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The Correlation Between Knowledge Levels Regarding Gestational Hypertension and Its Prevalence: A Cross-Sectional Study Among Pregnant Women

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ABSTRACT

Hypertension during pregnancy is one of the most serious complications that can increase the risk of morbidity and mortality for the mother and fetus. Pregnant women's understanding of hypertension during gestation plays a very important role in the prevention and management of these conditions. This study aims to analyze the relationship between pregnant women's knowledge of gestational hypertension and the prevalence of hypertension in the Talise Health Center's work area in Palu City, Central Sulawesi. This study used an analytical cross-sectional design with 51 respondents selected through convenience sampling. Data were obtained through a structured questionnaire to assess knowledge levels and through blood pressure checks to detect hypertension. Data analysis was performed using the chi-square test. The study found that the majority of respondents' knowledge fell into the poor (37.3%), sufficient (33.3%), and good (29.4%) categories. The prevalence of hypertension among respondents was 56.9%. Statistical tests showed that there was a significant relationship between knowledge about gestational hypertension and the prevalence of hypertension (p=0.007). These findings suggest that improving maternal knowledge through health education may help reduce the risk of hypertension during pregnancy. However, the cross-sectional design of this study limits the ability to establish causal relationships.

Key Messages:

- Lower maternal knowledge is significantly associated with a higher prevalence of gestational hypertension.
- Targeted antenatal health education is essential to prevent hypertension-related pregnancy complications.

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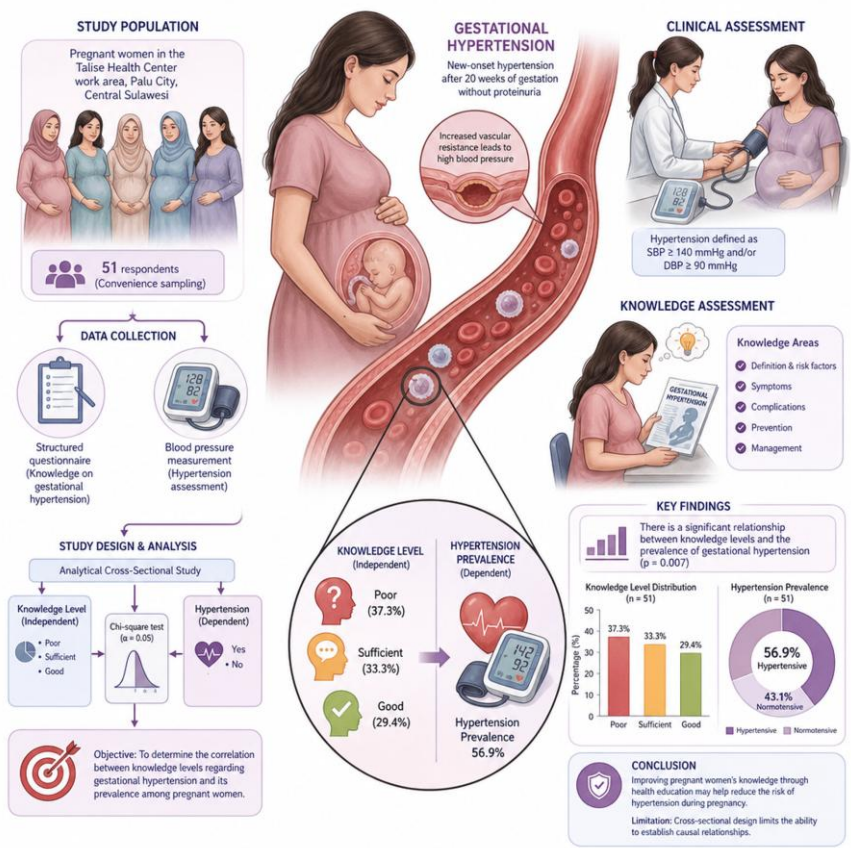
GRAPHICAL ABSTRACT



INTRODUCTION

Pregnancy is a critical period in a woman's life requiring specialized health monitoring. Globally, hypertensive disorders in pregnancy affect approximately 10–15% of all pregnancies and remain one of the leading causes of maternal and perinatal morbidity and mortality worldwide (1). Hypertension is one of the most common complications during pregnancy and a leading cause of maternal morbidity and mortality (1,2). If not treated appropriately, hypertension during pregnancy can increase the risk of preeclampsia, eclampsia, and even death for the mother and baby (3).

