Journal of Midwifery and Nursing, 8 (3) (2026) pp. 177-187

Published by: IOCSCIENCE

Journal of Midwifery and Nursing

Journal homepage: www.iocscience.org/ejournal/index.php/JMN

Continuity of midwifery care for a pregnant woman with chronic energy deficiency: A case study

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ARTICLE INFO

Article history:

Received Jul 27, 2026
Revised Aug 4, 2026
Accepted Aug 12, 2026

Keywords:

Childbirth;
Chronic Energy Deficiency;
Continuity of Midwifery Care;
Postpartum;
Pregnancy.

ABSTRACT

Background: Chronic Energy Deficiency (CED) remains an important nutritional problem among pregnant women and is associated with adverse maternal and neonatal outcomes. However, limited case-based evidence has described the implementation of continuity of midwifery care specifically for pregnant women with CED across the maternal and neonatal continuum. Objective: To implement continuity of midwifery care for a pregnant woman with CED from pregnancy through childbirth, postpartum, neonatal, and family planning care. Methods: A descriptive case study was conducted at an independent midwifery practice in Medan, Indonesia. The participant was a 22-year-old primigravida with a Mid-Upper Arm Circumference (MUAC) of 22 cm, indicating CED. Care was provided using Varney's Midwifery Management Model and documented using the Subjective, Objective, Assessment, and Plan (SOAP) format. Data were collected through interviews, physical and obstetric examinations, supporting examinations, and documentation review. Results: Continuity of care included nutritional counseling, MUAC monitoring, iron supplementation, antenatal monitoring, intrapartum care, postpartum follow-up, neonatal care, and family planning services. Pregnancy progressed to 38 weeks and 2 days and ended in spontaneous vaginal delivery. At admission, cervical dilatation was 7 cm and fetal heart rate was 140 beats/minute. The first stage of labor lasted approximately 14 hours without complications. Four postpartum follow-up visits showed normal maternal recovery and successful exclusive breastfeeding. The newborn demonstrated normal adaptation without identified complications. Conclusion: Continuity of midwifery care facilitated early identification and management of CED and supported favorable maternal and neonatal outcomes in this case. Practically, integrating nutritional screening, individualized counseling, and continuous maternal-neonatal monitoring may strengthen care for pregnant women with CED in primary midwifery settings.

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1. Introduction

Maternal and child health remains a major global public health concern and is recognized as one of the priority targets of the Sustainable Development Goals (SDGs). Improving maternal health is essential for reducing maternal and neonatal mortality while ensuring optimal growth and development during early

life. Consequently, many countries have strengthened maternal healthcare services to improve the accessibility and quality of antenatal, intrapartum, postpartum, and neonatal care (Republik Indonesia, 2024).

Maternal nutritional status plays a crucial role in determining pregnancy outcomes. Adequate nutritional intake supports maternal well-being, promotes optimal fetal growth, and contributes to the delivery of healthy infants. Conversely, poor maternal nutrition remains a significant challenge, particularly in developing countries. One of the most prevalent nutritional disorders during pregnancy is Chronic Energy Deficiency (CED), a condition caused by prolonged inadequate energy and protein intake. In Indonesia, CED is commonly identified by a Mid-Upper Arm Circumference (MUAC) of less than 23.5 cm and is associated with increased risks of adverse maternal and neonatal outcomes, including impaired fetal growth, preterm birth, low birth weight, and maternal morbidity. A retrospective study of 81 pregnant women with malnutrition reported substantial maternal and neonatal morbidity, including anemia and perinatal complications, highlighting the importance of early identification and appropriate management of maternal undernutrition during pregnancy (Dewi, R., Hadriyati, A., & Situngkir, 2025; Tambun, M., Agussamad, I., Rezeki, S., & Sembiring, 2025).

Maternal nutritional problems are influenced by multiple factors, including nutritional intake, education, knowledge, antenatal care utilization, and socioeconomic conditions. In rural Indonesia, maternal age, education, and access to supplementary feeding have been associated with CED among young pregnant women (Kuntari & Utami, 2024). Similarly, low nutritional knowledge and inadequate informational and instrumental support have been identified as factors associated with CED among pregnant women in Indonesia (Triyawati & Yuliani, 2023). These findings indicate that management of CED should extend beyond nutritional screening to include individualized education, behavioral support, regular monitoring, and continuity of care.

