



## ANALYSIS OF FACTORS IN PREGNANT WOMEN ON THE INCIDENCE OF PREECLAMPSIA

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### ABSTRACT

Preeclampsia in Indonesia is still the largest part of the problem that contributes to maternal and fetal deaths worldwide recorded in Indonesia as many as 1,077 cases. Objective: This study aims to see what factors have a chance of increasing the incidence of preeclampsia. Method: The type of research uses quantitative analytical research with a cross sectional design. The study was conducted in the city of Palembang on 86 samples using secondary data which was then analyzed to determine the relationship between factors and the incidence of preeclampsia. the research implementation is February-April 2024. Results: he results of the statistical test of logistic regression of bivariate results showed that it was significantly related to age (0.000), education level (0.042), gravida status (0.000), hemoglobin (0.002), nutritional status (0.016), history of hypertension (0.000), history of diabetes mellitus (DM) (0.008), calcium consumption (0.003). Conclusions: Based on the results of the multivariate test, there is a variable that is most closely related to the incidence of preeclampsia is age (0.000). Advice according to the results of the research midwife can control maternal factors and screen when patients are planning a pregnancy.

Keywords: age; calcium; diabetic; gravida; hyoertension; preeclampsia

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### INTRODUCTION

Pregnancy is physiological as a result of the union of the ovum and sperm, which then occurs in the nidation process and continues to develop until the gestational age is full. However, the nidation process can cause problems and disorders in the blood vessels which will eventually affect the process of transferring nutrients and oxygen to the fetus, this symptom will usually appear after >22 weeks of pregnancy where the results of the blood pressure check are in the hypertension category, it can also be followed by other symptoms such as the presence of protein in the urine. This sign in pregnancy is called preeclampsia (Guyton, A.C., dan Hall, 2011). Maternal and infant deaths, the biggest cause of which is preeclampsia. Endometrial dysfunction in placental defects is still suspected to be the cause of preeclampsia, this dysfunction affects organ systems. The affected organ system causes high blood pressure which is a symptom of preeclampsia (Logan et al., 2020). Pregnant women are required to control considering that the impact is very serious and can even persist until after childbirth (Mustikasari Kurnia Pratama & Nuryani, 2019).

The number of cases of preeclampsia has become a polemic and there are still many researchers who are trying to find factors that can trigger or even aggravate the mother's condition. Low social, economic and educational status in developing countries is often

associated with how pregnant women can understand health. Therefore, factors from within the mother such as age, how the previous mother's history when experiencing pregnancy, childbirth, and previous disease history of course cannot be ignored (Situmorang et al., 2016). Especially midwives must encourage every pregnant woman to have a routine check-up. Routine check-ups recommended by (Kementerian Kesehatan RI, 2020) each pregnant woman makes visits during pregnancy at least six times or more in accordance with the needs of the mother during pregnancy (Fatmawati et al., 2016). The impact of hypertension on pregnant women does not only occur in developing countries but also in developed countries, World Health Organization (WHO) data as much as 16% of deaths in developed countries (Das et al., 2019). Four million pregnant women with preeclampsia per year, 50,000–70,000 deaths were recorded (Fatmawati et al., 2016).

The Indonesian Ministry of Health in 2021 reported 1,077 cases out of 7,389 pregnant women experiencing preeclampsia. Based on this data, preeclampsia is still part of the problem in Indonesia, so solutions must continue to be sought (Kemenkes RI, 2021). Every year the incidence of preeclampsia continues to soar. The health office said that maternal and infant deaths caused by preeclampsia amounted to 445 cases (Dinas Kesehatan Provinsi Sumatera Selatan, 2019). Risk factors for preeclampsia in addition to age, mothers whose weight is based on BMI before pregnancy are classified as obese, pregnant women who have experienced preeclampsia in their pregnancy, pregnant women who have a history of diabetes (Deshinta Utari & Hardy Hasibuan, 2022) (Situmorang et al., 2016) are factors that have a chance for pregnant women to experience preeclampsia. WHO in 2019 at the Executive Guideline Steering Group (GSG) recommended that every woman of childbearing age who is planning a pregnancy to consume calcium before planning a pregnancy and early pregnancy as a prevention (World Health Organization, 2021). The purpose of this study is to find out the analysis of risk factors for preeclampsia in pregnant women.

## **METHOD**

The research design used in this study is an analytical survey with a cross sectional approach. This research was carried out in January-April 2024. The sample in this study totaled 86 using secondary data, and according to the following criteria, Inclusion criteria: single pregnancy in the second and third trimesters and willing to participate in this study. This analysis was carried out to determine the relationship between each independent variable and the dependent variable. Bivariate analysis uses the Chi-Square statistical test with a  $p$  value of  $< 0.05$ . This study was also carried out multivariate analysis used to see the most dominant factors using logistic regression statistical tests.

