and iron supplementation. Post-intervention data revealed a significant increase in protein consumption (from 73.32 g to 89.08 g) and iron intake (from 7.16 mg to 9.72 mg), coupled with improved knowledge scores and slight weight gain. These findings highlight the effectiveness of targeted nutritional education in enhancing dietary behavior and reducing anemia risk among pregnant women. Strengthening nutritional care through education and coordinated support from health professionals can play a vital role in promoting maternal health outcomes.

ARTICLE INFO

CASE REPORTS

Submitted: 15 March, 2025
Accepted: 30 May 2025

Keywords:
Maternal Nutrition, Protein Intake, Iron-Deficiency Anemia

Key Messages:

- Nutritional interventions targeting increased protein and iron intake significantly improved dietary behavior and reduced anemia risk in pregnant women at Public Health Center Biru .
- Educational efforts and coordinated support from healthcare professionals were vital in enhancing maternal knowledge, nutrient consumption, and overall health outcomes during pregnancy.

INTRODUCTION

Anemia remains a major public health concern among pregnant women in Indonesia, with a national prevalence of 37.1%. Rural regions exhibit a higher rate (37.8%) compared to urban areas (36.4%). In 2018, anemia among pregnant women was disproportionately higher in rural areas (49.5%) than in urban settings (48.3%) (Ministry of Health RI, 2019). Local data from the Bone District Health Office shows that the prevalence of anemia among pregnant women in Watampone reached 6.2%, with an estimated 1,793 cases reported, indicating a year-on-year increase from 2018 to 2024.

Anemia is defined as a condition characterized by a deficiency in red blood cells (erythrocytes), which impairs oxygen delivery throughout the body. In pregnancy, anemia is clinically determined by hemoglobin concentrations below 11 g/dL in the first and third trimesters or below 10.5 g/dL in the second trimester (Yanti et al., 2023). Iron deficiency remains the predominant cause, often stemming from inadequate dietary intake, poor absorption, excessive losses, or increased physiological demands such as during gestation.

Additional etiological factors include chronic bleeding, malnutrition, malabsorption syndromes, and impaired erythropoiesis due to bone marrow dysfunction (Astutik & Ertiana, 2018). Furthermore, maternal knowledge significantly influences anemia risk, as nutritional awareness shapes health behaviors. Enhanced understanding of anemia-related complications and preventive measures encouraging healthier practices during pregnancy (Maharani et al., 2021).

Maternal anemia poses serious risks to both mother and fetus, including miscarriage, preterm birth, low birth weight, and increased maternal and neonatal mortality. Women with hemoglobin levels below 10 g/dL face a 2.25 times higher likelihood of delivering low birth weight infants, and those with severe anemia are 4.2 times more likely to experience such outcomes. Additionally, maternal mortality risk escalates by 3.5 times among those affected by anemia.

CASE DESCRIPTION

Study Period and Location: Data were collected over a six-day period, from Feb 26 to March 2, 2025, at Biru Public Health Center, located in Tanete Riattang District, Bone. Cases subject of five pregnant women were selected using purposive based on their antenatal visit schedule and willingness to participate. All participants had received iron supplementation. Data Collection Procedures: The Standardized Nutrition Care Process (NCP) was applied, which included: Nutrition Assessment: Demographics: Age, education, employment status, gestational age, parity, and iron tablet consumption (see Table 1).

Assessment, the majority (80%) were within the low-risk age range of 20–35 years, while one respondent (20%) was in the high-risk age group. Most participants had completed secondary education (60%), followed by 20% each with diploma and bachelor's degrees. Regarding employment status, three women (60%) were employed and two (40%) were not. Gestational age was most commonly in the first trimester (60%), with the rest (40%) in the third trimester. Parity data showed 60% of respondents were nuliparous, having never given birth, and 40% were multiparous. Notably, all respondents (100%) reported consuming iron supplements (Fe tablets), reflecting adherence to anemia prevention efforts during pregnancy.

