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Continuity of midwifery care for a pregnant woman with moderate anemia: A case report

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Abstract:
Anemia is one of the most common complications of pregnancy in Indonesia and contributes to preventable maternal and neonatal harm. Midwife-led continuity of care (CoC) may strengthen its detection and management, yet practical descriptions from primary care remain scarce. This case report aimed to describe the implementation and outcomes of CoC-based midwifery care for a third-trimester pregnant woman with moderate anemia. A descriptive case study, reported according to the CARE guidelines, was conducted at Grogol Primary Health Center, Indonesia, from October 2025 to March 2026. The participant was a 23-year-old primigravida (G1P0000) at 33 weeks of gestation with a hemoglobin (Hb) level of 9.0 g/dL. Data were collected through interviews, observation, physical and laboratory examinations, and document review, and were analyzed descriptively using the SOAP framework. Care included iron–folic acid supplementation, adherence counseling, dietary education with beetroot as a complementary food, and continued care through birth, postpartum, newborn, and family planning services. Hb increased from 9.0 to 10.0 and then 10.9 g/dL within four weeks, shifting the condition from moderate to mild anemia. Labor progressed normally, and mother and baby remained healthy. Midwife-led CoC supported effective anemia management in this case.

Keywords:
anemia; continuity of care; iron supplementation; midwifery; pregnancy

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INTRODUCTION

Maternal and neonatal deaths remain sensitive markers of how well a health system performs. In 2023, about 260,000 women died from causes related to pregnancy and childbirth; most of these deaths occurred in low- and middle-income countries and were preventable with timely, good-quality care (World Health Organization, 2025). The Sustainable Development Goals (SDGs) aim to achieve a global maternal mortality ratio (MMR) below 70 per 100,000 live births by 2030. Indonesia is still far from this target. The 2020 Population Census Long Form estimated a national MMR of 189 per 100,000 live births and an infant mortality rate of 16.85 per 1,000 live births (Badan Pusat Statistik, 2024).

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Anemia in pregnancy is one of the most frequent and most modifiable contributors to this burden. The World Health Organization (WHO) defines anemia in the third trimester as a hemoglobin (Hb) concentration below 11.0 g/dL and grades it as mild (10.0–10.9 g/dL), moderate (7.0–9.9 g/dL), or severe (<7.0 g/dL) (World Health Organization, 2024). Globally, about 36% of pregnant women were anemic in 2019, with little improvement over two decades (Karami et al., 2022; Stevens et al., 2022). In Indonesia, national survey data showed that the prevalence among pregnant women rose from 37.1% in 2013 to 48.9% in 2018 (Sungkar et al., 2022).

During pregnancy, plasma volume expands more than red cell mass, while iron needs rise sharply to support the fetus, the placenta, and maternal erythropoiesis. When dietary intake and iron stores cannot meet this demand, iron deficiency anemia develops; it is the leading cause of anemia in pregnancy, although infections and other nutritional deficiencies also contribute (Chaparro & Suchdev, 2019; Pasricha et al., 2021). Low maternal Hb is associated with preterm birth, low birth weight, small-for-gestational-age infants, stillbirth, and postpartum hemorrhage (Figueiredo et al., 2018; Rahman et al., 2016; Young et al., 2023), and severe anemia roughly doubles the risk of maternal death (Daru et al., 2018).

Daily oral iron–folic acid supplementation is the cornerstone of prevention and treatment and markedly reduces anemia at term (Peña-Rosas et al., 2015). Its effectiveness, however, depends on adherence, which is often limited by side effects, poor understanding of the condition, and inconsistent counseling (Gebremichael & Welesamuel, 2020). Dietary advice on iron-rich foods and on factors that enhance absorption is therefore recommended alongside supplementation (Pavord et al., 2020). In Indonesia, local foods such as beetroot (Beta vulgaris), which provides folate, vitamin C, nitrates, and betalain antioxidants, are often promoted as complementary sources (Clifford et al., 2015), although they cannot replace iron therapy.

