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The Relationship between Maternal Age and History of Hypertension with the Incidence of Hypertension in Pregnant Women at Kendari City Regional General Hospital

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A B S T R A C T
Hypertension during pregnancy remains a leading cause of maternal morbidity and mortality worldwide. This study aimed to determine the relationship between maternal age and history of hypertension with the incidence of hypertension in pregnant women at Kendari City Regional General Hospital (RSUD Kota Kendari). A quantitative, cross-sectional analytical design was employed. The study was conducted in May 2025. Samples consisted of 132 pregnant women with hypertension and a gravidity of ≥2 during 2022–2024, selected by purposive sampling from hospital medical records. Bivariate analysis used the Chi-Square test ($\alpha = 0.05$). Results showed that 56.1% of respondents had chronic hypertension and 43.9% had gestational hypertension. For the age variable, the Chi-Square test yielded $p = 0.002$ (< 0.05), indicating a significant relationship between maternal age and hypertension incidence. High-risk age groups (< 20 or > 35 years) predominantly experienced chronic hypertension (66.2%). For history of hypertension, the test yielded $p = 0.035$ (< 0.05), also indicating a significant association; respondents with a prior hypertension history more frequently developed chronic hypertension (60.8%). Both maternal age and history of hypertension are significantly associated with the type and occurrence of hypertension in pregnancy. Antenatal care providers should screen for these risk factors early to mitigate complications

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INTRODUCTION

Hypertension in pregnancy is defined as a systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg in a pregnant woman. It is one of the most frequently encountered disorders in pregnancy worldwide and ranks among the three leading causes of maternal mortality and morbidity (Riskesdas, 2024). The condition encompasses several clinical categories: chronic hypertension, preeclampsia, eclampsia, chronic hypertension superimposed with preeclampsia, and gestational hypertension.

Maternal and fetal consequences of unmanaged gestational hypertension are severe. Maternal risks include eclampsia, haemorrhagic and ischaemic stroke, HELLP syndrome, hepatic failure, renal dysfunction, caesarean delivery, preterm labour, and abruptio placentae. Fetal risks include preterm birth, impaired intrauterine growth, respiratory distress syndrome, and intrauterine death (Rosy Yurianti et al., 2020).

Indonesia's maternal mortality ratio in 2020 was 189 per 100,000 live births, far above the Sustainable Development Goals (SDGs) target of 70 per 100,000 live births by 2030. In 2023, a total of 4,482 maternal deaths were recorded nationally; hypertension in pregnancy accounted for 412 cases, obstetric haemorrhage for 360 cases, and other obstetric complications for 204 cases (Ministry of Health, 2023).

Epidemiological data from Kendari City reveal a fluctuating but persistently high prevalence of hypertension during pregnancy over the past five years. In 2024, 1,896 cases were recorded among 7,961 pregnant women (23.8%), the highest proportion since 2020. At Kendari City Regional General Hospital (RSUD Kota Kendari) specifically, 87 cases were identified among 406 pregnant women in 2024 (21.43%), representing a marked increase from prior years. These figures underscore the clinical and public-health importance of understanding the determinants of gestational hypertension in this setting.

Table 1. Hypertension in Pregnancy: Kendari City, 2020–2024

Year	Pregnant Women	Hypertension in Pregnancy	Percentage (%)
2020	8,697	1,630	18.7
2021	9,020	1,415	15.7
2022	9,655	1,727	17.9
2023	8,153	1,289	15.8
2024	7,961	1,896	23.8

Source: Kendari City Health Office

Multiple risk factors for hypertension in pregnancy have been identified in the literature, including physiological factors (maternal age, parity, gravidity, prior hypertension, genetic predisposition, obesity), dietary factors (sodium, potassium, fat and fibre intake), and lifestyle factors (physical activity, alcohol consumption, psychosocial stress) (Andriani, 2022). Among these, maternal age

and history of hypertension are consistently reported as clinically significant and modifiable through targeted antenatal care strategies.

