



The Determinant Factors of Preeclampsia Incidence in Pregnant Women at Haji Hospital Makassar in 2024

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Abstract

Hypertensive disorders during pregnancy, particularly preeclampsia, are a leading cause of maternal and perinatal mortality worldwide. Preeclampsia can progress into severe complications such as eclampsia and HELLP syndrome. Factors such as age, pregnancy history, and body mass index (BMI) are known to play a role in the occurrence of this condition. This study was conducted at RSUD Haji Makassar to identify determinant factors influencing the occurrence of preeclampsia in pregnant women. This study used a descriptive-analytical approach with a retrospective design, where secondary data were obtained from medical records of patients diagnosed with preeclampsia during a specific period (year 2024). Analysis was performed on factors influencing the incidence of preeclampsia in pregnant women at RSUD Haji Makassar. Age, parity, BMI, and height significantly influenced the occurrence of preeclampsia. Older age and higher parity increased the risk of preeclampsia. Higher BMI and shorter height were also associated with higher blood pressure, which worsened the condition. However, gravida and weight did not show significant effects. Age, parity, BMI, and height are significant determinants of preeclampsia. Management and prevention of preeclampsia should consider these factors to improve maternal and fetal safety during pregnancy.

Introduction

Hypertensive disorders of pregnancy are a major cause of maternal and perinatal mortality worldwide. Preeclampsia, which can be accompanied by severe symptoms, is a pregnancy disorder characterized by the emergence of new hypertension and often accompanied by proteinuria, usually after 20 weeks of pregnancy and near delivery. This disease covers a spectrum of hypertensive disorders of pregnancy, starting with gestational hypertension that can develop into severe preeclampsia, which eventually has the potential to cause more severe conditions such as eclampsia and HELLP syndrome (Al-Khataibeh et al., 2024; Berhan, 2016; Martin & Morris, 2019; Phoswa & Khaliq, 2021). According to the American College of Obstetricians and Gynecologists, hypertensive disorders of pregnancy are one of the leading causes of maternal and perinatal mortality globally (American College of Obstetricians and Gynecologists, 2020; Sinkey et al., 2020; Khedagi & Bello, 2021). Preeclampsia is estimated to occur in 2% to 8% of pregnancies worldwide. Based on the National Guidelines for Medical Services for the Management of Pregnancy Complications in 2017, the incidence of preeclampsia in Indonesia reached 128,273 cases per year or around 5.3%. In the last two

decades, there has been no significant decrease in the incidence of preeclampsia (Kementerian Kesehatan Republik Indonesia, 2021).

Based on the 2021 South Sulawesi Provincial Health Profile, 30 maternal deaths were recorded due to hypertension in pregnancy (Dinas Kesehatan Provinsi Sulawesi Selatan, 2021). Preeclampsia is a serious medical problem with a high level of complexity, which not only affects the mother during pregnancy and childbirth, but also carries the risk of causing postpartum problems due to endothelial dysfunction in various organs, such as an increased risk of cardiovascular disease and other complications (Perkumpulan Obstetri dan Ginekologi Indonesia (POGI), 2016; Powe et al., 2011; Ramlakhan et al., 2020; Boeldt & Bird, 2016).

The factors that play a role in the occurrence of preeclampsia are very diverse and complex (Sello et al., 2020; Wang et al., 2009). Some risk factors that are known to influence the occurrence of preeclampsia include maternal age (either too young or too old), history of preeclampsia in previous pregnancies, maternal health conditions such as hypertension or diabetes, and genetic and environmental factors (Martadiansyah et al., 2019; Chang et al., 2023; Mayrink et al., 2018). In addition, socioeconomic factors, nutritional status, and psychosocial conditions also play an important role in increasing the risk of preeclampsia. Adhitya et al. (2019) Research into the determinant factors that influence the occurrence of preeclampsia is needed to identify modifiable risk factors, so that more effective prevention and management efforts can be carried out to reduce the incidence of preeclampsia and improve the safety of mothers and babies during pregnancy (Sukma Putri et al., 2020).

Therefore, it is important to understand the various factors that can contribute to the incidence of preeclampsia, especially in RSUD Haji Makassar, as an effort to reduce the incidence and improve the quality of health services for pregnant women in this area. This study aims to identify determinant factors that influence the incidence of preeclampsia in pregnant women at RSUD Haji Makassar.

Methods

This study uses a descriptive analytical approach with medical records as a data source to analyze the determinant factors of preeclampsia in pregnant women at RSUD Haji Makassar. This type of research is retrospective, where the data used is secondary data obtained from medical records of patients who have been diagnosed with preeclampsia in a certain period.

