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# Comprehensive antenatal midwifery care for 9 weeks of pregnancy with chronic energy deficiency, nausea, and vomiting: A case study

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***Abstract:***

Nausea and vomiting in pregnancy (NVP) are common in the first trimester and can reduce food intake in women who are already undernourished. Chronic energy deficiency (CED), defined by a mid-upper arm circumference (MUAC) below 23.5 cm, increases the risk of adverse birth outcomes. This study aimed to describe comprehensive antenatal midwifery care for a pregnant woman with NVP and CED at Ngadiluwih Public Health Center, Kediri Regency, Indonesia. A descriptive single-case study was carried out using Varney's seven-step midwifery management and reported according to the CARE guideline. Data came from interviews, observation, physical examination, and medical record review. Mrs. EM, G2P1001, at 9 weeks of gestation, had a MUAC of 23 cm, body weight of 44.5 kg, height of 158 cm, and a body mass index (BMI) of 17.8 kg/m², confirming CED and underweight. Care consisted of nutritional counselling, dietary strategies to reduce nausea, vitamin B6, aromatherapy, education on danger signs, and collaboration with an obstetrician and a nutritionist. At evaluation, her nausea and vomiting complaints had decreased, and her understanding of nutritional intake and danger signs had improved. A follow-up visit with ultrasound was planned after two weeks. Structured, collaborative midwifery care using the Varney approach was feasible in a primary care setting and was followed by symptom relief and better maternal knowledge. Because this is a single case with short follow-up, the findings cannot be generalized, and repeated weight and MUAC measurement is needed to confirm nutritional recovery.

***Keywords:***
midwifery care; nausea and vomiting in pregnancy; chronic energy deficiency; Varney management; antenatal care; case study

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## INTRODUCTION

Nausea and vomiting in pregnancy (NVP) are one of the most common complaints of early pregnancy. It affects up to 70% of pregnant women, and its severe form, hyperemesis gravidarum, is reported in 0.3–10.8% of pregnancies (Fejzo et al., 2019). Most women can be managed with dietary and lifestyle changes, but more than one-third have symptoms that need further treatment (Fejzo et al., 2019). Beyond physical discomfort, NVP affects daily life. Between 37% and 55% of

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affected women lose time from work (Fejzo et al., 2019), and persistent symptoms can increase stress and limit usual activities (Joulaeerad et al., 2018). When vomiting continues, dehydration and weight loss may follow (American College of Obstetricians and Gynecologists [ACOG], 2018).

Chronic energy deficiency (CED) is a state of long-term insufficient intake of energy and protein. In antenatal care, CED is commonly screened for using mid-upper arm circumference (MUAC), and a value below 23.5 cm indicates CED. The 2018 National Basic Health Research (Riskesdas) reported that 17.3% of pregnant women in Indonesia were at risk of CED (Kementerian Kesehatan Republik Indonesia, 2018). MUAC is simple to measure, does not require a pre-pregnancy weight, and has been identified as a preferred indicator for finding undernourished pregnant women (Ververs et al., 2013).

The consequences reach the child. Maternal undernutrition contributes to fetal growth restriction, which raises the risk of neonatal death and of stunting in childhood (Black et al., 2013). A meta-analysis found that underweight women were more likely to give birth to a low-birth-weight infant (adjusted relative risk, 1.64; 95% confidence interval, 1.38–1.94) (Han et al., 2011). Early detection and nutritional care in the first trimester are therefore important.

NVP and CED are related, but not in a simple way. A MUAC below 23.5 cm at 9 weeks of gestation reflects nutritional reserves built before conception, not the effect of a few weeks of nausea. However, in a woman who is already undernourished, reduced food intake in early pregnancy leaves little margin and may worsen her condition. The nutritional consequences of severe NVP are well described (Maslin et al., 2021). This combination calls for care that treats symptoms and nutrition together.