Among the five pregnant women assessed, 40% had a pre-pregnancy Body Mass Index (BMI) below 18.5 kg/m^2, indicating underweight status, while the majority (60%) had a BMI at or above 18.5 kg/m^2. Regarding Mid-Upper Arm Circumference (MUAC), two respondents (40%) showed measurements below 23.5 cm, suggesting a risk of chronic energy deficiency (CED), while three women (60%) measured above the threshold, indicating adequate nutritional status. These data reflect a relatively balanced distribution of nutritional risk, with MUAC and BMI serving as key indicators for evaluating maternal health during pregnancy.

RESULTS

Table 1: Distribution of Respondent Characteristics Based on Anemia Incidence

Characteristics	Anemia		Non-Anemia		Total	
	n	%	n	%	n	%
Maternal Age						
• High Risk	1	33.3	0	0.0	1	20.0
• Low Risk	2	66.7	2	100.0	4	80.0
Education						
• High School (SMA)	2	66.7	1	50.0	3	60.0
• Diploma (D3)	0	0.0	1	50.0	1	20.0
• Bachelor's (S1)	1	33.3	0	0.0	1	20.0
Employment Status						
• Unemployed	1	33.3	1	50.0	2	40.0
• Employed	2	66.7	1	50.0	3	60.0
Gestational Age						
• 0–12 weeks (Trimester I)	1	33.3	2	100.0	3	60.0
• 13–28 weeks (Trimester II)	0	0.0	0	0.0	0	0.0
• 29–40 weeks (Trimester III)	2	66.7	0	0.0	2	40.0
Parity						
• Nulliparous	1	33.3	2	100.0	3	60.0
• Primiparous	0	0.0	0	0.0	0	0.0
• Multiparous	2	66.7	0	0.0	2	40.0
Total	3	100.0	2	100.0	5	100.0

Iron and protein intake among pregnant women at Puskesmas Biru was notably below recommended levels, which likely contributed to the high incidence of anemia. Third-trimester pregnancies and multiparity were associated with greater vulnerability, emphasizing the need for targeted nutritional support.

Mrs AA exhibited a well-proportioned physique, clear facial complexion without pallor, normal appetite, and stable vital signs with blood pressure 105/79 mmHg, heart rate 74 bpm, respiratory rate 20 bpm, and body temperature 36.5°C. Mrs. AK showed a disproportionate and thin body, signs of physical weakness with reduced appetite, yet no facial pallor, with vital parameters of 90/57 mmHg blood pressure, 80 bpm pulse, 20 bpm respiration, and 36.5°C temperature. Mrs. Y presented with proportional body features but demonstrated facial pallor, general fatigue, appetite decline, and elevated blood pressure at 152/99 mmHg, accompanied by a pulse of 87 bpm, respiratory rate of 20 bpm, and temperature of 36.5°C. Mrs. NP had a proportional build but clinical signs of mild anemia including pallor, fatigue, and decreased appetite, with blood pressure at 101/64 mmHg, heart rate 80 bpm, respiration 22 bpm, and temperature 36.5°C. Mrs. DM appeared physically disproportionate and thin, with facial pallor, weakness, diminished appetite, and slightly elevated pulse and respiratory rate at 108/68 mmHg blood pressure, 92 bpm heart rate, 23 bpm respiration, and 37°C temperature.

The comparison of nutrient intake before and after education highlights the effectiveness of nutritional counseling in improving specific dietary habits. Notably, there was a marked increase in iron and protein intake, suggesting that participants absorbed and applied knowledge about the role of these nutrients in preventing anemia. While energy and macronutrient intakes remained relatively stable, the targeted improvements indicate a positive shift in dietary behavior aligned with the goals of the education program.

Table 2: Nutrient Intake Before and After Education

Nutrient Variable	Before Education (Mean ± SD)	After Education (Mean ± SD)
Energy (kcal)	1,809.86 ± 308.07	1,797.46 ± 198.34
Protein (g)	73.32 ± 11.71	89.08 ± 9.07
Fat (g)	51.26 ± 9.06	49.76 ± 7.92
Carbohydrate (g)	226.96 ± 20.27	206.92 ± 27.47
Iron (Fe) (mg)	7.16 ± 1.70	9.72 ± 4.28

DISCUSSION

The analysis combining respondent characteristics and dietary intake patterns reveals a troubling intersection of risk factors for anemia during pregnancy. Despite being mostly within the low-risk age bracket, maMrs of the pregnant women at Puskesmas Biru exhibited inadequate nutritional intake—especially for iron and energy—well below recommended levels. This insufficiency, compounded by factors such as multiparity and third-trimester gestation, underscores the urgent need for nutritional interventions that go beyond basic supplementation and consider individualized risk profiles.