Result and Discussion

Table 1. Age of respondents

Age	Frequency	Percentage (%)
<26 Years	10	29.4
26-35 Years	16	47.1
>35 Years	8	23.5
Total	34	100.0

Based on Table 1, the majority of respondents in this study were in the age range of 26-35 years, as many as 16 people or 47.1%, which is the optimal reproductive age for pregnant women. As many as 10 respondents or 29.4% were under 26 years old, while 8 respondents or 23.5% were over 35 years old, who were at higher risk of experiencing pregnancy complications, including preeclampsia. This distribution shows that most pregnant women in this study were in a relatively safe age group for pregnancy, although there were still groups with higher potential risks.

Table 2. Gravid Pregnancy

pregnancy	Frequency	Percentage (%)
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G1	13	38.2
G2	5	14.7
G3	8	23.5
G4	3	8.8
G5	2	5.9
G6	2	5.9
G7	1	2.9
Total	34	100.0

Based on Table 2, the majority of respondents in this study were first-time pregnant women (G1) as many as 13 people or 38.2%, indicating that most of the mothers in this study had no previous pregnancy experience. Group G2 consisted of 5 people or 14.7%, while G3 included 8 people or 23.5%, indicating that about a quarter of the respondents had experienced two previous pregnancies. Meanwhile, mothers with a fourth pregnancy (G4) were 3 people or 8.8%, fifth (G5) and sixth (G6) pregnancies were 2 people or 5.9% each, and only 1 person or 2.9% had experienced seven pregnancies (G7). This distribution shows that the majority of respondents were mothers with first to third pregnancy experiences, who potentially have a higher risk of complications compared to mothers with repeated pregnancies.

Table 3. Pregnancy Parity

Parity	Frequency	Percentage (%)
P0	14	41.2
P1	7	20.6
P2	5	14.7
P3	3	8.8
P4	4	11.8
P5	1	2.9
Total	34	100.0

Based on Table 3, the majority of respondents in this study were mothers who had never given birth (P0) as many as 14 people or 41.2%, which shows that almost half of the respondents were first-time pregnant women. As many as 7 people or 20.6% were in group P1, meaning they had had one child, while 5 people or 14.7% were in group P2 with two children. Respondents with three deliveries (P3) numbered 3 people or 8.8%, while P4 numbered 4 people or 11.8%, and only 1 person or 2.9% had five children (P5). This distribution shows that most respondents were mothers with little or no experience of giving birth, who may be at higher risk of pregnancy complications, including preeclampsia.

Table 4. Characteristics of Pregnant Women

Variables	N	Minimum	Maximum	Mean	Std. Deviation
IMT	34	20.80	45.00	29.4559	6.33950
TB	34	150.00	186.00	162.7941	8.76902
BB	34	55.48	165.00	93.7700	38.41870
Pre-eclampsia	34	140.00	190.00	154.7059	14.65467

Based on Table 4, the respondents' body mass index (BMI) ranged from 20.80 to 45.00 with an average of 29.46 and a standard deviation of 6.34, indicating variations in the nutritional status of pregnant women. The respondents' height (TB) ranged from 150 cm to 186 cm, with an average of 162.79 cm and a standard deviation of 8.77 cm, indicating quite diverse differences in height among respondents. The respondents' weight (BB) had a minimum value of 55.48 kg and a maximum of 165.00 kg, with an average of 93.77 kg and a standard deviation of 38.42, reflecting a fairly wide distribution of body weight. Meanwhile, systolic blood pressure as an indicator of preeclampsia ranged from 140 mmHg to 190 mmHg, with an

average of 154.71 mmHg and a standard deviation of 14.65, indicating that most respondents were in the category of hypertension during pregnancy.

Table 5. ANOVA Test of Determinant Factors of Preeclampsia

Variables	B	Std. Error	t	Sig.
(Constant)	144.943	46.321	10	29.4
Usia	-5.242	3.339	3.129	.004
Gravida	-10.065	4.087	-1.570	.128
Paritas	11.702	4.571	-2.462	.020
IMT	1.315	.335	2.560	.016
TB	-.107	.293	3.921	.001
BB	.091	.074	-.365	.718

Based on Table 5, it is known that several variables have a significant effect on the incidence of preeclampsia. The age variable has a coefficient $B = -5.242$ with a p value = 0.004, which indicates that the older the mother, the blood pressure tends to decrease significantly. The parity variable also has a significant effect on preeclampsia with $B = 11.702$ and $p = 0.020$, indicating that the higher the number of deliveries, the blood pressure tends to increase. In addition, BMI has a positive effect on preeclampsia ($B = 1.315$, $p = 0.016$), which means that the higher the BMI, the more likely the mother is to experience increased blood pressure. The height variable (TB) also has a significant effect on preeclampsia ($B = -0.107$, $p = 0.001$), with a negative direction indicating that mothers with lower heights tend to have higher blood pressure. In contrast, the variables gravida (number of pregnancies) and body weight (BW) did not show a significant effect on the incidence of preeclampsia, with p values = 0.128 and $p = 0.718$ respectively. Overall, age, parity, BMI, and height are significant determinants of the incidence of preeclampsia in pregnant women in this study.