Several measures are available. Dietary and lifestyle advice is the first step for mild NVP, and pyridoxine (vitamin B6), alone or combined with doxylamine, is the recommended first-line drug therapy (ACOG, 2018; Madjunkova et al., 2014). A Cochrane review, however, found that the evidence for most interventions is limited, with trial evidence supporting vitamin B6 and other antiemetics for mild-to-moderate symptoms (Matthews et al., 2015). Aromatherapy is popular, but trial results are mixed. Combined lemon and peppermint inhalation reduced symptoms compared with placebo (Safajou et al., 2020), whereas peppermint oil was no better than placebo in another trial (Joulaeerad et al., 2018). For undernourished women, antenatal nutrition education can increase birth weight and reduce preterm birth (Ota et al., 2015), and two-way counseling may improve dietary intake, although the certainty of evidence is low (Dewidar et al., 2023).

Midwives are central to quality maternal care, and effective teamwork with other professions is part of that role (Renfrew et al., 2014). Midwife-led continuity models are associated with fewer interventions and more positive experiences for women (Sandall et al., 2024). Varney's seven-step management provides midwives with a clear structure that progresses from assessment to evaluation. Complex cases also require doctors and nutritionists, yet an Indonesian hospital case study found that interprofessional collaboration was only partially implemented due to poor communication between professions (Afandi, Candrayani, et al., 2023).

One additional consideration is that early antenatal care provides an opportunity to identify nutritional risks before they affect maternal weight gain and fetal growth. Combining MUAC measurement with dietary assessment, symptom evaluation, and nutrition counseling can help midwives develop care plans suited to each woman's needs. Regular follow-up is particularly

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important when nausea and vomiting limit food intake or when MUAC is below the recommended threshold. Collaboration with nutritionists can support practical dietary advice, while family involvement may help women maintain adequate intake at home. This integrated approach is consistent with recommendations for antenatal nutrition care and the management of NVP (ACOG, 2018; Ota et al., 2015; Dewidar et al., 2023).

Documented case studies from primary care that show how these elements come together for a woman with both NVP and CED are still limited. Such cases help clinicians see how recommendations work in daily practice. This study therefore aims to describe comprehensive antenatal midwifery care, using Varney's management approach, for a woman at 9 weeks' gestation with NVP and CED at the Ngadiluwih Public Health Center, Kediri Regency.

## METHOD

A descriptive single-case study design was used. A case study allows an in-depth exploration of a real-life issue in its own setting (Crowe et al., 2011), and it has been applied to describe clinical care in Indonesian health services (Afandi, Candrayani, et al., 2023; Afandi, Fauziah, et al., 2023; Afandi et al., 2024). The report follows the CARE (Case Report) guideline (Riley et al., 2017). The case was managed at the Ngadiluwih Public Health Center (Puskesmas) in Kediri Regency, East Java, Indonesia.

The participant was Mrs. EM, G2P1001 (gravida 2; one term birth, no preterm birth, no abortion, one living child), at 9 weeks of gestation. She was selected purposively because she reported nausea and vomiting in the first trimester and had a MUAC below 23.5 cm. Four data sources were used: (1) interviews with Mrs. EM, her family, and health workers about her history, symptoms, and eating pattern; (2) direct observation of her condition; (3) physical examination, including weight, height, and MUAC; and (4) review of her medical records. A literature review was used to support the care plan. The instruments were the Maternal and Neonatal Assessment Management Form, a management form based on Varney's seven steps, and SOAP (Subjective, Objective, Assessment, Plan) notes for follow-up.

CED was defined as a MUAC below 23.5 cm. BMI was calculated as weight in kilograms divided by height in meters squared, and a BMI below 18.5 kg/m² was classified as underweight according to the World Health Organization criteria. Because the examination took place at 9 weeks of gestation, BMI approximates the pre-pregnancy value. NVP was identified from the clinical history. Care followed Varney's seven steps: (1) data collection; (2) interpretation of data to determine the diagnosis, problems, and needs; (3) identification of potential diagnoses or problems; (4) identification of the need for immediate action, collaboration, or referral; (5) planning; (6) implementation; and (7) evaluation. The interventions included nutritional counseling and information; education on strategies to reduce nausea; vitamin B6 administration; aromatherapy; education on danger signs; and collaboration with an obstetrician-gynecologist and a nutritionist. Each step was recorded in SOAP notes.

Data were analyzed descriptively and qualitatively. The findings at each step were compared with midwifery care standards and the current literature to identify where practice agreed with or differed from theory. Anthropometric values were interpreted against the criteria above. Credibility

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was supported by triangulation of the four data sources. The purpose of the report was explained to the participant, and her identity is protected by using initials only.

