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FACTORS THAT AFFECT THE INCIDENCE OF HYPERTENSION IN PREGNANCY IN THE WORKING AREA OF THE FISH MARKET HEALTH CENTER IN BENGKULU CITY

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ABSTRACT

Hypertension during pregnancy is a common obstetric complication and a major contributor to both maternal and fetal morbidity and mortality. This study aimed to identify factors affecting the occurrence of hypertension in pregnancy within the Pasar Ikan Community Health Center's service area. Employing an observational analytical design with a cross-sectional approach, the study involved 50 pregnant women in their second and third trimesters, selected through total sampling. Inclusion criteria were pregnant women attending the health center with complete medical record data for blood pressure. The findings revealed that 32.0% of the participants experienced hypertension during pregnancy. Bivariate analysis indicated significant correlations between maternal age (p=0.003) and caffeine intake (p=0.001) with the occurrence of hypertension. Conversely, gravidity showed no significant relationship with hypertension incidence (p=0.960). Multivariate analysis showed that caffeine consumption emerged as the most influential factor, with an adjusted Odds Ratio (OR) of 7.246 (95% CI: 1.720–30.531), which indicates a 7-fold greater risk of hypertension due to caffeine consumption compared to age and gravidity. It is advised to enhance educational efforts targeting pregnant women about their consumption habits and the associated hypertension risks.
Keywords: Pregnancy Hypertension Graviditas, Age, Caffeine

INTRODUCTION

Based on data provided by the World Health Organization (WHO), 33% of populations worldwide suffer from hypertension, or 1 in 3 people. WHO data shows that hypertension in expectant mothers is one of the main causes of 5-10% morbidity and 14% mortality in maternal and fetal life worldwide.

Hypertension in pregnancy is one of the most common obstetric complications and is the main It is a contributing factor to both maternal and fetal morbidity and mortality. Hypertensive disorders in pregnancy are characterized by blood pressure levels of at least 140/90 mmHg that occurs after the 20-week mark in pregnancy, accompanied or otherwise by proteinuria or not (Cunningham et al., 2022).

The first pregnancy (primigravida) tends to have a higher risk of experiencing gestational hypertension compared to subsequent pregnancies or multigravida (Windarena 2020). This is due to the adaptation of the mother's body to the first pregnancy, which can affect the body's vascular and hemodynamic response to hormonal and physiological changes during pregnancy. This is in line with previous research, namely Rasyid et al 2024 where there is an association between gravity and hypertension in pregnancy.

A mother's age is closely related to the development of her reproductive organs. The age range that is considered ideal and safe for pregnancy is between 20 to 35 years. Pregnancy that occurs before the age of 20 is risky because biologically the reproductive organs are not fully mature, and pregnant women tend to be physically or mentally unready to undergo pregnancy. Meanwhile, pregnancy at an old age >35 years increases

the risk of mothers having conditions in their pregnancy because their reproductive function is deteriorating and endurance decreases (Marlina et al., 2021).

Consuming caffeine in pregnant women can worsen the condition through the stimulation mechanism of the central nervous system and the activation of the sympathetic nervous system. Caffeine inhibits adenosine receptors in the brain, increasing the release of stress hormones (cortisol) and catecholamines such as adrenaline, which triggers vascular vasoconstriction and increased heart rate. This has an impact on systemic blood pressure increases. In pregnancy, the vasoconstricting effects of caffeine also reduce placental blood flow, limiting the supply of oxygen and nutrients to the fetus, thereby increasing the risk of hypoxia and oxidative stress. These findings are in line with the results of Marlina et al.'s (2021) research which shows that hypertension is more often experienced by pregnant women who have a habit of consuming coffee.

Based on data from the results of the 2023 Indonesian Health Survey (SKI), it was found that hypertension in pregnancy was 3.2% of pregnant women who experienced complaints during pregnancy. Based on data from the Provincial Health Office Profile in 2023, 5.9% of pregnant women who experience hypertension experience complications in pregnancy.