Table 2. Hypertension in Pregnancy: RSUD Kota Kendari, 2020–2024

Year	Pregnant Women	Hypertension in Pregnancy	Percentage (%)
2020	493	79	16.02
2021	571	72	12.61
2022	589	63	10.69
2023	535	79	14.76
2024	406	87	21.43

Source: RSUD Kota Kendari Medical Records

Previous research in Indonesia has corroborated these associations. Pratiwi (2022) found significant relationships between age, parity, and history of hypertension and the occurrence of gestational hypertension ($p = 0.000$ for all variables). Usalma (2023) similarly reported significant associations between age and parity with hypertension in pregnancy ($p = 0.000$). The present study was therefore designed to determine the relationship between maternal age and history of hypertension with the incidence of hypertension in pregnant women at RSUD Kota Kendari from 2022 to 2024.

LITERATURE REVIEW

Definition and Classification of Hypertension in Pregnancy

Hypertension in pregnancy is defined as a sustained systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg (Saifuddin, 2020). It complicates 5–15% of all pregnancies and constitutes one of the three leading causes of maternal mortality worldwide (Saifuddin, 2020). The condition is classified into four principal categories: (1) Chronic hypertension — hypertension that predates pregnancy or is diagnosed before 20 weeks of gestation with BP ≥ 140/90 mmHg; (2) Preeclampsia — new-onset hypertension after 20 weeks of gestation accompanied by proteinuria; (3) Eclampsia — preeclampsia complicated by generalised seizures and/or coma; and (4) Gestational hypertension — new-onset hypertension after 20 weeks without proteinuria, resolving within three months postpartum (Manuaba, 2017).

Maternal Age as a Risk Factor

Maternal age is a well-established risk factor for hypertensive disorders of pregnancy. Women aged under 20 years face heightened risk because the reproductive organs have not yet reached full anatomical and physiological maturity; psychological instability inherent to adolescence further compromises blood-pressure regulation (Saifuddin, 2020). At the other extreme, women older than 35 years are subject to degenerative changes in vascular tissue — notably arteriosclerosis and decreased arterial elasticity — alongside a higher burden of

comorbidities such as diabetes mellitus and chronic kidney disease (Arif, 2017; Mochtar, 2017).

The optimal reproductive window, 20–35 years, is characterised by mature organ systems, stable hormonal milieu, and physiological reserve adequate to sustain the haemodynamic demands of pregnancy without precipitating hypertension. Mochtar (2017) affirms that age groups outside this range carry significantly elevated perinatal risk. Two years post-menarche, pelvic growth of 2–7% and height gain of 1% may still be occurring, rendering the pelvis and vasculature incompletely prepared for the stresses of gestation (Saifuddin, 2020).

History of Hypertension as a Risk Factor

A personal history of hypertension is a potent predictor of hypertensive disorders in subsequent pregnancies. Women who experienced hypertension before pregnancy or before 20 weeks of gestation face a substantially elevated risk of chronic hypertension, superimposed preeclampsia, and its associated maternal and neonatal morbidity and mortality (Rahmadini, 2023). Pathophysiologically, pre-existing hypertension impairs placental perfusion through vasoconstriction and endothelial dysfunction, producing a vicious cycle of uteroplacental hypoxia, ischaemia, and further blood-pressure elevation (Manuaba, 2017).

Ratumbuysang (2014) found that women with a hypertensive history face up to a fourfold increased likelihood of developing hypertension in subsequent pregnancies, particularly in primiparas with a long inter-pregnancy interval. Saifuddin (2020) corroborates this, noting that the renin-angiotensin-aldosteron system is dysregulated in women with antecedent hypertension, predisposing them to inappropriate fluid retention and vascular remodelling during pregnancy.

Review of Prior Studies

Pratiwi (2022) conducted a cross-sectional study among 100 pregnant women at Puskesmas Babat, finding statistically significant associations between age ($p = 0.000$), parity ($p = 0.000$), and history of hypertension ($p = 0.000$) with gestational hypertension. Usalma (2023) reported similar findings in Banda Aceh, with maternal age and parity both significantly related to hypertension in pregnancy ($p = 0.000$). A literature review by Rosy Yurianti et al. (2020), synthesising 10 peer-reviewed studies, concluded that maternal age above 35 years is the dominant factor influencing the occurrence of hypertension in pregnancy. Muhid Abdul (2025) further reported at RSUD Soedjono Selong that history of hypertension independently predicted preeclampsia ($p = 0.001$; OR = 3.754), while maternal age was also significant ($p = 0.010$; OR = 2.786).

METHODOLOGY

Research Design

This study employed a quantitative, cross-sectional analytical design to investigate simultaneous associations between independent variables (maternal age, history of hypertension) and the dependent variable (type and occurrence of hypertension in pregnant women) (Sugiyono, 2019).