## RESULTS

Mrs. EM, G2P1001, at 9 weeks of gestation, attended antenatal care with a complaint of nausea and vomiting in the first trimester. Physical examination showed a MUAC of 23 cm, body weight of 44.5 kg, and height of 158 cm, giving a BMI of 17.8 kg/m². The MUAC was below the 23.5 cm cut-off, and the BMI was below 18.5 kg/m², confirming CED and underweight (Table 1).

Table 1. Assessment findings and interpretation of Mrs. EM

| Parameter | Finding | Reference criterion | Interpretation |
|---|---|---|---|
| Gestational age | 9 weeks | – | First trimester |
| Obstetric history | G2P1001 | – | Second pregnancy; one living child |
| Main complaint | Nausea and vomiting | Clinical history | NVP; severity score not reported |
| MUAC | 23 cm | < 23.5 cm indicates CED | CED |
| Weight / height | 44.5 kg / 158 cm | – | Used to calculate BMI |
| BMI | 17.8 kg/m² | < 18.5 kg/m² = underweight (WHO) | Underweight |

Note. BMI = weight (kg) / height (m)². CED = chronic energy deficiency; MUAC = mid-upper arm circumference; NVP = nausea and vomiting in pregnancy; WHO = World Health Organization.

Table 2. Midwifery management of Mrs. EM according to Varney's seven steps

| Varney step | Findings and actions in this case |
|---|---|
| 1. Data collection | Subjective: nausea and vomiting in the first trimester. Objective: MUAC 23 cm, weight 44.5 kg, height 158 cm, BMI 17.8 kg/m². Medical records reviewed. |
| 2. Interpretation of data | Diagnosis: G2P1001, 9 weeks of gestation, with NVP and CED. Problem: nausea and vomiting in early pregnancy. Needs: information, education, and counselling; dry biscuits or bread before getting out of bed; vitamin B6; aromatherapy. |
| 3. Potential diagnoses or problems | Worsening undernutrition (CED) and risk to mother and fetus if left unaddressed. |
| 4. Immediate action and collaboration | Collaboration with an obstetrician-gynaecologist (pharmacological and non-pharmacological therapy) and a nutritionist (daily nutritional needs). |
| 5. Planning | (a) Inform the mother of examination results; (b) collaborate with the obstetrician-gynaecologist; (c) collaborate with the nutritionist; (d) schedule a revisit after 2 weeks with follow-up ultrasound; (e) document all interventions and observations. |
| 6. Implementation | All planned interventions were delivered as planned, without deviation, including counselling, dietary strategies, vitamin B6, aromatherapy, and education on danger signs. |
| 7. Evaluation | Complaints of nausea and vomiting decreased; understanding of nutritional intake and danger signs improved (see Table 3). |

Note. Steps follow Varney's midwifery management; interventions were recorded in SOAP notes.

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Management followed Varney's seven steps (Table 2). The diagnosis was G2P1001 at 9 weeks of gestation with NVP and CED. The identified problem was nausea and vomiting in early pregnancy. The needs were information, education, and counseling on coping with nausea; advice to eat dry biscuits or bread before getting out of bed; vitamin B6; and aromatherapy. The potential problems were worsening undernutrition and adverse effects on mother and fetus if the condition was left untreated. As an anticipatory step, the midwife collaborated with an obstetrician-gynecologist for pharmacological and non-pharmacological therapy and with a nutritionist for guidance on daily nutrient intake.

Table 3. Interventions and reported outcomes

| Problem or need | Intervention | Reported outcome at evaluation |
|---|---|---|
| Nausea and vomiting | Education on coping strategies; dry biscuits or bread before getting out of bed; small meals; avoiding fatty and strongly flavored foods; vitamin B6; aromatherapy | Complaints of nausea and vomiting decreased |
| CED and nutritional risk | Nutritional counselling; collaboration with an obstetrician-gynecologist and a nutritionist to meet daily nutritional needs | Understanding of the importance of adequate nutritional intake improved; repeat weight and MUAC not yet reported |
| Knowledge of danger signs | Education on continuous vomiting, dehydration, and marked weight loss, and when to seek medical help | Awareness of danger signs and of the risks of untreated CED increased |
| Monitoring | Revisit after 2 weeks with follow-up ultrasound; documentation of all interventions and observations | Scheduled |

Note. Outcomes are descriptive and were not measured with a standardized symptom score.