Based on data from the 2024 registration book in the five health centers with the most pregnant women, according to data from the Bengkulu City Health Office, namely the Telaga Dewa Health Center, there are 6 pregnant women with hypertension, the Jembatan Kecil Health Center with 5 hypertensive women, the Kandang Health Center with 1 pregnant woman, the Sawah Lebar Health Center with 3 pregnant women, and the Pasar Ikan Health Center with 15 pregnant women with hypertension.

The prevalence rate of hypertension in pregnancy at the Pasar Ikan Health Center was recorded at 32%. This study aims to identify factors that contribute to the occurrence of hypertension in pregnancy in the working area of the Fish Market Health Center, Bengkulu City.

MATERIALS AND METHODS

This study used an analytical observational design with a cross-sectional approach, which was carried out in the Working Area of the Fish Market Health Center from June 26 to July 5, 2025. The study population comprised all pregnant women in their second and third trimesters within the region, totaling 50 participants. A total sampling technique was employed, resulting in a sample size of 50 respondents. Bivariate analysis was conducted using the Chi-Square test. Multivariate analysis utilized Logistic Regression (Enter method) to identify the most influential risk factor.

OPERATIONAL DEFINITIONS AND VARIABLE MEASUREMENT

Hypertension in Pregnancy: Diagnosed based on secondary data from the Health Center's medical records, where blood pressure levels were at least 140/90 mmHg after 20 weeks of gestation.

Maternal Age: Categorized into at-risk (<20 or >35 years) and not at-risk (20–35 years).

Gravidity: Categorized into Primi+Grande (first pregnancy or more than four pregnancies) and Multi (second to fourth pregnancies).

Caffeine Consumption: Data was collected via a structured questionnaire regarding consumption habits of caffeinated beverages (coffee, tea, etc.). The quantity of caffeine consumed was based on beverage volume, categorized into unsafe (>150 ml per day) and safe (<150 ml per day). Limitations in converting beverage volume to specific mg of caffeine are acknowledged as a potential bias in this study

RESULTS AND DISCUSSION

1. Univariate Analysis

Table 1. Distribution of Frequency of Hypertension Incidence in Pregnancy, Severity, Age, Caffeine Consumption in the Working Area of the Fish Market Health Center in Bengkulu City

No	Variable	Frequency Variable (N = 50)	Persentage (%)
1	**Hypertension**		
	Yes	16	32.0
	Not	34	68.0
2	**Graviditas**		
	Primi+Grande	19	38.0
	Multi	31	62.0
3	**Age**		
	Risk (<20, >35 years)	12	24.0
	No Risk (20-35 years)	38	76.0
4	**Cafeinee Consumption**	18	36.0
	Unsafe (>150 ml)	32	64.0
	Safe (<150 ml)		

Based on Table 1, the analysis results indicate that out of 50 pregnant women, 32.0% experienced hypertension in pregnancy. The distribution of other variables was: 38.0% were primigravida/grandemultigravida, 24.0% were in the at-risk age range, and 36.0% consumed an unsafe amount of caffeine (>150 ml).

2. Bivariate Analysis

Tabel 2. Relationship of Gravity, Age, Caffeine Consumption with the Incidence of Hypertension in Pregnancy in the Working Area of the Fish Market Health Center, Bengkulu City.

Variabel	Hypertensi0n				Total		*P Value*	OR
	Yes		No					
	N	%	N	%	N	%		
Graviditas								
Primi+ Grande	6	12.0	13	26.0	19	38.0	0.960	2.004
Multi	10	20.0	21	42.0	31	62.0		
Total	16	32.0	34	68.0	50	100		
Age								
At Risk (<20, >35 years)	8	16.0	4	2.0	12	24.0	0.003	6.102
No Risk (20-35 years)	8	16.0	30	60.0	38	76.0		
Total	16	32.0	34	68.0	50	100		
Cafeinee Consumption								
Unsafe (>150 ml)	11	22.0	7	14.0	18	36.0	0.001	7.246
Safe (<150 ml)	5	10.0	27	54.0	32	64.0		
Total	16	32.0	34	8.0	50	100		

According to the information presented in Table 2, of the 19 respondents with primigravida experienced High blood pressure (12%). Based on the Chi-Square test, the p-value was found to be. 0.960>0.05 which means that there is no meaningful relationship between gravity and the incidence of hypertension in pregnancy.