Setting and Period

The study was conducted at Kendari City Regional General Hospital (RSUD Kota Kendari), Jl. Brigjen Z.A. Sugianto No. 39, Kambu District, Kendari City, Southeast Sulawesi, Indonesia. Data collection was performed in May 2025, covering the period 2022–2024.

Population and Sample

The target population comprised all pregnant women diagnosed with hypertension and registered in the RSUD Kota Kendari medical record book from 2022 to 2024, totalling 229 individuals. The study sample consisted of 132 pregnant women meeting the following inclusion criteria: (1) pregnant women with hypertension and a gravidity ≥2; and (2) absence of communicable diseases (tuberculosis, hepatitis, or other infectious conditions). Exclusion criteria were: (1) primiparous women (gravidity 1); and (2) presence of the above communicable diseases. Sampling was performed by purposive sampling.

Instrument and Data

Data were collected from the hospital's medical record register. Three variables were extracted: (1) Maternal age — categorised as High Risk (< 20 or > 35 years) or Low Risk (20–35 years); (2) History of hypertension — Yes or No; (3) Type of hypertension — Chronic Hypertension (onset before 20 gestational weeks) or Gestational Hypertension (onset ≥20 gestational weeks without proteinuria). All data were secondary in nature.

Statistical Analysis

Data were processed through coding, editing, scoring, and tabulation using IBM SPSS Statistics software. Univariate analysis described the frequency distribution of each variable. Bivariate analysis used the Chi-Square test ($\alpha = 0.05$; 95% confidence interval) to assess the statistical significance of associations between independent and dependent variables. A p-value < 0.05 was interpreted as a statistically significant association.

RESEARCH RESULT

General Description of the Study Site

RSUD Kota Kendari is a government-owned district general hospital established in 1927. It occupies a 13,000-hectare site and has been accredited by the National Hospital Accreditation Committee (KARS No. SERT 139/I/2012). The hospital's vision is to serve as the preferred healthcare facility for residents of Kendari and the broader Southeast Sulawesi Province. Its mission encompasses the provision of high-quality, accessible, and timely healthcare

services, the continuous development of human resources, and the maintenance of a safe and comfortable environment for patients, families, and staff.

Characteristics of Respondents

Table 3. Frequency Distribution by Maternal Education Level, RSUD Kota Kendari, 2022–2024

Education Level	Frequency (n)	Percentage (%)
Elementary School	4	3.0
Junior High School	40	30.3
Senior High School / Vocational	57	43.2
Diploma III	15	11.4
Bachelor's Degree (S1)	16	12.1
Total	**132**	**100**

Source: Secondary Data

Table 4. Frequency Distribution by Maternal Occupation, RSUD Kota Kendari, 2022–2024

Occupation	Frequency (n)	Percentage (%)
Housewife (IRT)	70	53.0
Entrepreneur	12	9.1
Civil Servant (PNS)	21	15.9
Private Employee	29	22.0
Total	**132**	**100**

Source: Secondary Data

The majority of respondents had completed senior high school or vocational school (43.2%), followed by junior high school (30.3%), bachelor's degree (12.1%), Diploma III (11.4%), and elementary school (3.0%). With respect to occupation, most respondents were housewives (53.0%), followed by private employees (22.0%), civil servants (15.9%), and entrepreneurs (9.1%). These characteristics reflect a predominantly middle-education, non-working female sample, which may influence health-seeking behaviour and awareness of gestational risk factors.

Univariate Analysis

Table 5. Frequency Distribution by Maternal Age, RSUD Kota Kendari, 2022–2024

Maternal Age	Frequency (n)	Percentage (%)
High Risk (< 20 or > 35 years)	71	53.8
Low Risk (20–35 years)	61	46.2
Total	**132**	**100**

Source: Secondary Data

Table 6. Frequency Distribution by History of Hypertension, RSUD Kota Kendari, 2022–2024

History of Hypertension	Frequency (n)	Percentage (%)
Yes	69	52.3
No	63	47.7
Total	**132**	**100**

Source: Secondary Data

Table 7. Frequency Distribution by Type of Hypertension in Pregnant Women, RSUD Kota Kendari, 2022–2024

Type of Hypertension	Frequency (n)	Percentage (%)
Chronic Hypertension	74	56.1
Gestational Hypertension	58	43.9
Total	**132**	**100**

Source: Secondary Data

Of 132 respondents, 71 (53.8%) were in the high-risk age category (< 20 or > 35 years) and 61 (46.2%) were in the low-risk category (20–35 years). Regarding history of hypertension, 69 respondents (52.3%) had a prior history and 63 (47.7%) did not. With respect to the type of hypertension, 74 (56.1%) experienced chronic hypertension and 58 (43.9%) experienced gestational hypertension.