At the national level, gestational hypertension is still a significant public health problem in Indonesia, contributing substantially to maternal mortality (4). The prevalence of hypertension in pregnant women in Indonesia is still relatively high and is still a public health problem that needs attention (4). Data from the Central Sulawesi Provincial Health Office indicate that the incidence of gestational hypertension in 2022 was 21%, an increase from 19% in 2021 (5). In addition, the cause of maternal death due to hypertension ranks second after bleeding, with a percentage of 26.67%, and Palu City ranks second out of 13 districts/cities (5). At the local level, this increasing trend indicates an urgent need for targeted interventions, especially in areas such as the Talise Health Center work area, where the burden of disease continues to rise. Thus, more research is needed to identify various factors related to hypertension.

One important factor associated with the occurrence of gestational hypertension is the level of maternal knowledge. Theoretically, knowledge influences health behavior through cognitive processes, such that individuals with an adequate understanding are more likely to adopt preventive behaviors, recognize early symptoms, and seek timely medical care (6,7). In the context of gestational hypertension, insufficient knowledge may lead to delayed detection, poor adherence to antenatal care, and unhealthy lifestyle practices, all of which can increase the risk of hypertension (8,9). Conversely, adequate knowledge can encourage early recognition of warning signs, compliance with medical recommendations, and engagement in preventive behaviors, thereby reducing the likelihood of hypertensive complications.

Several previous studies have shown that the level of knowledge of pregnant women plays an important role in the prevention and treatment of gestational hypertension. A study suggests that pregnant

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women with adequate knowledge about hypertension tend to identify red flags and seek help more quickly (10,11). Another study reported that increasing pregnant women's knowledge through health education programs implemented across several regions in Indonesia reduced the incidence of hypertension (12–14). In addition, other studies emphasize the importance of community-based education in increasing pregnant women's knowledge (15,16). Most studies examine this issue in broader contexts and do not focus on specific regions with unique population characteristics.

Although many studies have examined the relationship between maternal knowledge and health, there are still gaps in local research, especially in the Talise Health Center work area. Based on data from interviews with the Talise Health Center coordinator, the number of pregnant women from 2023 to May 2024 is 103. During the preliminary survey, 20 pregnant women had little knowledge about gestational hypertension. In addition, 10 pregnant women said they had high blood pressure and said they did not know the causes, signs, symptoms, or prevention. This condition reflects the urgent need to investigate the relationship between the level of knowledge and the prevalence of hypertension among pregnant women, specifically in the region. This data provides an opportunity to identify risk factors that can intervene in the next period.

Therefore, the purpose of this study is to analyze the relationship between pregnant women's knowledge of hypertension during pregnancy and the prevalence of hypertension in the Talise Health Center's working area.

METHODS

Research Design

This study uses an analytical cross-sectional design. This study employed this approach to determine the relationship between the level of knowledge of pregnant women about hypertension due to pregnancy and the prevalence of hypertension at the same time. This study was conducted from May to June 2024 at the Talise Community Health Center, Palu City, Central Sulawesi.

Population and Sample

The study population comprised all pregnant women recorded in the Talise Health Center's working area, with a sample of 51 respondents. The sample size in this study was determined using a minimum sample size approach for cross-sectional studies, considering the total accessible population of 103 pregnant women in the study area. Based on feasibility, time constraints, and the inclusion criteria, 51 respondents were recruited, representing nearly 50% of the population and considered adequate to detect an association between variables in an analytical cross-sectional design. A convenience sample technique was used in this study with the inclusion criteria of pregnant women who were domiciled in the working area of the Talise Health Center, willing to participate in the study by signing informed consent, gestational age in the first to third trimester, and being at the Talise Health Center when the study was conducted. Exclusion criteria include pregnant women who do not complete the questionnaire and cannot be revisited for data clarification if needed. The questionnaire was adapted from previous studies and reviewed for content validity before use.