Effective management of anemia during pregnancy requires more than the provision of iron–folic acid supplementation. It involves repeated assessment of hemoglobin levels, evaluation of treatment adherence, identification of potential barriers to supplementation, and individualized dietary counseling. These components are particularly important because improvements in hemoglobin depend not only on the prescribed treatment but also on its consistent use and the woman's ability to follow recommended nutritional practices. Integrating these activities into routine antenatal care may help midwives identify inadequate treatment responses and determine when further assessment or referral is needed.

Midwife-led continuity of care (CoC) is a model in which the same midwife, or a small team, supports a woman from pregnancy through birth, the postpartum period, and family planning. A Cochrane review found that women receiving midwife CoC were less likely to have preterm and instrumental births and were more satisfied with their care, with no evidence of harm (Sandall et al., 2024). Continuity also supports maternal mental health and trusting relationships with providers (Cibralic et al., 2023) and is central to the framework for quality maternal and newborn care (Renfrew et al., 2014). In low- and middle-income countries, CoC has been implemented in various forms (Adnani et al., 2025), and a midwife-led CoC model has been designed specifically to manage iron deficiency anemia in pregnancy (Naz et al., 2024).

For pregnant women with anemia, continuity of care may provide a practical structure for coordinating these management activities across antenatal visits, childbirth, and the postpartum

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period. Consistent contact with the same midwife or a small team can facilitate monitoring of hemoglobin changes, reinforcement of adherence to supplementation, and adjustment of counseling to individual needs. It may also improve the recognition of persistent anemia and support timely referral when clinical improvement is inadequate. Thus, CoC offers an opportunity to connect clinical monitoring, nutritional support, and therapeutic adherence within a coordinated model of maternal care.

Despite this evidence, few reports describe how CoC is applied to a pregnant woman with anemia in routine Indonesian primary care, from first detection to the postpartum period. Detailed case reports can show how assessment, counseling, and follow-up connect in daily practice and can guide midwives working in similar settings. This case report therefore aimed to describe the implementation and outcomes of CoC-based midwifery care for a pregnant woman in the third trimester with moderate anemia at a primary health center in Indonesia.

METHODS

This study used a descriptive single-case design. A case study approach was chosen because it allows an in-depth, real-world description of a care process for one patient over time (Afandi et al., 2023). The report follows the CARE (Case Report) guidelines (Riley et al., 2017). The study was conducted at Grogol Primary Health Center (Puskesmas) in Indonesia from October 2025 to March 2026. This period covered the third trimester of pregnancy, labor and birth, the postpartum and neonatal periods, and family planning counseling.

The participant, Mrs. N, was purposively selected from among women attending antenatal care. She was eligible because she was in the third trimester, had moderate anemia according to WHO criteria (Hb 7.0–9.9 g/dL), had a singleton pregnancy, had no known chronic disease, and agreed to receive continuous care until the postpartum period. At recruitment, she was 23 years old, primigravida (G1P0000), and at 33 weeks of gestation.

Midwifery care followed the CoC approach and was provided by the same team of midwives throughout. Antenatal care consisted of three visits (23 December 2025, 4 January 2026, and 21 January 2026), followed by labor care, postpartum care, newborn care, and family planning services. The anemia care package included (1) iron–folic acid tablets according to the national antenatal protocol; (2) counseling on regular intake and on taking iron with vitamin C–rich foods or drinks; (3) dietary education on iron-rich foods such as green leafy vegetables, red meat, liver, eggs, and legumes; and (4) beetroot as a complementary local food. Each visit also included education on third-trimester discomforts, pregnancy exercise, danger signs, and signs of labor.

Data were collected through interviews, direct observation, physical examination, laboratory testing, and review of the Maternal and Child Health (MCH) handbook and medical records. At each antenatal visit, the midwife recorded maternal weight, blood pressure, fundal height, fetal heart rate, and Hb level. Pregnancy risk was screened with the Poedji Rochjati Score Card (Kartu Skor Poedji Rochjati, KSPR). Anemia severity was classified using the WHO cut-offs for the third trimester (World Health Organization, 2024).