The results of the study showed that (16%) of the 12 respondents who had a risk age (16.0%) a small percentage of respondents experienced hypertension during pregnancy. Based on the results

of the chi-square test with a p-value of 0.003 (<0.05), it can be concluded that there is a significant association between age and the occurrence of high blood pressure in pregnancy.

The results showed that of 18 respondents who consumed more than 150 ml of caffeine, as many as 22.0% experienced hypertension. The chi-square analysis, with a p-value of 0.001 (<0.05), indicated a significant correlation between caffeine consumption and the incidence of hypertension in pregnancy.

3. Multivariate Analysis

Table 3. The Most Influential Factors with the Incidence of Hypertension in Pregnancy

Variabel	*P value*	Exp (B)	95% CI	
			Lower	Upper
Age	0.026	6.102	1.248	29.838
Cafeinee Consumption	0.007	7.246	1.720	30.531

Table 3 presents the results of the multivariate logistic regression analysis (enter method), showing that the factor of caffeine consumption had the most significant impact on the incidence of pregnancy hypertension.

The multivariate analysis results confirm that caffeine consumption was the most influential factor (p=0.007). The statistically significant Odds Ratio (OR) of 7.246 indicates that pregnant women who consumed caffeine unsafely had a 7 times higher risk of experiencing hypertension compared to those who consumed it safely. It is important to note that the wide confidence interval (CI) suggests variability in this estimation, likely associated with the relatively small sample size.

DISCUSSION

1. Graviditas

Gravidity is the number of pregnancies regardless of gestational age. Gestational hypertension is present in 5-8% of pregnancies, more than 12% in primigravida, especially young. The risk of preeclampsia according to The New England Journal of Medicine is 3,9% in the first pregnancy, 1,7% in the second, and 1,8% in the third.

Primigravida has a 2.173 times greater risk of natural pregnancy hypertension than multigravida. This is because in the first pregnancy, the body has not fully formed protective antibodies against placental antigens, so the implantation process is disrupted. In addition, primigravida is more easily stressed during childbirth, which increases the hormones CRH and cortisol, so that blood pressure and sympathetic responses This is supported by the research of Febyan et al. (2020), which examined the relationship between gravity status and the incidence of hypertension in pregnancy. In the study, the analysis was carried out using the Chi-Square test on 132 respondents, and it was found that as many as 16 mothers (12.1%) with primigravida status, namely mothers who had less than two pregnancies, experienced hypertension in pregnancy. According to the analysis results, a p-value of 0.077 was obtained, which is above the significance threshold of 0.05. Thus, it can be concluded that there is no statistically significant association between gravidity status and the occurrence of hypertension during pregnancy.

This research is in line with Rizky and Sari (2025) who examined the relationship between gravity status and the incidence of hypertension in pregnant women. In the study, of 95 pregnant women with at-risk gravity status, 56 people (58.9%) experienced hypertension, while 39 people (41.1%) did not experience it. Meanwhile, of the 55 pregnant women with non-risk gravity, there were 35 people (63.6%) who had hypertension and 20 people (36.4%) who did not. The results of statistical analysis showed the p-value of 0.694, being higher than the 0.05 significance level, indicates that there is no significant association between gravidity status and the occurrence of hypertension in pregnant women.