According to the World Health Organization (WHO), the global maternal mortality ratio reached 223 deaths per 100,000 live births in 2020, with substantially higher rates reported in low-income countries than in developed nations. In Indonesia, the maternal mortality ratio was reported at 189 deaths per 100,000 live births, while the neonatal mortality rate reached 9.3 deaths per 1,000 live births. Furthermore, maternal deaths increased from 4,005 cases in 2022 to 4,129 cases in 2023, whereas neonatal deaths rose from 20,882 to 29,945 during the same period. These findings indicate that maternal and neonatal mortality remains a major public health issue requiring comprehensive preventive strategies (Kementerian Kesehatan Republik Indonesia, 2021; Tambun, M., Tinggi, S., Kesehatan, I., Husada, M., Timur, A., & Regency, 2025).

To improve pregnancy outcomes, the Ministry of Health of the Republic of Indonesia recommends standardized antenatal care through the 10T service standard, which includes maternal anthropometric assessment, blood pressure measurement, nutritional evaluation using MUAC, fetal growth monitoring, laboratory examinations, iron supplementation, tetanus immunization screening, ultrasonography, case management, and health counseling. Within this framework, midwives have an important role in identifying nutritional risk, providing individualized counseling, monitoring adherence to nutritional recommendations and supplementation, and coordinating further care when complications are identified (Simbolon, M., Sembiring, M., Ginting, S. S., & Feronika, 2025; Srininta, Simarmata, M., Ginting, S. S. T., Sembiring, I., & Putri, 2023).

Continuity of midwifery care (CoMC) provides a framework for integrating these components across pregnancy, childbirth, postpartum, and neonatal care. Evidence from systematic reviews indicates that midwife-led continuity models are associated with a greater likelihood of spontaneous vaginal birth and lower rates of some obstetric interventions while maintaining comparable maternal and neonatal safety (Sandall J, Soltani H, Gates S, Shennan A, 2024). Recent evidence from low- and middle-income countries also suggests that continuity of midwifery care can support maternal and newborn outcomes, although implementation may be influenced by healthcare resources, workforce capacity, community acceptance, and integration with existing health systems (Estiningtyas et al., 2025).

The prevention of Chronic Energy Deficiency is consistent with the recommendations of the World Health Organization (WHO), which emphasizes improving maternal nutrition to reduce maternal

and neonatal mortality and prevent stunting. These efforts also support the achievement of the Sustainable Development Goals, particularly Goal 2 (Zero Hunger) and Goal 3 (Good Health and Well-being). At the national level, CED prevention aligns with Indonesia's health development agenda through the Asta Cita program, which prioritizes the development of high-quality human resources by improving public health (Ginting, 2022; Sinaga, R., Azizah, N., Sirait, A. I., & Zahra, 2025).

Data from the North Sumatra Health Profile reported that 11,357 pregnant women experienced Chronic Energy Deficiency in 2020, including 437 cases in Medan City. To address this problem, the government has implemented nutritional interventions through supplementary feeding programs for pregnant women with CED. According to the Regulation of the Minister of Health No. 51 of 2016 concerning Nutritional Supplement Standards, supplementary food for pregnant women consists of fortified biscuits containing protein, carbohydrates, linoleic acid, 11 vitamins, and seven minerals (Badan Pusat Statistik Sumatera Utara, 2020; Pasaribu, 2018).

According to the Indonesian National Work Competency Standards (SKKNI), midwives play a strategic role in preventing and managing CED through early identification using MUAC measurement, nutritional counseling, monitoring compliance with supplementary feeding, and evaluating maternal nutritional status throughout pregnancy. These responsibilities highlight the importance of continuity of midwifery care in improving maternal and neonatal health outcomes (Munthe, 2022).