Pregnancy is a physiologically demanding period in which energy metabolism increases significantly, requiring optimal nutrition and macronutrient intake to maintain maternal health and support fetal development. Protein plays a vital role in tissue growth, immune regulation, and placental function, yet based on 24-hour recall data, the average protein intake among pregnant women was 71.64±11.99 g markedly lower than the recommended daily requirement of 95.00±22.59 g. This deficit reflects inadequate dietary consumption, potentially contributing to maternal fatigue and compromised fetal growth. Similarly, iron intake was notably insufficient, with a mean of only 7.02±1.58 mg/day compared to the required 21.60±4.93 mg/day. Iron's central role in hemoglobin synthesis and oxygen transport highlights the risk posed by such deficiencies, corroborated by biochemical findings in which 60% of subjects had hemoglobin levels below 11 g/dl, indicating clinical iron-deficiency anemia.

Following nutrition education interventions, marked improvements were observed in dietary intake: protein consumption increased from 73.32±11.71 to 89.08±9.07 g, and iron intake rose from 7.16±1.70 to 9.72±4.28 mg. These gains demonstrate the positive impact of balanced nutrition counseling, particularly in improving awareness and food selection behaviors. Although iron intake remained below the recommended threshold, the upward trend indicates progress toward achieving nutritional adequacy. Analysis also suggested that chronic energy deficiency (CED) could exacerbate iron-related anemia, though the study showed a paradoxical trend where anemia prevalence was higher in non-CED mothers. This suggests that micronutrient deficiency may occur independently of caloric status and supports the necessity for dietary improvement focusing on high-quality protein and iron sources.

Iron-deficiency anemia remains a significant concern due to its implications for maternal and fetal outcomes, including preterm birth, low birth weight, and increased susceptibility to infection 20. Strategic dietary prescriptions must emphasize iron-rich foods, particularly heme sources like liver, poultry, and fish, complemented by vitamin C to enhance absorption. Nutrition plans should also incorporate sufficient high-quality protein from animal products and legumes. Supplementation with ferrous tablets (two per day) should continue until hemoglobin levels reach at least 11 g/dl, with ongoing monitoring to ensure compliance and efficacy. These interventions must be coordinated with antenatal services and supported by educational outreach to reinforce behavioral change.

CONCLUSION

In conclusion, bridging the gap between actual and recommended nutrient intake—particularly for protein and iron—is fundamental to maternal health. Nutrition education demonstrated promising effects, yet sustained strategies are required to address individual variability and dietary limitations. Targeted supplementation, dietary modifications, and multi-sectoral engagement remain imperative to reducing the burden of maternal anemia and optimizing prenatal outcomes.

Funding: This research received no external funding
Acknowledgments: The authors would like to thank Dr. Tadjuddin Chalid Hospital Makassar for providing access to medical records to support this case report
Conflicts of Interest : The authors declare no conflict of interest.

REFERENCES

1. Trivillin A, Zanella S, Castaldo RJ, Prati F, Zanconato S, Carraro S, et al. Early Oral Nutritional Supplements in the Prevention of Wheezing, Asthma, and Respiratory Infections. Front Pediatr. 2022;10(March):1–10.
2. Sood, Geetaa; Argani, Cynthiab; Ghanem, Khalil Ga; Perl, Trish Mc; Sheffield JS. Infections complicating cesarean delivery. Curr Opin Infect Dis. 2018;31(4):368–76.
3. Strobl MR, Demir H, Sánchez Acosta G, Drescher A, Kitzmüller C, Möbs C, Pfützner W BB. The role of IgG1 and IgG4 as dominant IgE-blocking antibodies shifts during allergen immunotherapy. J Allergy Clin Immunol. 2023;151(5):1371-1378.e5.
4. Kim JH, Kim KW, Kim MJ, Jee HM, Sohn MH KK. Age of tolerance acquisition in children with cow's milk allergy: associations with initial specific IgE levels. Pediatr Allergy Immunol. 2011;22((1 Pt 2)):69–74.
5. Suh DI, Lee SY, Nam YH, Kim BJ, Kim HB, Park HS et al. Predictors of tolerance in children with IgE-mediated cow's milk

