Case Study of Evidence-Based Nursing Implementation: Beetroot Juice Therapy to Increase Hemoglobin Levels in Pregnant Women with Anemia

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ARTICLE INFO	ABSTRACT/ ABSTRAK

ABSTRACT. Anemia in pregnant women is a condition in which the mother has a hemoglobin (Hb) level in her blood of less than 11 g/dL, resulting from the inability of red blood cell-forming tissues to produce enough cells to maintain Hb concentration at a normal level. This study aims to provide nursing care to pregnant women with anemia through the administration of beetroot juice therapy to increase hemoglobin levels at Harapan Bunda Hospital, Batam. The method employed in this study was a case study based on the stages of nursing care, including assessment, nursing diagnosis, intervention, implementation, and evaluation. The assessment was conducted using a head-to-toe approach. The nursing diagnosis identified was fatigue related to anemia. The intervention was designed based on criteria and expected outcomes by applying beetroot juice therapy as an Evidence-Based Nursing (EBN) practice. The implementation was carried out over a 7-day period, and evaluation was based on the SOAP format. The results showed that administering beetroot juice to third-trimester pregnant women increased hemoglobin levels from 7.2 g/dL to 11.2 g/dL. The outcome criteria included decreased complaints of fatigue, reduced lethargy, increased energy, reduced headaches, decreased cyanosis and anxiety, and improved appetite. Therefore, it can be concluded that beetroot juice intervention effectively increases hemoglobin levels in pregnant women with anemia. It is recommended that pregnant women with anemia consider beetroot juice as a non-pharmacological therapy to help improve Hb levels.

ABSTRAK. Anemia pada ibu hamil adalah kondisi ibu dengan kadar hemoglobin (Hb) dalam darahnya kurang dari 11gr/dl sebagai akibat ketidakmampuan jaringan pembentuk sel darah merah dalam produksinya untuk mempertahankan konsentrasi Hb pada tingkat normal. Penelitian ini bertujuan untuk melakukan Asuhan Keperawatan pada ibu hamil yang mengalami anemia dengan Pemberian Terapi Jus Buah Bit untuk Menaikkan Kadar Hemoglobin Di Rumah Sakit Harapan Bunda Batam. Metode yang digunakan pada penelitian ini adalah studi kasus yang dilakukan berdasarkan tahap asuhan keperawatan meliputi pengkajian, diagnose keperawatan, intervensi, implementasi, evaluasi. Pengkajian dilakukan berdasarkan *head to toe*, diagnose keperawatan yang diangkat yaitu keletihan berhubungan dengan anemia, intervensi disusun berdasarkan kriteria dan hasil dengan penerapan pemberian jus buah bit sebagai *Evidence-Based Nursing*, implementasi dilakukan selama 7 hari, dan evaluasi berdasarkan SOAP. Hasil Penelitian didapatkan pemberian jus buah bit pada ibu hamil Trimester III dapat menaikkan kadar Hb dari 7,2 mg/dl menjadi 11, 2 mg/dl dengan kriteria hasil keluhan lelah pasien menurun, lesu menurun, peningkatan tenaga, sakit kepala menurun, sianosis menurun, gelisah menurun, nafsu makan membaik. Oleh karena itu di dapat disimpulkan bahwa intervensi pada jus buah bit dapat meningkatkan Hemoglobin pada ibu hamil yang mengalami anemia. Saran bagi penderita anemia pada ibu hamil melakukan terapi non farmakologi jus buah Bit agar mampu menaikan kadar Hb.

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INTRODUCTION

Pregnancy is a natural fertilization process resulting in the development of a fetus in the mother's uterus. It is a condition that occurs when fertilization and fetal development take place within the womb. A normal pregnancy lasts approximately 40 weeks, or 10 lunar months, or 9 months according to the international calendar, counted from the first day of the last menstrual period (Ministry of Health of the Republic of Indonesia, 2016). Anemia in pregnant women is defined as a condition where the hemoglobin (Hb) level in the blood is less than 11 g/dL, due to the inability of red blood cell-forming tissues to maintain normal Hb concentration (WHO, 2014). Anemia may also be caused by an increase in plasma volume that exceeds the increase in red blood cells, leading to hemodilution (Waryana, 2010, as cited in Fitriani, 2021).