Despite evidence regarding the risks associated with CED and the benefits of continuity of midwifery care, an important gap remains. Previous research has largely examined CED and its associated maternal-neonatal risks or continuity of midwifery care as a general maternity-care model, while limited case-based evidence has specifically documented the integration of CED management within continuity of midwifery care across the complete maternal-neonatal continuum. A previous case report demonstrated that continuous support involving nutritional education, antenatal monitoring, and supplementation adherence could improve MUAC and result in a favorable neonatal outcome in a pregnant woman at risk of CED (Alfina et al., 2024). However, further case-based documentation is needed to illustrate how CED-focused nutritional management can be embedded within comprehensive midwifery care extending from pregnancy through childbirth, postpartum, neonatal, and family planning services, particularly in an independent midwifery practice setting.

The novelty of this study does not lie in introducing a new model of midwifery care, but in documenting the practical integration of CED identification and nutritional management within a continuous midwifery care pathway across the maternal-neonatal continuum in an independent midwifery practice. In this case, CED was identified through a MUAC measurement of 22 cm, followed by individualized nutritional counseling, nutritional monitoring, iron supplementation, antenatal surveillance, intrapartum monitoring, postpartum follow-up, neonatal care, and family planning services. The implementation of CoMC in this case was assessed using clinically relevant indicators across the continuum of care, including gestational age at birth, mode and safety of delivery, maternal postpartum recovery, breastfeeding, neonatal adaptation, and the occurrence of maternal or neonatal complications. The pregnancy reached 38 weeks and 2 days and ended in spontaneous vaginal delivery without identified maternal or fetal complications. Four postpartum follow-up visits demonstrated normal maternal recovery and successful exclusive breastfeeding, while neonatal follow-up showed normal adaptation without identified complications.

The practical contribution of this case is to demonstrate how independent midwives can integrate nutritional risk screening and individualized counseling into routine continuity of care rather than treating CED as an isolated antenatal finding. Such an approach may support earlier identification of nutritional risk, strengthen maternal adherence to health recommendations, facilitate timely referral when complications arise, and improve coordination of maternal and neonatal follow-up.

At the service-policy level, this case supports strengthening nutrition-sensitive antenatal and continuity-of-care components within primary midwifery services. However, because this study is based on a single case, the findings should be interpreted as practice-based evidence rather than evidence of effectiveness or a basis for population-level policy change.

The Independent Midwifery Practice of Bd. Juniarsih, S.Keb., in Medan Amplas District, Medan City, was selected because the identified participant with CED received her continuity of midwifery care at this primary-care setting. The practice provided the setting in which antenatal, intrapartum, postpartum, neonatal, and family planning services could be followed longitudinally, making it appropriate for documenting the implementation of CoMC in a woman with nutritional risk. Therefore, this study aimed to implement and describe continuity of midwifery care for a pregnant woman with CED from pregnancy through childbirth, postpartum, neonatal, and family planning care at the Independent Midwifery Practice of Bd. Juniarsih, S.Keb., Medan Amplas District, Medan City.

2. Methods

This study employed a descriptive case study design using a continuity of midwifery care approach. The case study aimed to provide comprehensive midwifery care for a pregnant woman with Chronic Energy Deficiency (CED) throughout pregnancy, childbirth, the postpartum period, neonatal care, and family planning services. A descriptive single-case study design was selected because the study aimed to examine the clinical care process and outcomes of one information-rich case within its real-life context, rather than to test a causal relationship or estimate the effectiveness of CoMC at the population level. Case study methodology is appropriate when a clinical phenomenon is investigated in depth using multiple sources of evidence and when the context in which care is delivered is an important part of the analysis ((Cleland, J., Conde-Agudelo, A., Peterson, H., Ross, J., & Tsui, 2021). The case was bounded by the Independent Midwifery Practice of Bd. Juniarsih, S.Keb., Medan Amplas District, Medan City, and by the period extending from pregnancy through childbirth, postpartum, neonatal, and family planning care.

