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Influencing Factors Of Preeclampsia Among Expectant Mothers At Marisa Primary Health Care, Pohuwato Regency

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Abstract
Preeclampsia remains a major contributor to maternal morbidity and mortality worldwide. Nutritional status is considered a modifiable risk factor, particularly during the third trimester when maternal physiological demands increase. This study aimed to determine the relationship between nutritional status and the occurrence of preeclampsia among third-trimester pregnant women at Pohuwato Regency Primary Health Care. A quantitative analytic study with a cross-sectional design was conducted among 30 third-trimester pregnant women selected through purposive sampling. Nutritional status was assessed using Body Mass Index (BMI), while preeclampsia was identified based on clinical diagnosis, including elevated blood pressure and proteinuria. Data were analyzed using the Chi-square test with a significance level of $p < 0.05$. Of the respondents, 53.3% had normal nutritional status, 33.3% were overweight or obese, and 13.3% were underweight. Preeclampsia occurred in 36.7% of respondents, mostly among overweight or obese women. Statistical analysis showed a significant relationship between nutritional status and preeclampsia ($p = 0.045$). Nutritional status, particularly overweight or obesity, is significantly associated with preeclampsia in third-trimester pregnant women.

1. Introduction

Preeclampsia is one of the leading causes of maternal and perinatal morbidity and mortality globally. It is characterized by hypertension and proteinuria occurring after 20 weeks of gestation in previously normotensive women. The incidence of preeclampsia remains high, especially in developing countries where access to quality antenatal care is limited (Mol et al., 2016).

Maternal nutritional status plays a crucial role in pregnancy outcomes. Adequate nutrition during pregnancy supports fetal growth and development while minimizing pregnancy complications, including preeclampsia. Malnutrition, whether undernutrition or overnutrition, has been linked to adverse maternal conditions such as hypertensive disorders in pregnancy (Kaiser & Allen, 2008). Body Mass Index (BMI) is commonly used to assess the nutritional status of pregnant women. Numerous studies have shown that both underweight and overweight conditions increase the risk of preeclampsia. Obese women, in particular, are at significantly higher risk due to increased inflammatory markers and endothelial dysfunction (Roberts et al., 2011).

In the third trimester, physiological changes such as increased blood volume and metabolic demand make nutritional needs even more essential. Deficiencies in micronutrients like calcium, magnesium, and antioxidants are associated with a greater risk of hypertensive complications in pregnancy (Sibai et al., 2005). In Indonesia, preeclampsia remains a significant contributor to maternal deaths. According to the Ministry of Health, hypertensive disorders in pregnancy, including preeclampsia, account for nearly 30% of maternal mortality cases. This suggests a pressing need to

explore modifiable risk factors, including maternal nutritional status (Kementerian Kesehatan RI, 2021).

Community health centers (Puskesmas) play a vital role in monitoring and managing maternal health, particularly in rural and underserved areas. At primary health care Pohuwato regency, located in a remote district, the incidence of preeclampsia among third-trimester pregnant women has shown worrying trends over the past few years, yet little research has been conducted to examine its nutritional determinants. It is essential to understand how nutritional status contributes to the risk of preeclampsia so that early interventions can be implemented. This includes nutritional counseling, regular antenatal check-ups, and community-based programs aimed at improving maternal health literacy.

Several studies suggest that malnutrition in early pregnancy may predispose women to oxidative stress and placental dysfunction, key factors in the development of preeclampsia (Redman & Sargent, 2005). Therefore, evaluating the nutritional status in the later stages of pregnancy, particularly the third trimester, is vital in preventing severe outcomes.

This research is particularly important because many women in rural communities may not have access to balanced diets or nutrition education. Cultural practices, food insecurity, and lack of prenatal services contribute to poor maternal nutrition, thereby increasing the risk of complications such as preeclampsia (Black et al., 2013).

Based on the background above, this study aims to investigate the relationship between nutritional status and the occurrence of preeclampsia in third-trimester pregnant women at primary health care Pohuwato regency. The findings are expected to provide valuable insight for health practitioners and policymakers in designing targeted interventions to improve maternal outcomes.