Bivariate Analysis: Maternal Age and Hypertension Incidence

Table 8. Relationship between Maternal Age and Hypertension Incidence, RSUD Kota Kendari, 2022–2024

Maternal Age	Chronic HT n (%)	Gestational HT n (%)	Total n (%)	p-value
High Risk (< 20 or > 35 yrs)	49 (66.2%)	22 (37.9%)	71 (53.8%)	**0.002**
Low Risk (20–35 yrs)	25 (33.8%)	36 (62.1%)	61 (46.2%)	
Total	**74 (100%)**	**58 (100%)**	**132 (100%)**	

Source: Secondary Data

As shown in Table 8, among the 71 respondents classified as high-risk age, 49 (66.2%) experienced chronic hypertension and 22 (37.9%) experienced gestational hypertension. Among the 61 respondents classified as low-risk age, 25 (33.8%) experienced chronic hypertension and 36 (62.1%) experienced gestational hypertension. The Chi-Square test yielded p = 0.002 (< α = 0.05), indicating that H_0 is rejected and H_a is accepted. There is a statistically significant relationship between maternal age and the incidence of hypertension in pregnant women at RSUD Kota Kendari, 2022–2024.

Bivariate Analysis: History of Hypertension and Hypertension Incidence

Table 9. Relationship between History of Hypertension and Hypertension Incidence, RSUD Kota Kendari, 2022–2024

History of Hypertension	Chronic HT n (%)	Gestational HT n (%)	Total n (%)	p-value
Yes	45 (60.8%)	24 (41.4%)	69 (52.3%)	**0.035**
No	29 (39.2%)	34 (58.6%)	63 (47.7%)	
Total	**74 (100%)**	**58 (100%)**	**132 (100%)**	

Source: Secondary Data

As shown in Table 9, among the 69 respondents with a history of hypertension, 45 (60.8%) experienced chronic hypertension and 24 (41.4%) gestational hypertension. Among the 63 respondents without a hypertension history, 29 (39.2%) experienced chronic hypertension and 34 (58.6%) gestational hypertension. The Chi-Square test yielded p = 0.035 (< α = 0.05), indicating that H_0 is rejected and H_a is accepted. There is a statistically significant relationship between history of hypertension and the incidence of hypertension in pregnant women at RSUD Kota Kendari, 2022–2024.

DISCUSSION

Relationship between Maternal Age and Hypertension Incidence

The present study found that more than half (53.8%) of respondents fell into the high-risk age category, and this group predominantly experienced chronic hypertension (66.2%) rather than gestational hypertension (37.9%). The significant association (p = 0.002) is consistent with established physiological explanations. In adolescent pregnancies (< 20 years), incomplete maturation of the cardiovascular and endocrine systems impairs blood-pressure homeostasis. The hypothalamic–pituitary–adrenal axis and the renin–angiotensin–aldosteron system have not reached adult set-points, predisposing to exaggerated vasopressor responses. Psychosocial stressors common in this age group may further activate sympathoadrenal pathways that elevate blood pressure (Saifuddin, 2020; Arif, 2017).

At the other extreme, women older than 35 years experience progressive arteriosclerosis, declining endothelial nitric oxide bioavailability, and increased arterial stiffness. The compounding effect of subclinical metabolic disorders (insulin resistance, dyslipidaemia) commonly present in this age group substantially magnifies hypertensive risk (Mochtar, 2017; Ernawati, 2018). The predominance of chronic rather than gestational hypertension in the high-risk group is logical: older women with pre-existing vascular pathology are more likely to carry hypertension into pregnancy than to develop de-novo gestational hypertension.

These findings align with Pratiwi (2022), who found a highly significant association between maternal age and gestational hypertension in Puskesmas Babat (p = 0.000). Usalma (2023) likewise reported p = 0.000 in a hospital-based cohort in Banda Aceh. Rosy Yurianti et al. (2020) systematically synthesised evidence from 10 studies and concluded that age > 35 years is the dominant predictor of hypertension in pregnancy, reinforcing the clinical imperative of age-stratified risk assessment during antenatal care.