Data were analyzed descriptively using the SOAP (Subjective, Objective, Assessment, Plan) framework. Findings from each visit were organized chronologically and summarized in a table to

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show changes in maternal and fetal parameters over time. The findings were then compared with current evidence. Written informed consent was obtained from the participant before data collection, including consent for publication. Her identity was protected by using initials only, and all records were stored confidentially.

RESULTS

Mrs. N was a 23-year-old primigravida (G1P0000) with no history of chronic disease. She was followed through three antenatal visits in the third trimester. At the first visit (23 December 2025; 33 weeks of gestation), she reported back pain. Her weight was 53.0 kg, blood pressure 110/70 mmHg, fundal height 29 cm, and fetal heart rate 139 beats per minute. Her Hb level was 9.0 g/dL, which indicated moderate anemia. The midwifery diagnosis was G1P0000, 33 weeks of gestation, single live intrauterine fetus, with moderate anemia. The KSPR score was 2, indicating a low-risk pregnancy.

The care plan focused on correcting anemia while maintaining routine antenatal surveillance. The midwife provided iron–folic acid tablets and explained why daily intake was important, how to take them with vitamin C–rich foods or drinks, and which local foods are rich in iron. Beetroot was suggested as a complementary food. Education on back pain and other third-trimester discomforts was also given, and the mother was encouraged to join pregnancy exercise classes.

Table 1 summarizes maternal and fetal findings across the three visits. Hb increased by 1.0 g/dL between the first and second visits and by a further 0.9 g/dL by the third visit, a total rise of 1.9 g/dL over four weeks. Based on WHO cut-offs, anemia improved from moderate to mild by the second visit and remained mild, close to the normal threshold, at 37 weeks. Blood pressure stayed within normal limits, and fetal heart rate stayed within the normal range (120–160 beats per minute). Fundal height increased from 29 to 30 cm and remained unchanged between the second and third visits. The KSPR score remained 2 throughout.

Table 1. Maternal and fetal findings during third-trimester antenatal visits

Parameter	Visit 1	Visit 2	Visit 3
Date	23 Dec 2025	4 Jan 2026	21 Jan 2026
Gestational age (weeks)	33	34–35	37
Main complaint	Back pain	None	None
Weight (kg)	53.0	54.3	56.5
Blood pressure (mmHg)	110/70	115/70	110/75
Fundal height (cm)	29	30	30
Fetal heart rate (bpm)	139	150	155
Hemoglobin (g/dL)	9.0	10.0	10.9
Anemia category (WHO)	Moderate	Mild	Mild
KSPR score	2	2	2
Main care provided	Iron–folic acid; adherence and diet counseling; beetroot	Reinforced diet and supplement counseling; pregnancy exercise	Continued supplementation; education on signs of labor

Note. bpm = beats per minute; KSPR = Poedji Rochjati Score Card; WHO = World Health Organization. Anemia category based on third-trimester cut-offs: mild 10.0–10.9 g/dL, moderate 7.0–9.9 g/dL (World Health Organization, 2024).

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At the second and third visits, the mother had no complaints and reported that her back pain had resolved. Diet and supplementation counseling was repeated at each visit. At 37 weeks, education focused on signs of labor, including regular and increasing contractions, bloody show, and rupture of membranes, and on when to come to the health facility.

Care then continued through labor, the postpartum period, newborn care, and family planning, in line with the CoC approach. Labor progressed normally, and both mother and newborn were in good health. No complications related to anemia were recorded, and family planning counseling was provided during the postpartum period.