Research Variables

The independent variable is the level of knowledge of pregnant women about gestational hypertension, referring to the extent to which pregnant women understand the concept, causes, signs and symptoms, risks, and prevention of hypertension during pregnancy. This knowledge is measured using a structured questionnaire consisting of multiple-choice questions. Knowledge scores are categorized as either if the score is ≥ 76%, enough if the score is 56–75%, or less if the score is ≤ 55% of the total maximum score.

The dependent variable is the incidence of hypertension in pregnant women, defined as the blood pressure of pregnant women measured with a sphygmomanometer. Hypertension is defined as systolic blood pressure ≥ 140 mmHg and/or diastolic pressure≥ 90 mmHg (17). This variable was measured once during a visit to the Talise Health Center. The measurement results are categorized as non-hypertension if blood pressure is < 140/90 mmHg and as hypertension if blood pressure is ≥ 140/90 mmHg.

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Data Analysis

Univariate analysis used frequency distribution to describe respondent characteristics (age, parity, education, occupation), level of knowledge, and prevalence of hypertension. Bivariate analysis used the chi-square test to examine the relationship between pregnant women's knowledge level and hypertension prevalence, with a significance level of 95% ($p < 0.05$).

CODE OF HEALTH ETHICS

This research has obtained ethical approval from the KEPK Poltekkes of the Ministry of Health Palu with the number 000817/KEPK POLTEKKES OF THE MINISTRY OF HEALTH PALU on May 9, 2024. Each participant has been provided with information about the study and given written consent before participating.

RESULTS

The study findings, based on 51 respondents, are presented in the following tables.

Table 1. Frequency Distribution of Respondent Characteristics.

Characteristic	n=51	%
Age		
16-24 Years	18	35.3
25-33 Years	21	41.2
34-43 Years	12	23.5
Gestational Age		
First Trimester	3	5.9
Second Trimester	25	49.0
Third Trimester	23	45.1
Education		
Secondary Education	38	74.5
Higher Education	13	25.5
Occupation		
Homemaker	48	94.1
Self-Employed	1	2.0
Contract Worker	2	3.9

Table 1 shows the frequency distribution of respondent characteristics in this study (n=51). Overall, the majority of respondents were in the productive age group (25–33 years), with most pregnancies occurring in the second and third trimesters. Regarding education, respondents were predominantly at the secondary level, and almost all were homemakers. These findings indicate that the study population is largely composed of non-working pregnant women with moderate educational backgrounds, which may influence their access to health information and health-seeking behavior.

Table 2 presents the distribution of maternal knowledge and the prevalence of hypertension among pregnant women.

Research Variables	n=51	%
Knowledge of gestational hypertension		
Good	15	29.4
Moderate	17	33.3
Poor	19	37.3
Incidence of Hypertension		
No Hypertension	22	43.1
Hypertension	29	56.9

Table 2 shows the current status of knowledge about pregnancy-related hypertension and the distribution of hypertension incidence among pregnant women (n=51). Respondents' knowledge was

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mostly classified as "poor" (37.3%), followed by "moderate" (33.3%) and "good" (29.4%). Regarding the prevalence of hypertension, it was found that more than half of the respondents had hypertension (56.9%), and the rest did not experience hypertension (43.1%).