The participant was Mrs. M, a 22-year-old primigravida with a Mid-Upper Arm Circumference (MUAC) of 22 cm, indicating CED. The participant was selected because she had not previously received continuity of midwifery care during pregnancy. Purposive case selection was used because the study specifically required a clinically relevant case of CED that could be followed longitudinally throughout the continuity-of-care pathway. The selection of a single participant was based on the information-rich nature of the case and the objective of obtaining a detailed clinical description rather than statistical generalization. The case was identified at the study site and the participant was invited to participate after receiving an explanation of the study objectives and procedures. Written informed consent was obtained before data collection. The inclusion criteria were a pregnant woman receiving care at the study site, MUAC <23.5 cm indicating CED, willingness to participate in longitudinal follow-up and interviews, and provision of written informed consent. Exclusion criteria were the need for immediate referral or specialist management at recruitment, inability or unwillingness to participate in follow-up, and withdrawal of consent during the study.

The study was conducted at the Independent Midwifery Practice of Bd. Juniarsih, S.Keb., Medan Amplas District, Medan City, from September to October 2026. The site was selected because the identified participant with CED received her continuity of midwifery care at this primary-care setting, which enabled longitudinal observation of antenatal, intrapartum, postpartum, neonatal, and family planning services within one care pathway.

Continuity of midwifery care was implemented longitudinally across antenatal, intrapartum, postpartum, neonatal, and family planning care. During the antenatal period, care included maternal history taking, physical and obstetric assessment, MUAC measurement, nutritional assessment and counseling, iron supplementation, fetal monitoring, supporting examinations when indicated, health education, and preparation for childbirth. Nutritional counseling focused on adequate energy and protein intake, balanced nutrition, adherence to iron supplementation, recognition of pregnancy danger signs, and preparation for delivery. During labor, continuity was maintained through monitoring of maternal vital signs, uterine contractions, cervical dilatation, fetal heart rate, fetal presentation and descent, and labor progress using the partograph. Active management of the third stage of labor and monitoring during the fourth stage were performed according to applicable midwifery standards. Postpartum care consisted of four follow-up visits at approximately 6 hours, 6 days, 24 days, and 6

weeks after delivery, including assessment of maternal vital signs, uterine involution, lochia, breastfeeding, maternal complaints, nutritional needs, danger signs, and health education. Neonatal care included immediate skin-to-skin contact, early initiation of breastfeeding, umbilical cord care, vitamin K administration, ophthalmic prophylaxis, assessment of vital signs and neonatal adaptation, breastfeeding support, monitoring for neonatal danger signs, and immunization education. Family planning counseling was provided as the final component of the continuity-of-care pathway.

Data were collected through interviews, direct observation, physical and obstetric examinations, supporting examinations, and documentation review. The semi-structured interview guide covered demographic characteristics, obstetric and medical history, nutritional intake and dietary practices, supplement adherence, pregnancy complaints, health knowledge, psychosocial conditions, and experiences of receiving midwifery care. Observation and clinical assessment forms were used to record maternal vital signs, anthropometric measurements including MUAC, fundal height, fetal presentation, fetal heart rate, cervical dilatation, uterine contractions, fetal descent, postpartum uterine involution, lochia, breastfeeding status, and neonatal adaptation. Documentary data included antenatal, intrapartum, postpartum, neonatal, and family planning records, SOAP documentation, partograph records, and available laboratory or ultrasonographic results.

Data were analyzed descriptively by comparing the findings obtained during continuity of care with relevant theories and standards of midwifery practice. The analysis was presented narratively to describe the implementation of care and maternal and neonatal outcomes throughout the study period. A structured within-case analysis was conducted by organizing the data chronologically according to the stages of CoMC. Relevant information was coded into clinical domains, including maternal nutritional status, maternal health, fetal condition, labor progress, postpartum recovery, breastfeeding, neonatal adaptation, complications, interventions, and health education. Findings from interviews, clinical observations, examinations, and medical records were then compared to identify consistency or discrepancies across data sources. The integrated case trajectory was subsequently interpreted in relation to midwifery care standards and relevant scientific evidence. Thematic analysis was not used because the purpose of the study was to describe a clinical case trajectory rather than to generate abstract themes from participants' lived experiences.