DISCUSSION

This case report describes CoC-based midwifery care for a primigravida with moderate anemia in the third trimester. Within four weeks of care, Hb rose from 9.0 to 10.9 g/dL; anemia improved from moderate to mild; maternal and fetal parameters remained within normal limits; and labor and the postpartum period were uncomplicated. These findings suggest that a simple care package consisting of iron–folic acid supplementation, repeated counseling, and dietary support, delivered through continuous contact with the same midwife team, can be effective in a primary care setting.

The size and speed of the Hb response deserve careful interpretation. A rise in Hb within two to four weeks of starting oral iron is the expected response in iron deficiency anemia and is itself used to support that diagnosis (Pavord et al., 2020). The increase of about 1 g/dL every two weeks seen in this case is therefore consistent with a good response to standard therapy rather than an unusual one. Daily iron supplementation has been shown to reduce anemia at term considerably (Peña-Rosas et al., 2015). The clear response also suggests that iron deficiency, rather than physiological hemodilution alone, was the main cause of the low Hb. Hemodilution lowers Hb in late pregnancy, but it would not be expected to reverse while plasma volume is still high (Chaparro & Suchdev, 2019; Pasricha et al., 2021).

Adherence was probably the key factor in this response. Poor adherence is a major reason iron supplementation fails in practice and is linked to limited knowledge, side effects, and inadequate counseling (Gebremichael & Welesamuel, 2020). In this case, the same team of midwives met with the mother repeatedly, checked her progress, and reinforced the same messages at each visit. This kind of relationship is a core feature of CoC and helps explain why continuity models improve women's experience and outcomes (Sandall et al., 2024). Trust built through continuity also supports maternal well-being and openness to advice (Cibralic et al., 2023). Naz et al. (2024) proposed a midwife-led CoC model for iron-deficiency anemia based on similar principles: early screening, regular follow-up, and counseling by a known midwife. Collaboration with other professionals, such as laboratory staff, nutritionists, and physicians, can further strengthen this care, as shown in an earlier case study of interprofessional collaboration in chronic disease management (Afandi et al., 2023).

An important contribution of the CoC approach is its ability to integrate clinical monitoring with individualized health education throughout pregnancy. Rather than treating anemia as an isolated laboratory abnormality, continuous midwifery care enables the midwife to monitor

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changes in hemoglobin levels, identify barriers to supplementation, assess dietary practices, and adapt counseling based on the mother's response. This integration is particularly relevant because the effectiveness of iron supplementation depends not only on prescribing the appropriate therapy but also on consistent adherence and timely evaluation of treatment response (Gebremichael & Welesamuel, 2020; Pavord et al., 2020). Repeated contact with a familiar midwife may also facilitate early recognition of persistent anemia and the need for further clinical assessment or referral. Thus, the value of CoC lies in connecting treatment, monitoring, and supportive communication within a continuous care pathway (Sandall et al., 2024; Naz et al., 2024).

Beetroot was offered as a complementary food, and its role should be stated with caution. Beetroot contains folate, vitamin C, nitrates, and betalain antioxidants, but its iron content is modest and in non-heme form (Clifford et al., 2015). Its direct effect on Hb is therefore likely to be smaller than that of iron tablets. It may still have helped indirectly, for example, by giving the mother an acceptable, culturally familiar food that reinforced her engagement with dietary advice, or by adding vitamin C, which improves non-heme iron absorption. Because beetroot intake was not measured, its specific contribution cannot be separated from that of supplementation. Dietary approaches should therefore be presented as a complement to, not a substitute for, iron therapy (Pavord et al., 2020). Where side effects limit adherence, alternate-day dosing may be considered, since it can improve fractional iron absorption by reducing hepcidin-mediated blockade (Stoffel et al., 2020).

The clinical value of reducing anemia from moderate to mild before term is considerable. Low maternal Hb is associated with low birth weight, preterm birth, and perinatal death (Figueiredo et al., 2018; Rahman et al., 2016), and an updated global meta-analysis confirmed links with several adverse maternal and infant outcomes (Young et al., 2023). Women with severe anemia have about twice the risk of death, especially from postpartum hemorrhage (Daru et al., 2018). Entering labor with a higher Hb gives a greater safety margin against blood loss. However, an Hb of 10.9 g/dL remains below the WHO threshold (World Health Organization, 2024), so supplementation should continue after birth, and Hb should be rechecked in the postpartum period.