Table 3. Chi-Square test results: The relationship between knowledge about gestational hypertension and the incidence of hypertension in pregnant women in the working area of the Talise Health Center

Knowledge on Hypertensive Disorders in Pregnancy	Incidence of Gestational Hypertension				*p-value*
	No Hypertension		Hypertension		
	n	%	n	%	
Good	10	66.7	5	33.3	0.007
Moderate	9	52.9	8	47.1	
Poor	3	15.8	16	84.2	
Total	22	43.1	29	56.9	

The chi-square test results indicated a significant association between maternal knowledge of hypertensive disorders in pregnancy and hypertension incidence ($p = 0.007$). The prevalence of hypertension increased as knowledge decreased, with the highest prevalence observed among respondents with poor knowledge. In contrast, respondents with good knowledge were more likely to be in the non-hypertensive group. These findings suggest that lower maternal knowledge is associated with a higher prevalence of hypertension. However, due to the cross-sectional design, causality cannot be established.

DISCUSSION

The study found that most pregnant women had a lack of knowledge about gestational hypertension (37.3%), and more than half of the respondents had hypertension (56.9%). The results of the Chi-Square test showed a significant relationship between knowledge level and hypertension incidence. Respondents with good knowledge were less likely to experience hypertension compared to those with moderate or poor knowledge. In contrast, low levels of knowledge are associated with a higher incidence of hypertension. These findings emphasize the importance of education related to gestational hypertension to reduce the prevalence of hypertension in pregnant women.

The results of this study are important because they show that the level of knowledge of pregnant women plays an important role in reducing the risk of gestational hypertension. Hypertensive disorders affect 10-15% of pregnancies globally, causing severe complications for both mother and baby (1). In Gambia, 19% of pregnant women experience hypertension due to pregnancy, correlated with adverse labor outcomes such as low birth weight and postpartum bleeding (18)(18) Good knowledge can help pregnant women recognize the danger signs of pregnancy, including early signs of hypertension, and take preventive measures faster (19). Lack of knowledge can worsen maternal and fetal health conditions, especially in areas with limited access to health services (20). Therefore, health education interventions must be a priority in efforts to prevent gestational hypertension.

The relationship between maternal knowledge and the incidence of gestational hypertension can be explained through health behavior theory, which states that knowledge is a fundamental determinant of individual behavior. Adequate knowledge enables pregnant women to understand risk factors, recognize early warning signs, and adopt preventive measures such as maintaining a healthy diet, attending regular antenatal care, and adhering to medical advice (21,22). Conversely, limited knowledge may result in delayed health-seeking behavior, poor compliance with antenatal services, and unhealthy lifestyle practices, which can increase the risk of hypertension during pregnancy (23,24). Therefore, knowledge acts as an indirect but critical factor influencing the occurrence of hypertension through behavioral pathways.

In addition to knowledge, several other factors can directly influence the occurrence of hypertension in pregnant women. Biological factors such as maternal age, parity, and genetic

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predisposition play a significant role (25,26). Nutritional status, particularly excessive sodium intake and obesity, is also strongly associated with increased blood pressure. Furthermore, psychosocial factors such as stress and lack of family support can contribute to elevated blood pressure during pregnancy. Environmental and healthcare access factors, including availability of antenatal services and exposure to health information, also determine the early detection and management of hypertension (27). These factors interact with maternal knowledge, making gestational hypertension a multifactorial condition that requires comprehensive intervention.

A lack of understanding of the risks and management of gestational hypertension can explain the high prevalence of hypertension in pregnant women with low knowledge. A study found that well-informed respondents were better able to recognize early signs and comply with medical recommendations, thereby minimizing the risk of hypertension (28–30). Conversely, a lack of knowledge hinders prevention efforts, such as a healthy diet and regular consultations. Another study revealed that 75.8% of pregnant women had low knowledge about preventing hypertension (31,32). In addition, environmental factors, including air pollution, dietary habits, access to information, and educational level, also affect respondents' knowledge levels (33–36). These findings emphasize the importance of structured, locally tailored needs-based health education.