Data credibility was strengthened through triangulation of data sources and data collection methods. Source triangulation involved comparing information obtained from the participant with clinical records and examination findings, while method triangulation involved comparing interview findings, clinical observations, physical and obstetric examinations, and documentary records. Member checking was conducted by presenting the summary of relevant findings and the chronology of care to the participant to confirm the accuracy of the information. An audit trail was maintained by retaining interview notes, clinical assessment records, documentary sources, coding records, and records of analytical decisions, allowing the research process to be traced from data collection through interpretation. These procedures were used to strengthen the credibility, dependability, and confirmability of the case study.

Ethical principles were observed throughout the study. Permission to conduct the study was obtained from the Independent Midwifery Practice of Bd. Juniarsih, S.Keb., Medan Amplas District, Medan City, before data collection. Written informed consent was obtained from the participant after she was informed about the purpose and procedures of the study. Confidentiality, anonymity, privacy, and the participant's right to withdraw from the study at any stage were respected. All information obtained during the study was used solely for research purposes, and the participant's identity was protected in the reporting of the case.

3. Results and Discussion

This section presents the findings obtained from the implementation of continuity of midwifery care for a pregnant woman diagnosed with Chronic Energy Deficiency (CED). The continuity of care covered antenatal, intrapartum, postpartum, neonatal, and family planning services. The findings are discussed by comparing the clinical outcomes with relevant theories and current evidence to evaluate the effectiveness of comprehensive midwifery care throughout the continuum of maternal health services.

Pregnancy Care

The participant was a 22-year-old primigravida with a Mid-Upper Arm Circumference (MUAC) of 22 cm, indicating Chronic Energy Deficiency (CED). During pregnancy, the participant received routine antenatal care, nutritional counseling, MUAC monitoring, iron supplementation, health education, and fetal monitoring. The identification of a MUAC of 22 cm at the initial assessment served as an objective indicator of maternal nutritional risk and became the basis for providing individualized nutritional counseling and closer monitoring throughout pregnancy. Rather than treating CED as an isolated nutritional finding, the care plan incorporated nutritional assessment and education into the broader continuity-of-care pathway. The pregnancy progressed to 38 weeks and 2 days, indicating that the participant reached term before delivery. At admission for labor, cervical dilatation was 7 cm and the fetal heart rate was 140 beats/minute, indicating a reassuring fetal condition at the time of assessment. The first stage of labor lasted approximately 14 hours and progressed to spontaneous vaginal delivery without identified maternal or fetal complications. These findings provide objective clinical indicators of a favorable pregnancy and intrapartum course in this individual case.

The favorable course observed in this case should not, however, be interpreted as evidence that CoMC directly caused the positive outcomes. Because this study involved a single participant and had no comparison group, causal attribution is not possible. The findings instead demonstrate that CED-focused nutritional management could be incorporated into a continuous midwifery care pathway and that the participant experienced a favorable clinical trajectory while receiving this care.

This interpretation is important because previous studies have reported that CED during pregnancy is associated with substantially poorer maternal and neonatal outcomes. In a retrospective study of 81 pregnant women with malnutrition, the average maternal weight gain was 8.78 kg, while anemia occurred in 51.9% and perinatal maternal complications in 54.4% of participants; neonatal complications included congenital defects, hyaline membrane disease, and NICU admission (Indarti et al., 2023). In contrast, the present case reached 38 weeks and 2 days and resulted in spontaneous vaginal delivery without identified maternal or fetal complications. The difference should be interpreted as a comparison of clinical trajectories rather than evidence of treatment effectiveness, because the present study does not have a control or comparison group.

The findings are also consistent with previous case-based evidence suggesting that continuous nutritional counseling and monitoring may be useful for pregnant women with CED. A 2024 case report of a pregnant woman at risk of CED reported improvement in MUAC and a favorable neonatal outcome following continuous support that included nutritional education, antenatal monitoring, and supplementation adherence (Alfina et al., 2024). Similarly, another case study reported increased maternal weight and MUAC following intensive midwifery monitoring and supplementary feeding (Khusniyati & Purwati, 2024). These studies support the clinical rationale for integrating nutritional management into continuous midwifery care, although they do not establish causal effectiveness.