The improvement from moderate to mild anemia should therefore be interpreted as a meaningful clinical response, but not as complete hematological recovery. Women entering childbirth with residual anemia may have a reduced capacity to tolerate blood loss compared with women whose hemoglobin levels have returned to the normal range. This is particularly important because postpartum hemorrhage remains a major contributor to maternal morbidity and mortality, and pre-existing anemia may reduce physiological reserves when significant blood loss occurs (Daru et al., 2018; Young et al., 2023). Consequently, antenatal improvement should be followed by continued iron supplementation, postpartum hemoglobin assessment when clinically indicated, and evaluation of ongoing symptoms or possible blood loss. This approach emphasizes that anemia management should extend beyond improving antenatal hemoglobin levels and remain part of comprehensive maternal care through the postpartum period (Pavord et al., 2020; World Health Organization, 2024).

Fetal surveillance showed a normal heart rate at every visit. Fundal height rose from 29 to 30 cm and then remained at 30 cm at 37 weeks. Engagement of the fetal head near term can slow or stop the increase in fundal height. Even so, a measurement more than 2–3 cm below gestational

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age should prompt further assessment, usually by ultrasound, to exclude fetal growth restriction. No ultrasound results were available in this case, although the uncomplicated birth and a healthy newborn are reassuring.

These findings are relevant to Indonesia, where nearly half of pregnant women were anemic in national data (Sungkar et al., 2022). Studies from low- and middle-income countries show that the number of antenatal visits alone does not ensure quality; what matters is whether essential content, such as Hb testing, supplementation, and counseling, is actually delivered (Benova et al., 2018). The CoC model offers a practical way to ensure that this content is delivered and followed up on. It fits the framework for quality maternal and newborn care (Renfrew et al., 2014) and matches the many ways CoC is being adapted in low- and middle-income countries (Adnani et al., 2025). For primary health centers, the main implication is that anemia care should include scheduled Hb rechecks and repeated counseling by the same midwife, not only the distribution of tablets.

This report has several strengths. Care was continuous from the third trimester through family planning; findings were documented systematically using the SOAP framework, and the report follows the CARE guidelines. It also has limitations. First, as a single case, it cannot establish cause and effect or be generalized. Second, anemia was assessed by Hb alone; serum ferritin, the most informative marker of iron stores, was not measured (Camaschella, 2015; Pasricha et al., 2021). Third, the iron dose, beetroot intake, and adherence were not quantified, for example, by pill counts. Fourth, care began at 33 weeks, so earlier antenatal data were not available. Fifth, pre-pregnancy body mass index was not reported, so the adequacy of the weight gain from 53.0 to 56.5 kg could not be judged. Finally, ultrasound and postpartum Hb data were not available.

Future studies should use larger samples and controlled designs to test the effect of midwife-led CoC on anemia outcomes. They should also include ferritin testing, objective measures of adherence, and follow-up of maternal and infant iron status after birth. Such evidence would help health centers design anemia programs that combine supplementation, nutrition counseling, and continuity of midwifery care.

CONCLUSION

Midwife-led continuity of care was successfully implemented for a pregnant woman in the third trimester with moderate anemia. Iron–folic acid supplementation, repeated counseling, and dietary support delivered by the same midwife team raised her Hb from 9.0 to 10.9 g/dL within four weeks, improving the anemia from moderate to mild. Labor, the postpartum period, and newborn care were uncomplicated. Continuity of care is a practical approach that midwives in primary health centers can use to detect, treat, and follow up anemia in pregnancy.

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CONFLICT OF INTEREST

The authors declare that the research and publication of this article were conducted in the absence of any financial or personal conflicts of interest related to this study.

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