allergy. Allergy Asthma Immunol Res. 2017;9(4):350–355.
6. Feheliani F, Mahmudiono T IE. Nutritional care process with high-calorie, high-protein diet in pediatric bronchopneumonia: case report. Public Health Nutrition Media. 2024;13(1):276–285.
7. Jones CA, Lim J, Nguyen DT PM. Nutritional strategies in managing pediatric cow's milk allergy and atopic dermatitis: an integrative approach. Clin Nutr ESPEN. 2023;55:127–134.
8. Pelletier DL, Frongillo EA, Schroeder DG, Habicht JP. The effects of malnutrition on child mortality in developing countries. Bull World Health Organs. 1995;73(4):443–8.
9. Acevedo-Murillo JA, García León ML, Firo-Reyes V, Santiago-Cordova JL, Gonzalez-Rodriguez AP, Wong-Chew RM. Zinc Supplementation Promotes a Th1 Response and Improves Clinical Symptoms in Fewer Hours in Children With Pneumonia Younger Than 5 Years Old. A Randomized Controlled Clinical Trial. Front Pediatr. 2019;7(November):1–11.
10. Jorge Alberto Acevedo-Murillo et al. The significance of MUAC z_score in diagnosing pediatric malnutrition. Front Pediatr [Internet]. 2023;11(108113). Available from: https://www.frontiersin.org/articles/10.3389/fped.2023.108113/full
11. Burks AW et al. Allergy to extensively hydrolyzed cow's milk proteins in infants. J Pediatr [Internet]. 2002;140(3):S78–S84. Available from: https://www.jpeds.com/article/S0022-3476(02)00080-X/fulltext
12. Estrada-Reyes E, García-Hernández G, Martínez-Gimeno A, Nava-Ocampo AA. Effect of extensively hydrolyzed milk formula on growth and resistance to bronchitis and atopic dermatitis in infants and toddlers. J Investig Allergol Clin Immunol. 2006;16(3):183–7.
13. Durukan HE, Dörtkardeşler BE, Tosyalı M, Gökçe Ş, Kurugöl NZ, Koç F. Assessment of the Diagnostic Performance of MUAC in Malnutrition Screening and Its Correlation with Other Anthropometric Indicators in Healthy Children and Adolescents. Children. 2024;11(12):1–12.
14. Maloney CA, Rees WD. Gene-nutrient interactions during fetal development. Reproduction. 2005;130(4):401–10.
15. Cheng Liu et al. Impact of high_protein enteral nutrition on muscle preservation in mechanically ventilated patients with severe pneumonia. J Heal Popul Nutr [Internet]. 2024;43(152). Available from: https://doi.org/10.1186/s41043-024-00633-0
16. Bibo Health. The Crucial Role of Nutrition in Pneumonia Recovery. Bibo.
17. WHO. Zinc supplementation for the prevention of pneumonia in children aged 2 months to 59 months', ELENA Evidence Summary. 2023; Available from: https://www.who.int/ tools/elena/review%1Esummaries/zinc-pneumonia-children
18. Nicole Knebusch, Marwa Mansour, Stephanie Vazquez and Rytter MJH et al. The Immune System in Children with Malnutrition—A Systematic Review. PLoS One [Internet]. 2014;9(8):e105017. Available from: https://doi.org/10.1371/journal.pone.0105017
19. World Health Organization - WHO. Vitamin A for preventing acute lower respiratory tract infections in children up to seven years of age', ELENA Evidence Summary. 2022; Available from: https://www.who.int/tools/elena/review-summaries/vitamin%1Epneumonia%1Echildren
20. Karami M, Chaleshgar M, Salari N, Akbari H, Mohammadi M. Global prevalence of anemia in pregnant women: a comprehensive systematic review and meta-analysis. Maternal and child health journal. 2022 Jul;26(7):1473-87.