Intrapartum Care

The participant entered labor at 38 weeks and 2 days and underwent spontaneous vaginal delivery. At admission, cervical dilatation was 7 cm, fetal heart rate was 140 beats/minute, and the first stage of labor lasted approximately 14 hours. Continuous monitoring of maternal and fetal conditions enabled assessment of labor progression and early identification of potential complications. The absence of documented maternal or fetal complications and the achievement of spontaneous vaginal birth represent important clinical indicators of a favorable intrapartum outcome in this case.

However, the favorable intrapartum outcome cannot be attributed solely to CoMC because labor outcomes are influenced by multiple factors, including maternal age, parity, gestational age, fetal condition, obstetric characteristics, and the natural course of labor. The contribution of CoMC in this case is therefore better understood as facilitating continuous assessment, timely clinical decision-making, health education, and maintenance of care continuity rather than as an independent causal determinant of spontaneous vaginal delivery. This interpretation is consistent with broader evidence showing that midwife-led continuity models can increase the likelihood of spontaneous vaginal birth while reducing some obstetric interventions (Sandall J, Soltani H, Gates S, Shennan A, 2024). The

present case adds context-specific evidence by illustrating how continuity can be applied to a woman with nutritional risk in an independent midwifery practice.

Postpartum Care

Postpartum care was conducted through four follow-up visits at 6 hours, 6 days, 24 days, and 6 weeks after childbirth. Maternal recovery progressed normally throughout the observation period. Across these four visits, maternal recovery was documented as normal, including progressive uterine involution and absence of identified postpartum complications. The participant also achieved successful exclusive breastfeeding. The completion of four postpartum follow-up visits demonstrates that continuity extended beyond delivery rather than ending at childbirth.

The postpartum findings are relevant to CoMC because continuity allows the midwife to monitor maternal recovery, breastfeeding, nutritional needs, and danger signs over time. Nevertheless, because no comparison group was included, the findings indicate successful implementation and a favorable outcome within the case rather than an effect attributable exclusively to CoMC.

Neonatal Care

The newborn received immediate skin-to-skin contact, early initiation of breastfeeding, vitamin K administration, routine neonatal monitoring, and follow-up care. The newborn demonstrated normal adaptation without identified neonatal complications during the documented follow-up period. These findings, together with the absence of identified intrapartum fetal complications, represent the principal neonatal indicators available in this case.

Although birth weight and APGAR scores are important indicators of neonatal outcome, these measurements were not reported in the available case documentation and therefore were not used as quantitative outcome measures in this study. Similarly, maternal BMI, serial body weight, hemoglobin, and albumin levels were not available as documented outcome measures. Consequently, the interpretation of the nutritional and neonatal outcomes is limited to the objective indicators that were recorded, particularly the baseline MUAC of 22 cm, gestational age at delivery, fetal heart rate, mode of delivery, postpartum follow-up, breastfeeding, and documented neonatal adaptation.

Implications for independent midwifery practice

For independent midwifery practices and primary healthcare facilities, this case suggests that CED screening should be integrated into routine continuity of care rather than managed as a single antenatal finding. In practice, MUAC assessment can be used for early nutritional-risk identification, followed by individualized nutritional counseling, supplementation monitoring, repeated maternal assessment, fetal surveillance, postpartum follow-up, breastfeeding support, and neonatal monitoring. The approach may also facilitate earlier recognition of conditions requiring referral and improve coordination between maternal and neonatal services.

At the service level, the case supports strengthening nutrition-sensitive components within continuity-of-midwifery-care services, particularly in primary-care settings where midwives have regular contact with pregnant women. However, further studies involving larger samples and comparative designs are needed to determine whether CoMC produces measurable improvements in nutritional status, birth weight, APGAR scores, and other maternal-neonatal outcomes.