From a clinical perspective, midwives and obstetricians should flag both extremes of maternal age as high-priority risk groups warranting intensified blood pressure monitoring, early nutritional counselling, and targeted health education on danger signs of hypertension during the first antenatal visit.

Relationship between History of Hypertension and Hypertension Incidence

The analysis revealed that respondents with a prior history of hypertension were significantly more likely to develop chronic hypertension (60.8%) compared with those without such a history (39.2%), with an overall significant association (p = 0.035). This finding is substantiated by the pathophysiology of chronic hypertension superimposed on pregnancy. Women with established hypertension exhibit persistent activation of the renin–angiotensin–aldosteron system and endothelial dysfunction that are not corrected by the physiological cardiovascular adaptations of normal pregnancy. Consequently, these women fail to achieve the expected reduction in systemic vascular resistance during the first and second trimesters, maintaining or worsening hypertension throughout gestation (Manuaba, 2017).

Furthermore, pre-existing endothelial injury impairs placentation, reducing the invasion of trophoblasts into spiral arteries. Shallow placentation restricts uteroplacental blood flow, triggering a cascade of oxidative stress, angiogenic imbalance (reduced PlGF, elevated sFlt-1), and systemic inflammation that perpetuates and amplifies maternal hypertension. This mechanism explains why chronic hypertension confers a substantially elevated risk of superimposed preeclampsia compared with the general obstetric population (Saifuddin, 2020).

The results are consistent with Muhid Abdul (2025), who found that history of hypertension independently predicted preeclampsia at RSUD Soedjono Selong (p = 0.001; OR = 3.754), and with Rahmadini et al. (2023), who identified hypertension history as one of the strongest modifiable determinants of hypertensive disorders in pregnancy. Ratumbuysang (2014) further

demonstrated that the risk magnitude escalates with a long inter-pregnancy interval combined with hypertension history, particularly in primiparous women.

Clinically, comprehensive obstetric history-taking must include a systematic inquiry into prior blood pressure levels, antihypertensive medication use, and family history of hypertension. Women identified with a positive hypertension history should be enrolled in enhanced antenatal surveillance, including frequent blood pressure monitoring, urine dipstick analysis for proteinuria, laboratory assessment of renal and hepatic function, and consultation with an internist or maternal–fetal medicine specialist where appropriate.

Practical Implications and Study Limitations

The findings carry direct implications for midwifery practice in Kendari City. Given the high prevalence of both high-risk maternal age (53.8%) and prior hypertension history (52.3%) in this sample, healthcare facilities should institutionalise systematic risk stratification at the first antenatal visit. Community-level health education campaigns targeting women of childbearing age — particularly those with known hypertension — on the importance of blood pressure control prior to conception and during pregnancy may reduce the burden of hypertensive complications.

This study has several limitations. First, the sample was restricted to women with a gravidity ≥ 2, potentially underrepresenting the hypertension burden in primigravidae. Second, reliance on secondary data from medical records introduced the possibility of incomplete or inaccurately documented clinical information. Third, only two independent variables were analysed; the contribution of parity, body mass index, family history, sodium intake, and psychosocial stress warrants investigation in future research. Fourth, the cross-sectional design precludes causal inference. Longitudinal or cohort studies are needed to establish temporal sequences and effect estimates.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that there is a statistically significant relationship between maternal age and the incidence of hypertension in pregnant women at RSUD Kota Kendari ($p = 0.002$). Women in high-risk age groups (< 20 or > 35 years) are more likely to experience chronic hypertension than those within the reproductive safety window of 20–35 years. Additionally, there is a statistically significant relationship between history of hypertension and the incidence of hypertension in pregnant women ($p = 0.035$); women with a prior hypertension history are more prone to chronic hypertension than those without such a history.

Based on these findings, it is recommended that healthcare providers — particularly midwives — intensify health education for pregnant women with extremes of age or a documented hypertension history, emphasising danger signs of hypertension, the necessity of regular antenatal care visits, and the adoption of a heart-healthy lifestyle. Policy-makers should consider integrating systematic blood pressure risk stratification protocols into antenatal care guidelines at all levels of the health system in Kendari City. Future research

should adopt larger, multi-centre samples and include a broader set of determinants to provide a more comprehensive evidence base for preventive interventions.

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