Preeclampsia is one of the serious pregnancy complications, which can affect the health of the mother and fetus. Grum et al. (2017) Based on the results of this study, there are several significant determinants of the incidence of preeclampsia in pregnant women, including age, parity, BMI, and height. This study shows that the majority of pregnant women in this study were in the age range of 26-35 years, which is the optimal reproductive age group. However, this study also shows that older pregnant women, namely over 35 years, are at higher risk of experiencing pregnancy complications, including preeclampsia. This is in line with the findings reported by several previous researchers showing that older pregnant women have an increased risk of developing preeclampsia due to physiological changes that occur in their bodies during pregnancy (Irfa, 2021).

In terms of gravida, the majority of respondents in this study were first-time pregnant women (G1), which indicates that most mothers in this study had no previous pregnancy experience. The first pregnancy does have a higher risk factor for preeclampsia, because the mother's body is not yet accustomed to the physiological changes that occur during pregnancy. A study also confirmed that the first pregnancy is a major risk factor for preeclampsia, because in the first pregnancy, the mother's immune system is not yet accustomed to responding to the changes needed to maintain fetal survival without increasing the risk of complications (Yuniarti et al., 2018).

In addition, the parity variable in this study showed that mothers with higher parity (more than one delivery) were more likely to experience preeclampsia. For example, the study found that women with more than one delivery tended to have a higher risk of preeclampsia, which may be due to more intense vascular system disorders in mothers with high parity. This is in accordance with the results of this study which showed that the higher the number of deliveries, the greater the blood pressure that can increase, at risk of causing preeclampsia (Situmorang et al., 2016).

In addition to age and parity factors, body mass index (BMI) has also been shown to have a significant influence on the incidence of preeclampsia. This study shows that pregnant women with higher BMI tend to have a greater risk of preeclampsia. Studies show that obesity (BMI over 30) is associated with increased vascular resistance and impaired endothelial function, which can lead to increased blood pressure and trigger preeclampsia. Obesity increases leptin levels and pro-inflammatory factors in the body, which play a role in the development of preeclampsia (Peres et al., 2018).

In terms of height, the study found that mothers with shorter heights tended to have higher blood pressure, which is associated with an increased risk of preeclampsia. Research suggests that women with shorter heights may have smaller blood vessel diameters, which increases vascular resistance and blood pressure, thereby increasing the risk of developing preeclampsia (Al-Tairi et al., 2017).

The results of this study also revealed that the variable of body weight (BW) did not have a significant effect on the incidence of preeclampsia. Although there is a relationship between body weight and maternal health, previous studies have shown that obesity is more influential than overall body weight. Research shows that high BW does not always affect the incidence of preeclampsia if the mother's BMI is in the normal category, which suggests that other factors besides BW such as body fat distribution may play a role in the development of preeclampsia (Eva, 2018).

This study highlights the importance of attention to risk factors that have been shown to significantly influence the incidence of preeclampsia, especially age, BMI, and height. In line with this, it is important for medical personnel to carry out early detection and appropriate management of pregnant women who have these risk factors. Preventive measures such as regular blood pressure monitoring, healthy weight loss, and a balanced diet can help reduce the risk of preeclampsia (Sharami et al., 2017).

However, the gravida factor that did not show a significant effect in this study could potentially be caused by other factors that play a greater role in each individual, such as certain medical conditions or medications received during pregnancy. Further research is needed to understand the interaction between these variables in a broader context, including genetic and environmental factors that may influence the incidence of preeclampsia (Basyiar et al., 2021).

In addition, this study used secondary data obtained from medical records, which allows for limitations in data accuracy and completeness. Along with that, the researcher also suggests that research be conducted with a more complex design and using a more comprehensive method to dig deeper into the factors that can influence the incidence of preeclampsia, both individually and together.

Conclusion

Based on the results of this study, factors such as age, parity, body mass index (BMI), and height have a significant influence on the incidence of preeclampsia in pregnant women. Pregnant women aged 26-35 years have a lower risk of preeclampsia, while age over 35 years increases the risk. The first pregnancy (G1) also increases the likelihood of preeclampsia, because the mother's body is not yet accustomed to the physiological changes that occur during pregnancy. Higher parity, higher BMI, and lower height have been shown to contribute to an increased risk of preeclampsia, because these factors affect vascular resistance and blood pressure. Although weight did not show a significant effect, BMI played a greater role in increasing the risk. This study emphasizes the importance of regular blood pressure monitoring and management of risk factors such as BMI and height to prevent preeclampsia, and encourages further research to understand other factors that play a role in the incidence of preeclampsia.

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