All planned interventions were carried out according to the care plan, without deviation. At evaluation, Mrs. EM reported fewer nausea and vomiting complaints, and her understanding of the importance of adequate nutritional intake and of the danger signs of pregnancy had increased (Table 3). A repeat visit with a follow-up ultrasound was scheduled for two weeks later, and all interventions and observations were documented.

The care process was documented in SOAP notes, covering the assessment findings, identified problems, interventions, and evaluation. This documentation provided a basis for communication between the midwife and other healthcare professionals involved in Mrs. EM's care. At follow-up, priority areas included reassessing the frequency of nausea and vomiting, reviewing dietary intake and adherence to recommended strategies, and repeating weight and MUAC measurements. These assessments would help determine whether the initial management remained appropriate or whether additional interventions or referral were required.

At the end of the initial assessment and management period, the documented improvements were limited to reduced nausea and vomiting complaints and better understanding of nutritional needs and pregnancy danger signs. No repeat measurements of body weight, MUAC, or BMI were available to determine whether Mrs. EM's nutritional status had improved. The scheduled follow-up visits and ultrasound therefore remained important for reassessing her condition, reviewing the

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response to treatment, and determining whether further nutritional or medical management was needed.

## DISCUSSION

This case shows how Varney's management approach can organize midwifery care for a woman with two linked problems in early pregnancy: nausea and vomiting, and chronic energy deficiency. After counseling, dietary measures, vitamin B6, aromatherapy, and collaboration with an obstetrician and a nutritionist, her complaints decreased, and her understanding of nutrition and danger signs improved. These findings describe one case and do not prove that the package works.

The dietary advice used here, such as eating dry biscuits or bread before getting out of bed, taking small meals, and avoiding fatty and strongly flavored food, is typical first-line advice for NVP (Niebyl, 2010; ACOG, 2018). Vitamin B6 is a recommended first-line drug option, and the combination of doxylamine and pyridoxine has shown benefit in trials (ACOG, 2018; Madjunkova et al., 2014). Even so, the Cochrane review judged the evidence behind most interventions to be limited (Matthews et al., 2015). Reports should therefore state the dose and duration of vitamin B6, and administration should follow the six rights of medication: right patient, right drug, right dose, right time, right route, and right documentation (Afandi et al., 2024).

Evidence for aromatherapy is mixed. Safajou et al. (2020) found that combined inhalation of lemon and peppermint reduced mild-to-moderate NVP compared with placebo. In contrast, Joulaeerad et al. (2018) reported that symptom scores fell in both the peppermint group (7.36 to 5.18) and the placebo group (7.21 to 5.82), with no significant difference between groups, and suggested that deep breathing and relaxation may explain part of the effect. Adverse effects in that trial were mild and short-lived. In the present case, the improvement cannot be credited to a single component. It is more likely the combined result of diet, vitamin B6, aromatherapy, reassurance, and the natural course of symptoms. Aromatherapy appears to be low risk and may remain an optional supportive measure.

A MUAC of 23 cm and a BMI of 17.8 kg/m² place Mrs. EM in a group with a higher risk of adverse birth outcomes. Underweight women have a higher risk of low-birth-weight infants (Han et al., 2011), and maternal undernutrition contributes to fetal growth restriction and later stunting (Black et al., 2013). Using both MUAC and BMI was useful. MUAC is practical and has been proposed as the preferred screening indicator (Ververs et al., 2013), while BMI in early pregnancy approximates the pre-pregnancy value because weight gain in the first weeks is small.

In this setting, counseling is necessary but may not be enough. Antenatal nutrition education can increase birth weight and reduce preterm birth among undernourished women, and balanced energy and protein supplementation has been associated with higher birth weight (Ota et al., 2015). Two-way counseling may improve energy and protein intake, but the certainty of the evidence is low (Dewidar et al., 2023). Where supplementary feeding is available, enrolment should be considered alongside counseling. Because NVP makes it hard to eat enough, a nutritionist can help plan small, frequent, energy-dense meals and monitor intake (Maslin et al., 2021).