Discussion

The present case study demonstrated that continuity of midwifery care facilitated comprehensive monitoring throughout pregnancy, childbirth, the postpartum period, and neonatal care. Early identification of Chronic Energy Deficiency (CED) through Mid-Upper Arm Circumference (MUAC) measurement enabled timely nutritional counseling, routine follow-up, and continuous evaluation of maternal nutritional status. Despite being diagnosed with CED, the participant completed pregnancy without major maternal or neonatal complications. These findings are clinically relevant because CED represents a state of prolonged inadequate energy and nutrient availability that can affect maternal physiological adaptation and fetal growth.

However, the favorable trajectory observed in this case should not be interpreted as evidence that CoMC independently caused the outcomes because the study involved only one participant and had no comparison group. Instead, the case demonstrates how CED-focused nutritional management can be incorporated into a continuous midwifery-care pathway and how clinically relevant outcomes can be monitored throughout that pathway.

The biological plausibility for closer nutritional monitoring in women with CED is supported by the concept that maternal undernutrition can influence placental development, maternal-fetal nutrient transfer, endocrine regulation, and metabolic processes. These mechanisms may impair fetal growth and increase the risk of intrauterine growth restriction, low birth weight, preterm birth, and other adverse outcomes.Thus, the initial MUAC of 22 cm in this case was not merely an anthropometric finding but an indicator of nutritional vulnerability that justified individualized nutritional counseling, supplementation monitoring, and closer antenatal surveillance.

This biological rationale supports the integration of nutritional assessment into CoMC rather than managing CED as an isolated antenatal diagnosis. The favorable pregnancy outcome in this case differs from findings reported among larger populations of women with maternal malnutrition. Indarti et al. reported that among 81 pregnant women with CED-related malnutrition, the mean maternal weight gain was 8.78 kg, while anemia occurred in 51.9% and perinatal maternal complications in 54.4%; neonatal complications included hyaline membrane disease, congenital defects, and NICU admission (Indarti et al., 2023). In contrast, the participant in the present case reached term at 38 weeks and 2 days and had a spontaneous vaginal delivery without documented maternal or fetal complications.

The difference may reflect the individualized and continuous monitoring provided in this case, but other explanations including differences in baseline nutritional severity, comorbidities, access to care, parity, socioeconomic conditions, and the natural variability of pregnancy cannot be excluded. Therefore, the comparison supports clinical plausibility rather than causal attribution.

The relationship between maternal nutritional status and anemia provides another relevant biological pathway. CED may coexist with inadequate iron and micronutrient intake, while anemia can compromise maternal oxygen-carrying capacity and is associated with adverse pregnancy outcomes. A meta-analysis of 18 studies involving 932,090 pregnancies found that maternal anemia was associated with increased risk of preterm birth (RR 1.56, 95% CI 1.25–1.95), with a stronger association when anemia occurred during the first trimester (RR 1.65, 95% CI 1.31–2.08). A more recent meta-analysis of 28 studies involving 28,122 participants similarly reported a substantially higher risk of low birth weight among pregnant women with anemia (AOR 3.33, 95% CI 2.84–3.81) (Bekele et al., 2026). Although hemoglobin was not available as an outcome measure in the present case, these findings provide a scientific rationale for the nutritional counseling and iron supplementation incorporated into the participant's care.

The nutritional counseling provided in this case is also supported by evidence on antenatal nutrition education. A systematic review of 37 studies found that nutrition education and counseling during pregnancy increased gestational weight gain by an average of 0.45 kg, reduced late-pregnancy anemia by 30%, and increased birth weight by approximately 105 g; the effects were greater when counseling was accompanied by nutritional support such as food or micronutrient supplementation (Girard & Olude, 2012). This is consistent with the present care approach, which combined counseling with iron supplementation and repeated monitoring rather than relying on education alone. However, unlike the systematic review, the present case cannot quantify changes in maternal weight or birth weight because these data were not documented as serial outcomes.