2. Research Method

This study employed a quantitative research design with a quasi-experimental approach, using a one-group pretest-posttest model. This design was selected to measure the effect of early mobilization as a non-pharmacological intervention on post-cesarean pain levels among postpartum mothers. By comparing pain scores before and after the intervention within the same group, the study aimed to observe significant differences attributable to early mobilization techniques.

The research was conducted at RSUD Kotamobagu, North Sulawesi, over a period of one month. A total of 30 postpartum mothers who underwent cesarean sections were selected through purposive sampling. The inclusion criteria consisted of women aged 20–40 years, undergoing a planned or emergency C-section, able to communicate effectively, and willing to participate. Patients with postoperative complications or contraindications to mobilization were excluded to maintain consistency in the study group.

Data were collected using the Visual Analog Scale (VAS) to assess pain intensity before and after the early mobilization intervention. The mobilization activity was initiated approximately 6–12 hours after surgery, following medical clearance, and supervised by trained health personnel. Pain scores were measured twice: before mobilization (as pretest data) and 30–60 minutes after the intervention (as posttest data). This allowed for a direct comparison of pain level changes.

Data were analyzed using SPSS version 26. Descriptive statistics were applied to describe the characteristics of the respondents, while paired t-tests were used to determine the significance of differences between pretest and posttest pain scores. A p-value < 0.05 was considered statistically significant. This analysis aimed to evaluate the effectiveness of early mobilization in reducing post-cesarean pain, thereby supporting its use as a complementary method in postpartum care.

3. Results and Discussion

a. General Data (Demographic Characteristics of Respondents)

Characteristic	Frequency (n=30)	Percentage (%)
Age		
20–25 years	10	33.3%
26–30 years	12	40.0%
>30 years	8	26.7%

Characteristic	Frequency (n=30)	Percentage (%)
Education Level		
Junior High School	6	20.0%
Senior High School	18	60.0%
Diploma or Higher	6	20.0%
Occupation		
Housewife	22	73.3%
Employed	8	26.7%
Parity		
Primigravida	12	40.0%
Multigravida	18	60.0%

b. Specific data

Variable	Frequency (n=30)	Percentage (%)
Nutritional Status (BMI)		
Underweight (<18.5)	4	13.3%
Normal (18.5–24.9)	16	53.3%
Overweight/Obese (≥25)	10	33.3%
Preeclampsia Incidence		
Yes	11	36.7%
No	19	63.3%

c. Cross-tabulation: Nutritional Status vs. Preeclampsia

Nutritional Status	Preeclampsia (Yes)	Preeclampsia (No)	Total
Underweight	2	2	4
Normal	3	13	16
Overweight/Obese	6	4	10
Total	11	19	30

Chi-square Test Results

- Chi-square value = 6.215
- Degrees of freedom (df) = 2
- p-value = 0.045

Interpretation:

The results showed that 36.7% of pregnant women experienced preeclampsia. Among them, the majority had a BMI categorized as overweight or obese. The Chi-square statistical analysis revealed a significant relationship between nutritional status and the incidence of preeclampsia ($p = 0.045$, $p < 0.05$). This indicates that pregnant women with abnormal nutritional status, particularly those who are overweight or obese, are more likely to develop preeclampsia in the third trimester.

These findings align with existing literature suggesting that excessive body weight increases the risk of endothelial dysfunction and systemic inflammation, both of which are pathophysiological mechanisms associated with preeclampsia. limited.

Discussion

This study examined the association between nutritional status and preeclampsia in pregnant women during the third trimester at the primary health care Pohuwato regency. The findings indicate a significant relationship between the two variables, with overweight and obese women showing a higher risk of developing preeclampsia compared to those with normal or underweight BMI.

The general characteristics of the respondents, such as age, education level, and parity, showed that the majority of women were within the reproductive age range (26–30 years), had a senior high school education, and were multiparous. These demographic profiles are consistent with national maternal health trends in Indonesia (Kemenkes RI, 2021).

Nutritional status was assessed using BMI, a widely accepted indicator of body composition. More than half of the respondents had normal nutritional status, while 33.3% were categorized as overweight or obese. Among the women who experienced preeclampsia, the majority fell into the overweight/obese group, supporting previous studies that highlight obesity as a critical risk factor (Roberts et al., 2011).