An additional consideration is the timing of intervention. The first trimester is an important period for identifying nutritional problems because persistent nausea and vomiting may reduce

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food intake before substantial pregnancy-related weight gain occurs. Early screening allows midwives to distinguish women who can be managed with dietary adjustments and routine follow-up from those who need further assessment or referral. For women with CED, care should address both symptom control and nutritional recovery rather than treating nausea and vomiting as an isolated complaint. Individualized meal planning, monitoring of food intake, and timely referral when symptoms persist may help maintain adequate maternal nutrition throughout pregnancy. However, the effectiveness of these measures should be evaluated through repeated clinical and nutritional assessments rather than symptom improvement alone.

The midwife did not manage this case alone. Collaboration with an obstetrician for pharmacological and non-pharmacological therapy, and with a nutritionist for daily nutritional needs, reflects the view that midwifery works best within a team (Renfrew et al., 2014). Continuity of midwifery care is associated with fewer interventions and better experiences for women (Sandall et al., 2024). Collaboration, however, does not happen automatically. An Indonesian case study found that interprofessional collaboration was only partially implemented due to poor interprofessional communication and professional stereotypes (Afandi, Candrayani, et al., 2023). Clear referral routes, shared documentation such as SOAP notes, and joint case discussions may reduce these barriers. The pre- and post-conference format described in an Indonesian hospital case study (Afandi, Fauziah, et al., 2023) could be adapted for primary care teams.

Four points follow from this case. First, MUAC, weight, and height should be measured at the first antenatal contact to detect CED early. Second, a validated severity score, such as the 24-hour Pregnancy-Unique Quantification of Emesis (PUQE-24) scale (Ebrahimi et al., 2009), should be recorded at each visit, so that changes in symptoms can be measured rather than only reported. Third, danger signs should be taught clearly, namely persistent vomiting, dehydration, and rapid weight loss, because NVP can progress to hyperemesis gravidarum (Fejzo et al., 2019; Lee & Saha, 2011). Fourth, weight and MUAC should be rechecked at each visit, with referral if intake does not improve.

The strengths of this report are the use of a structured framework, four data sources, and a team approach that fits primary care practice. Its limitations are important. It describes a single woman with a short follow-up, so the results cannot be generalized. Several measures were given together, so the effect of each cannot be separated. Symptom change was described without a standardized score, and the effect on nutritional status had not yet been measured because repeat weight and MUAC measurements were not reported. Hemoglobin and hydration status were not reported either, and outcomes such as knowledge were based on the midwife's evaluation rather than a test. Future reports should use the PUQE-24 at baseline and follow-up, record the vitamin B6 dose and aromatherapy type, and follow the woman through delivery and the infant's birth weight.

Continuity of care is also important after the initial improvement. A reduction in nausea and vomiting does not necessarily indicate that nutritional status has recovered, particularly when a woman begins pregnancy with low MUAC and BMI. Follow-up should therefore assess symptom severity, dietary intake, weight trajectory, hydration, and the need for additional clinical management. Clear documentation of these findings can help the midwife, obstetrician, and nutritionist adjust the care plan and promptly identify deterioration. In this case, a structured

follow-up plan would strengthen the application of Varney's management approach by linking initial assessment, intervention, evaluation, and subsequent care. Nevertheless, these recommendations represent clinical implications from the case and require further evaluation in larger studies.

## CONCLUSION

Comprehensive antenatal midwifery care using Varney's seven-step management was feasible for Mrs. EM, a woman at 9 weeks of gestation with NVP and CED (MUAC 23 cm, BMI 17.8 kg/m$^2$). Nutritional counseling, dietary strategies, vitamin B6, aromatherapy, education on danger signs, and collaboration with an obstetrician and a nutritionist were associated with fewer nausea and vomiting complaints and improved maternal understanding of nutrition and danger signs. Because this is a single case with short follow-up, these findings are descriptive. Midwives should screen MUAC early, measure symptoms using a validated score, monitor weight, and work with other professions, while larger, longer-term studies test which components of this care matter most.

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