The importance of combining education with nutritional support is also reflected in intervention studies among women with CED. Halisah et al. reported that family-based education combined with zinc supplementation improved nutritional knowledge and several biochemical indicators, including hemoglobin, among pregnant women with CED (Halisah et al., 2022). Similarly, a nutrition-mentoring study involving 122 pregnant women with CED reported significant improvements in nutritional knowledge, dietary intake, MUAC, and maternal weight, with 32.8% of participants moving from CED to normal nutritional status after the intervention ((Nadimin & Asikin, 2025). These findings are consistent

with the rationale of the present case, although the intensity and type of intervention differed, and the current case cannot demonstrate comparable nutritional improvement because follow-up MUAC and weight data were unavailable.

A similar pattern has been reported in case-based midwifery research. Alfina et al. described a pregnant woman at risk of CED who received continuous nutritional education, antenatal support, monitoring of prenatal vitamin intake, and nutritional counseling, with subsequent improvement in MUAC and a favorable neonatal outcome (Alfina et al., 2024). Purwati et al. likewise reported increased maternal weight and MUAC following intensive midwifery monitoring and supplementary feeding in a woman with CED (Khusniyati & Purwati, 2024). The present case is similar in its use of continuous nutritional support, but differs because its focus extends beyond pregnancy and nutritional status to the entire maternal-neonatal continuum, including intrapartum, postpartum, neonatal, and family planning care. This broader continuity is the main practice-oriented contribution of the present case.

The participant progressed to spontaneous vaginal birth at 38 weeks and 2 days, with a fetal heart rate of 140 beats/minute and cervical dilatation of 7 cm at admission. Although these findings cannot establish a causal effect of CoMC, they are consistent with evidence that midwife-led continuity increases spontaneous vaginal birth and reduces some obstetric interventions, potentially through continuous assessment, early risk recognition, communication, and supportive care (Sandall J, Soltani H, Gates S, Shennan A, 2024). Four postpartum visits documented normal maternal recovery and successful exclusive breastfeeding, indicating that continuity was maintained beyond delivery and supported ongoing monitoring of maternal recovery, nutrition, breastfeeding, and family planning.

The newborn demonstrated normal adaptation without identified complications. This favorable outcome contrasts with evidence linking CED and related nutritional deficiencies to fetal growth problems, low birth weight, and preterm birth ((Bekele et al., 2026; Indarti et al., 2023). Maternal undernutrition may affect placental function and maternal-fetal nutrient transfer, providing a biological rationale for early nutritional assessment and continuous support. However, birth weight and APGAR scores were not documented in this case, limiting direct comparison with other studies.

Overall, the findings should be interpreted as practice-based evidence rather than proof of CoMC effectiveness, given the single-case design and absence of a comparison group. Nevertheless, the case illustrates how MUAC screening, individualized nutrition counseling, supplementation monitoring, and continuous maternal-neonatal follow-up can be integrated into midwifery practice. For independent midwifery and primary healthcare services, this approach supports nutrition-sensitive continuity of care and timely referral when nutritional or obstetric risks require further management (Girard & Olude, 2012).

4. Conclusion

This case demonstrates that continuity of midwifery care can be practically integrated with CED-focused management across pregnancy, childbirth, postpartum, neonatal, and family planning care in an independent midwifery practice. In this case, the initial MUAC of 22 cm identified maternal nutritional risk, while the pregnancy progressed to 38 weeks and 2 days and resulted in spontaneous vaginal delivery without documented maternal or fetal complications; four postpartum follow-up visits showed normal maternal recovery and successful exclusive breastfeeding, and the newborn demonstrated normal adaptation without identified complications. The scientific contribution of this study is the documentation of how nutritional risk screening, individualized counseling, supplementation monitoring, and continuous maternal-neonatal follow-up can be incorporated into a single longitudinal midwifery care pathway for a woman with CED. Although these findings cannot establish a causal effect of CoMC or be generalized to the wider population, they provide practice-based evidence that may guide independent midwives and primary healthcare providers in strengthening nutrition-sensitive continuity of care. Therefore, routine MUAC screening, individualized nutritional counseling, adherence monitoring, systematic maternal-neonatal follow-up, and timely referral should be integrated into CoMC for pregnant women at nutritional risk, while larger comparative studies are recommended to evaluate effects on maternal nutritional status, birth weight, APGAR scores, and other maternal-neonatal outcomes.

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