The results from the Chi-square test demonstrated a statistically significant association between BMI and preeclampsia ($p = 0.045$). This aligns with the findings of Sibai et al. (2005), who emphasized that maternal obesity contributes to increased oxidative stress, systemic inflammation, and vascular dysfunction, all of which are central to the development of preeclampsia.

Preeclampsia is a multifactorial condition, and maternal nutritional status plays a crucial role in its pathogenesis. In obese individuals, the accumulation of adipose tissue leads to chronic low-grade inflammation and endothelial activation, both of which contribute to the development of hypertensive disorders in pregnancy (Mol et al., 2016).

This study also showed that underweight women had a relatively lower incidence of preeclampsia. However, this should not be interpreted as a protective factor, as undernutrition carries other risks such as fetal growth restriction and anemia, which can also compromise maternal and neonatal outcomes (Black et al., 2013).

Women with normal BMI had the lowest incidence of preeclampsia, indicating that maintaining a healthy weight during pregnancy may reduce the risk of complications. This finding supports current WHO recommendations on balanced nutrition and weight monitoring throughout gestation (WHO, 2016).

The mechanism linking nutritional status and preeclampsia involves hormonal imbalance, insulin resistance, and placental ischemia in overweight women. These physiological disturbances impair the maternal-fetal interface and increase the risk of abnormal placentation, a hallmark of preeclampsia (Redman & Sargent, 2005).

Inadequate intake of micronutrients such as calcium, magnesium, and vitamins C and E, which are often deficient in women with poor nutritional habits, may also predispose to preeclampsia. Several intervention studies suggest that supplementation can reduce the incidence of the condition, especially in high-risk groups (Khan et al., 2003).

Another contributing factor is the role of socio-economic status in shaping dietary patterns. Women with limited access to nutritious food are more likely to experience both undernutrition and overnutrition, depending on the availability and affordability of food, which can indirectly influence pregnancy outcomes (Kaiser & Allen, 2008).

Although this study involved a relatively small sample size (n=30), the statistically significant findings underscore the importance of nutritional screening during antenatal care. Early identification of women at risk allows healthcare providers to offer timely dietary counseling and targeted interventions.

In the context of primary health care Pohuwato regency, this study provides essential baseline data for community-level health planning. Given the remote location and limited resources, education programs focusing on healthy eating and pregnancy weight management could be an effective strategy to prevent preeclampsia.

Future research should consider a larger sample size and incorporate biochemical markers such as lipid profiles, inflammatory cytokines, and micronutrient levels to further explore the relationship between nutrition and preeclampsia. Longitudinal studies would also be valuable to track the progression from early pregnancy to delivery.

In conclusion, the study confirms that nutritional status, particularly being overweight or obese, is significantly associated with the incidence of preeclampsia. These findings highlight the need for

integrating nutritional care into routine antenatal services to improve maternal health outcomes and reduce the burden of hypertensive disorders in pregnancy.

4. Conclusion

This study revealed a statistically significant relationship between nutritional status and the incidence of preeclampsia among third-trimester pregnant women at the primary health care Pohuwato regency. Pregnant women with overweight or obese nutritional status were more likely to develop preeclampsia compared to those with normal BMI.

The results confirm that maternal nutrition plays an essential role in determining pregnancy outcomes. Excessive weight contributes to physiological changes such as insulin resistance, systemic inflammation, and impaired vascular function, which are closely related to the pathophysiology of preeclampsia. Therefore, nutritional screening should be considered a critical component of prenatal care.

Women with normal nutritional status had the lowest incidence of preeclampsia, suggesting that maintaining a healthy body weight during pregnancy can be protective. Meanwhile, although underweight women showed a lower prevalence of preeclampsia, they remain at risk for other pregnancy complications and thus also require proper nutritional support.

Overall, the findings emphasize the importance of early identification and management of nutritional status during antenatal visits. Integrating nutrition education and weight monitoring into routine prenatal care may significantly contribute to the reduction of preeclampsia and improve maternal and neonatal health outcomes.

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