The global prevalence of anemia remains consistently high each year, primarily due to low income, which causes many women of reproductive age and pregnant women to be anemic. The World Health Organization estimated that 40% of pregnant women worldwide suffered from anemia in 2022. Approximately 32 million pregnant women globally are affected, with 27% prevalence in the Southeast Asia region. According to Basic Health Research (Riskesdas, 2018), the prevalence of anemia among pregnant women in Indonesia increased from 37.1% in 2013 to 48.9% in 2018, mainly due to non-compliance with iron tablet (Fe) consumption. Based on the 2023 Indonesian Health Survey, the rate of anemia among pregnant women caused by non-compliance with iron tablet consumption declined to 27.7%.

Data from the Riau Islands Provincial Health Office (2023) showed that 30.17% of pregnant women were anemic. According to the Batam City Health Office (2023), the figure was as high as 71.40%. Hospital data from Harapan Bunda Hospital in Batam reported a total of 1,284 pregnant women in 2023. A preliminary study conducted by the author on August 26, 2024, identified a patient with a hemoglobin level of 7.2 g/dL diagnosed with anemia. Interviews revealed three patients who complained of dizziness, weakness, and inability to perform daily activities, and stated they had experienced these symptoms since the 11th week of pregnancy.

The main causes of anemia are iron deficiency and folic acid deficiency. The WHO estimates that anemia occurs in up to 42% of families with moderate to low socioeconomic status (Dhini Anggraini Dhilon & Pena Sundari, 2020). If left untreated, anemia may hinder cell growth in the body and brain, leading to hypoxia (oxygen deficiency) affecting both body and brain functions. In pregnant women, anemia can lead to postpartum hemorrhage due to uterine atony (poor uterine contraction) (Dhini Anggraini Dhilon & Pena Sundari, 2020).

For the fetus, anemia may result in miscarriage, premature birth, low birth weight (LBW), stillbirth, asphyxia, and intrauterine growth restriction (IUGR). The Indonesian government's efforts to reduce anemia in pregnant women and women of reproductive age include health policies such as the "Healthy Indonesia" initiative and long-term development programs that promote the gradual distribution of iron tablets (Anindita & Novyriana, 2019).

Anemia management can be carried out through two approaches: pharmacological and non-pharmacological. The pharmacological approach involves administering iron and folic acid tablets. Meanwhile, the non-pharmacological approach includes consuming iron-rich foods such as vegetables and fruits, one of which is beetroot juice. The advantages of

non-pharmacological methods include enhancing patients' understanding of the disease, promoting clients' independence and skills in managing their condition, and reducing the excessive use of medications that may adversely affect kidney function (Sitti Zahyrah and Siana Dondi, 2020).

A study conducted by Anggraini DD (2019) on 16 pregnant women who were given 200 ml of beetroot juice daily for 7 days showed a significant increase in hemoglobin levels. Similarly, Stephana W (2018) demonstrated that administering beetroot juice for 7 days had a positive effect on hemoglobin levels in pregnant women. These findings are consistent with those of Suryandari (2015), who reported that combining red beetroot juice with iron tablets for one week significantly improved hemoglobin levels in pregnant women compared to using iron tablets alone. This study also aligns with research by Handayani et al. (2024), which found that nursing care provided over a 7-day period from August 22 to August 29, 2023 had a positive impact, increasing hemoglobin levels from 8.8 g/dL to 9.5 g/dL.

The Indonesian government's anemia prevention program includes the provision of at least 90 iron supplement tablets during pregnancy. Additional prevention strategies during pregnancy involve improving knowledge and fostering positive behavioral changes through education on adequate nutritional intake. Such education can be provided during antenatal care (ANC) visits. In the era of the new normal, ANC is recommended to be conducted at least six times throughout pregnancy, alongside consistent iron tablet consumption (minimum 90 tablets), hemoglobin checks during the first and third trimesters, prompt medical consultation when unusual symptoms appear, increased awareness among pregnant women and families in selecting, preparing, and serving food, as well as improving the quality of health and nutritional services in the community.

RESEARCH METHOD

The type of research used in this study is a case study. Based on the implementation of Evidence-Based Nursing (EBN) in nursing practice, this case study follows five stages as described by Polit and Beck (2019), namely: (1) formulating a question using PICO, (2) searching for relevant evidence, (3) critically appraising the evidence, (4) applying the evidence, and (5) evaluating the implementation of EBN. The first step involved formulating a PICO question (Problem, Intervention, Comparison, Outcome) based on the EBN framework, with the research question being: "What is the appropriate intervention for pregnant women with anemia?" The next step was to search for literature using electronic databases such as Google Scholar and ScienceDirect. The retrieved articles were analyzed to identify references supporting beetroot juice therapy as an intervention to increase hemoglobin levels in pregnant women.