2. Age

Pregnancy under the age of 20 years is risky because the reproductive organs are immature, while pregnancy over 35 years increases the risk of complications due to decreased reproductive function and immunity. The ideal age of pregnancy is 20-35 years. Pregnant Females younger than 20 possess a 2 to 5 times higher risk of complications and death compared to those aged 20–35 years. Adolescents who have never given birth also have a higher risk of developing hypertension in pregnancy, a similar risk also increases in pregnant women over the age of 35 (Manuaba 2021).

Based on the results of the Chi-Square test, a p value of 0.022 was obtained, which was below the significance threshold of 0.05. ThereforeThe findings suggest a meaningful relationship between the age of pregnant women and the occurrence of hypertension.

This research is also in line with Siti Husaidah and Nurbaiti (2020), demonstrating an association between high-risk age groups and the incidence of pregnancy-related hypertension. According to the Chi-Square test results, the p-value of 0.003 is less than 0.05, indicating a statistically significant association between at-risk age and the occurrence of hypertension during pregnancy. The discussion emphasizes connecting the data and analytical outcomes to the research problem or objective, as well as to the broader theoretical framework. It may also serve to explain the underlying reasons behind the findings observed in the data. The discussion is presented alongside the relevant data being analyzed.

3. Caffeinee Consumption

Caffeine is an alkaloid compound in coffee and tea that stimulates the central nervous system, reduces fatigue, hunger, drowsiness, and increases concentration and heart contractions (Ahmad Dahlan 2024)

Caffeine is often added in drinks with a safe limit of daily consumption of 100-150 mg. Coffee, which has been known for centuries, remains in demand as the population grows. However, regular coffee consumption can cause negative effects such as abnormal heart rate, dizziness, and gastric disorders.

Caffeine can raise blood pressure and heart rate in pregnant women and make frequent urination, which risks leading to dehydration if there is not enough fluids. This is in line with research in a prospective cohort study conducted by Yamamoto, et al. (2021).

The findings indicated that elevated amounts of caffeine consumption, namely ≥300 mg per day, Considerably amplified the possibility of HDP when compared to the group of pregnant women who consumed caffeine <100 mg per day. This risk can be seen from the adjusted odds ratio (OR) value of 1.26 with a 95% confidence range between 1.11 to 1.43. This means that pregnant women who consume high amounts of caffeine have about 26% greater chance of developing pregnancy hypertension compared to those who consume low amounts of caffeine.

Research by Arafa, et al. (2023) shows that high amounts of coffee consumption during pregnancy is shown to contribute significantly to the risk of preeclampsia. The meta-analysis the findings indicated an odds ratio of of 1.39 (95% CI: 1.03–1.86), meaning that pregnant women who consumed the highest amount of coffee had a 39% greater risk of developing preeclampsia compared to pregnant women who consumed a small amount of coffee.

CONCLUSION

It can be concluded that most respondents were multigravida, not in the at-risk age group, and consumed a safe amount of caffeine (<150 ml). No significant link was identified between gravidity and the occurrence of hypertension during pregnancy (p=0.960). However, an important correlation was identified between maternal age (p=0.003) and caffeine consumption (p=0.001) with the incidence of pregnancy-related hypertension.

Caffeine consumption is the most dominant factor influencing the occurrence of hypertension during pregnancy, with a risk seven times greater than the factor of age. This statement is supported by statistically significant logistic regression results. Nevertheless, the limitations of the cross-sectional study design and small sample size demand caution when interpreting causality and generalizing the findings. It is recommended

to increase education for pregnant women regarding caffeine consumption patterns and associated hypertension risks.

LIMITATIONS AND INTERPRETATION

This study used a cross-sectional design, which measures exposure (age, gravidity, caffeine) and outcome (hypertension) simultaneously. The limitation of this design is its inability to establish a definitive cause-and-effect relationship (causality). Although multivariate analysis identified caffeine as the most influential factor (OR 7.246), this result must be interpreted cautiously given the relatively small sample size (N=50) and the wide confidence interval. The caffeine consumption data based on volume (ml) rather than mass (mg) is also a potential source of bias. Further research with a longitudinal design and a larger sample is needed to strengthen the evidence of causality.

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