These findings are in line with previous research showing a positive association between pregnant women's health knowledge and a reduced risk of pregnancy complications. Pregnant women with a higher level of health knowledge are better equipped to recognize early signs of potential complications, such as gestational hypertension and preeclampsia. This awareness allows for timely medical intervention, which can significantly reduce risks for both mother and baby (37). Women who are better informed are more likely to engage in preventive health behaviors, such as maintaining a healthy diet, attending regular prenatal visits, and adhering to medical advice. This action is directly correlated with a lower incidence rate of complications during pregnancy (38). The study emphasizes the importance of educational and counseling programs during antenatal care. Women who received comprehensive information about pregnancy risks and management strategies demonstrated greater understanding and adherence to health care recommendations, resulting in better outcomes. In summary, there is a strong positive association between pregnant women's health knowledge and reduced pregnancy complications.

The differences in the findings of this study compared to previous studies may be due to the socioeconomic characteristics of the respondents. The majority of respondents in this study are homemakers with secondary education, who tend to have limited access to health information. In addition, disparities in primary health care between rural and urban areas can affect pregnant women's knowledge levels (39,40). Previous research in urban areas has shown a higher level of knowledge due to better access to information (41). These findings suggest that geographic disparities play an important role in pregnant women's health outcomes.

In addition to the level of knowledge, other factors such as nutritional status, family support, and access to health facilities can also affect the prevalence of hypertension. An unbalanced diet, such as high-sodium intake, may contribute to high blood pressure (42,43). Minimal family support can affect the mother's mental and physical health, thereby increasing the risk of hypertension (44) Additionally, financial constraints may limit the mother's ability to obtain adequate medical care (45). These factors need to be explored further to provide a more comprehensive picture.

The strength of this research lies in the method used to analyze the relationship between knowledge and hypertension incidence quantitatively. However, this study has a weakness in its relatively small sample size, so the generalizability of the results is limited. Another limitation is that the data are collected only in one working area of the Health Center, so they do not reflect the diversity of the pregnant women's population in other regions. In addition, the study did not explore other factors such as nutritional status or psychological stress. Further studies with larger samples and a wider range of variables are needed.

The findings of this study have important implications in planning health education programs for pregnant women, especially in rural areas. Community-based interventions, such as health counseling and cadre training, can be effective measures to increase knowledge about gestational hypertension. Future

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research needs to explore the relationship between other factors, such as diet and stress, and the incidence of hypertension in pregnant women. In addition, longitudinal studies can help understand the long-term impact of health education programs on maternal and infant health. With the right strategy, the risk of gestational hypertension can be minimized, improving maternal and child safety.

In preventing hypertension among pregnant women, targeted efforts are needed to improve maternal knowledge through community-based education. Local needs-based programs, such as those implemented in the Talise Health Center work area, can be an effective strategy to reduce hypertension prevalence. Strengthening collaboration between health workers and the community is essential to provide accessible information on the causes, symptoms, and prevention of hypertensive disorders in pregnancy. Such approaches may encourage healthier behaviors and reduce the risk of complications.

CONCLUSION

This study shows that the level of knowledge of pregnant women about gestational hypertension has a significant relationship with the incidence of hypertension. Pregnant women with lower levels of knowledge are at greater risk of developing hypertension than those with good knowledge. The high prevalence of hypertension in pregnant women in the work area of the Talise Health Center emphasizes the importance of health education as a preventive measure. It is recommended that the Health Center improve health counseling programs on gestational hypertension through a community-based approach and the training of health cadres. In addition, collaboration with medical personnel is needed to ensure that pregnant women get adequate information and better access to care. Further research with a wider coverage of regions and variables is also needed to understand other factors that affect gestational hypertension. However, further longitudinal studies are needed to better understand the causal relationship between maternal knowledge and gestational hypertension.

DECLARATION OF THE USE OF AI

The authors declare that no artificial intelligence (AI), AI-assisted technologies, or large language models (LLMs) were used in the conception of the study, data analysis, or the drafting, writing, and editing of this manuscript. The only exception is the graphical abstract, which was created using the design platform Illustrae (https://illustrae.co/). The authors take full responsibility for the content and accuracy of the graphical abstract and the entire manuscript.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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