The study was conducted on pregnant women with anemia at Harapan Bunda Hospital over a 7-day period. Informed consent was obtained both verbally and in writing to explain the procedures and to seek approval from the patients and their families. Data collection was carried out through physical examinations, medical records, observations, interviews, and relevant online literature sources. The nursing intervention aimed at increasing hemoglobin levels was the administration of beetroot juice therapy. The procedure involved utilizing beetroot by processing it into juice and administering approximately 250 ml daily for 7 consecutive days. The final stage in the nursing process was evaluation. Evaluation was

performed daily after the implementation of beetroot juice therapy to assess its effectiveness in increasing hemoglobin levels.

RESULTS
Nursing Assessment Analysis

Based on the assessment conducted, the author collected data through interviews, observations, and documentation from various sources, including the patient, healthcare professionals, and the patient's medical records at the hospital. The nursing assessment was performed on Mrs. M, 25 years old, married, Muslim, residing at Bengkong Indah Swadebi Block N.33. Obstetric status: G2 P1 A0 H1, gestational age: 38 weeks, general condition: weak, consciousness: compos mentis. The patient was admitted through the outpatient clinic at 13:00 WIB and was hospitalized with complaints of dizziness and weakness when sitting and standing. The patient stated that she often felt nauseated but did not vomit. She reported that these complaints had been present since early pregnancy. She felt unable to carry out many activities due to persistent weakness and dizziness when moving. The patient stated that she did not know how to manage or identify the cause of her condition and admitted to having low hemoglobin levels. She reported no history of drug or food allergies.

The physical examination results were as follows: current blood pressure 90/70 mmHg, pre-pregnancy blood pressure 110/80 mmHg, pulse 50 beats/min, temperature 36.5 °C, respiratory rate 18 breaths/min, hemoglobin level 7.2 g/dL. Head: clean scalp, black hair, no dandruff, abnormalities, or swelling. Eyes: non-anemic. Face: appeared pale. Nose: symmetrical, normal, no sinus issues or abnormalities. Mouth: clean, no lesions or swelling. Ears: patient reported regular cleaning, no cerumen, no complaints. Neck: patient reported no thyroid enlargement or goiter. Uterine contractions: absent. Leopold's Maneuver I: breech position. Fundal height: 10 cm. Estimated fetal weight: 15 grams.

This assessment is consistent with Proverawati's theory (2022), which states that signs and symptoms of anemia in pregnancy include fatigue, decreased energy, pallor, and low blood pressure. Inadequate intake of fruits and vegetables, resulting in iron deficiency, often causes fatigue in pregnant women, since iron is a key component in the production of hemoglobin.

Nursing Diagnosis Analysis

Based on the collected data from the assessment, the next step was to formulate a nursing diagnosis. The nursing diagnosis identified by the author, based on subjective and objective data, was fatigue related to physiological conditions (anemia in pregnancy). Fatigue is a subjective feeling that is not alleviated by rest. Therefore, nursing interventions are not focused on improving activity endurance, but rather on helping the client adapt to their condition. In contrast, the diagnosis of activity intolerance focuses on improving the client's tolerance and physical endurance. According to the Indonesian Standard of Nursing Diagnoses (SDKI), major signs and symptoms identified in this patient included lack of energy despite resting, reduced strength, complaints of tiredness, inability to maintain routine activities, and appearing lethargic. Minor signs and symptoms included feelings of guilt due to inability to fulfill responsibilities, decreased

libido, and increased need for rest. Although not all signs and symptoms were present, more than 80% of the major indicators were found during the patient's assessment

Nursing Intervention Analysis

The nursing interventions designed in this study were based on goals and outcome criteria. After implementing the nursing action of administering beetroot juice therapy for 7 days, the patient's hemoglobin levels were expected to increase, resulting in decreased fatigue. The expected outcomes included verbal expressions of improved energy recovery, increased physical strength, reduced fatigue complaints, decreased lethargy, increased appetite, and improved rest patterns. The interventions involved education on activity and rest, as well as nutritional management.

Nursing Implementation Analysis

Implementation is the step taken after the care plan is established. This included education about physical activity and rest, as well as education on the benefits of beetroot juice in increasing hemoglobin levels, instructions on how to prepare beetroot juice, and the importance of consuming a balanced and nutritious diet. Beetroot Juice Administration: The patient was given beetroot juice regularly at a dose of 250 ml per day for a period of 7 days to assess improvements in hemoglobin levels. Monitoring Hemoglobin Levels: Hemoglobin levels were monitored periodically to evaluate the effectiveness of the beetroot juice therapy. Encouraging a Balanced Diet: The patient was advised to consume foods rich in iron, vitamin C, and folic acid to support iron absorption and red blood cell production. These included red meat, green leafy vegetables, and fruits. Collaboration with Physicians: If the patient's condition did not improve or additional complaints arose, collaboration with the attending physician was carried out for further management.

Nursing Evaluation

After 7 days of intervention, the following results were observed: the patient no longer experienced dizziness, her fatigue complaints had decreased, she reported feeling more energetic, and stated only mild lethargy. Her appetite had improved, and she felt adequately rested. Hemoglobin level was recorded at 11.2 g/dL. The patient stated she would continue drinking beetroot juice regularly at home. Vital signs were as follows: blood pressure 120/80 mmHg, pulse 99 beats/min, temperature 36.5 °C, respiratory rate 19 breaths/min.

DISCUSSION

Following a 7-day implementation period, the patient's hemoglobin level increased and her fatigue decreased. Beetroot can serve as a beneficial food source for pregnant women with anemia due to its high iron content, as well as its folate and vitamin B6, which are essential for red blood cell formation.

These findings are supported by Wulandari (2024), who reported that the consumption of beetroot juice significantly increased hemoglobin levels from an average of 10.46 g/dL to 11.70 g/dL, with a p-value of 0.000, indicating a strong effect on hemoglobin improvement. This benefit can be attributed to the nutritional components found in beetroot (Beta vulgaris L.), such as iron, folic acid, vitamin B6, and copper, all of which play vital

roles in the formation of red blood cells and the transport of oxygen throughout the body (Fadlilah et al., 2023).

Additionally, folic acid in beetroot contributes to fetal nervous system development and anemia prevention, particularly during the first trimester of pregnancy. Mulalinda et al. (2024) noted that pregnant women who understand the benefits of folic acid tend to be more compliant in consuming it. This is consistent with the findings of Anurogo (2016), who stated that beetroot is one of the fruits with the highest folic acid content, at 108 mg, surpassing many other fruits. Beetroot contains copper, iron, and folic acid, which are highly beneficial in supporting fetal brain development and addressing anemia.

Moreover, the study by Suryadari (2014) demonstrated the effectiveness of beetroot as a therapeutic agent due to its bioactive compounds that function as blood purifiers, anti-cancer agents, and supporters of fetal brain development, as well as a natural remedy for anemia. The research also showed that beetroot juice consumption significantly increased leukocyte levels compared to the consumption of mullet fish, with an Independent Sample Test yielding a p-value of 0.000. Findings from LeMone et al. (2016) further support this, reporting that beetroot contains 34% folic acid, 7.4% iron, and 0.03% saturated fat, which together help improve blood circulation and increase hemoglobin levels.

Overall, previous studies have consistently supported the findings of this research, indicating that beetroot juice has potential as an effective complementary therapy for increasing hemoglobin levels and improving anemia status in pregnant women.

CONCLUSION

Based on the results of this study, it can be concluded that administering beetroot juice therapy regularly for 7 days in third-trimester pregnant women with anemia significantly increased hemoglobin levels from 7.2 g/dL to 11.2 g/dL. In addition to the rise in hemoglobin levels, clinical improvements were also observed, including reductions in fatigue, lethargy, dizziness, and increases in appetite and energy. These findings confirm that beetroot juice, which is rich in iron, folic acid, and vitamin B6, can serve as an effective non-pharmacological intervention in the management of anemia during pregnancy.

It is recommended that pregnant women diagnosed with anemia routinely consume beetroot juice as a complementary therapy to accelerate hemoglobin improvement and enhance overall physical condition. To strengthen these findings, further research with a quantitative design and a larger sample size is needed to evaluate the effectiveness of beetroot juice in increasing hemoglobin levels across different stages of pregnancy and to assess its long-term impact on maternal and fetal health.

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