## **RESULTS**

Based on table 1, the majority of respondents are in the healthy/reproductive age range with a percentage of 54.7%, at the level of education strata most are at a low level with a percentage of 72.1%, the pregnancy status of most pregnant women is primigravida with a percentage of 61.6%, in the respondents pregnant women do not suffer from preeclampsia with a percentage of 51.2%, and the majority of pregnant women are in normal conditions with a percentage of 79.1%, Most of the respondents had an abnormal BMI with a percentage of 54.7%, Most of the respondents had a history of hypertension (60.5%), most of the respondents did not have a history of DM 65.1%, the respondents also had enough calcium consumption with a percentage

Table 1.  
Respondent characteristics (n= 86)

Characteristic	f (%)	f (%)
Status Gravida		
Primigravida	53 (61.6)	86 (100)
Multigravida	33 (38.4)	
Age Risk	39 (45.3)	86 (100)
No risk	47 (54.7)	
Education Level		
Low	62 (72.1)	86 (100)
High	24 (27.9)	
Nutritional Status		86 (100)
Abnormal	47 (54.7)	
Usual	39 (45.3)	
Calcium History		
Less	42 (48.8)	86 (100)
Enough	44 (51.2)	
Hemoglobin		
Anemia	18 (20.9)	86 (100)
No Anemia	68 (79.1)	
DM History		
Yes	30 (34.9)	86 (100)
Not	55 (65.1)	
Preeclampsia		
Yes	42 (48.8)	86 (100)
Not	44 (51.2)	

Table 2.  
Hypothesis test analysis (n=86)

Factors	Preeclampsia		P
	Yes	Not	
Status Gravida			
Primigravida	36	17	0.000
Multigravida	6	27	
Age Risk	33	6	0.000
No risk	9	38	
Education Level			
Low	35	27	0.042
Tall	7	17	
Nutritional Status			
Abnormal	29	18	0.016
Usual	13	26	
Calcium History			
Less	28	14	0.003
Enough	14	30	
Hemoglobin			
Anemia	15	3	0.002
No Anemia	27	41	
History of Hypertension			
Yes	36	16	0.000
Not	6	28	
DM History			
Yes	21	9	0.008
Not	21	35	

Table 2 The results of the analysis of respondents who were at risk age were related to the incidence of preeclampsia with a value of p (0.000), respondents with a low level of education were also related to the incidence of preeclampsia with a value of p (0.042), mothers who were pregnant for the first time or prime mothers were more at risk of preeclampsia with a value of p (0.000), hemoglobin status was also related to the incidence of preeclampsia with a

value of p (0.002), Pregnant women who have abnormal or excessive nutritional status are also more at risk of preeclampsia with a p value (0.016), pregnant women who have a history of hypertension with a p value (0.000), pregnant women with DM history status are also at risk with a p value (0.008), pregnant women who do not consume enough calcium are also at risk of preeclampsia (0.003).

Variables with a p value of less than 0.25 were followed by logistic regression analysis. Age, education level, pregnancy status, hemoglobin, nutritional status, history of hypertension, diabetes mellitus, and calcium levels are all these variables. Based on table 3, the variable that is most closely related to preeclampsia is age which has a value of p = 0.000. The mother's age, with the highest OR of 16,515, showed that age had a 16,515 times greater risk of preeclampsia compared to all other variables.

Table 3.  
Logistic Regression Analysis

Variabel	B	S.E.	Wald	df	Sig.	Exp(B) OR	95% EXP(B)		C.I.for Upper
							Lower	Upper	
Age	2.804	.797	12.376	1	.000	16.515	3.462	78.777	
Education Level	.429	.823	.272	1	.602	1.536	.306	7.704	
Gravida	2.467	.877	7.919	1	.005	11.785	2.114	65.692	
Hemoglobin	2.033	1.058	3.691	1	.055	7.640	.960	60.812	
Nutritional Status	- 1.470	.964	2.324	1	.127	.230	.035	1.522	
History of Hypertension	1.145	1.064	1.159	1	.282	3.143	.391	25.294	
DM History	-.965	.953	1.026	1	.311	.381	.059	2.465	
Calcium History	1.154	1.059	1.187	1	.276	3.171	.398	25.281	

## DISCUSSION

Preeclampsia is one of the most dangerous pregnancy diseases that can cause malformations in the fetus or death of the mother and fetus. Although the cause of preeclampsia is not yet known for sure, there are many risk factors that contribute to this condition. A risk factor that is often associated with preeclampsia is age, especially those that are too old or young. Patients with excess BMI have the opportunity to increase risk factors, especially in obese BMI because in the body that has excess fat levels will interfere with blood flow to the heart. In addition, primi mothers or who have never experienced a previous pregnancy are more likely to have preeclampsia than mothers who have experienced pregnancy (Berriandi Arwan & Roza Sriyanti, 2020). A study (Muhammad Alamsyah Aziz et al., 2022) found that pregnant women at an older age are more likely to experience preeclampsia. A study said that genetic factors and maternal age contribute to the development of preeclampsia (Ola & Suliburska, 2023). A study (Cicik Opitasari & Lelly Andayasari, 2014) found that 78% of primipara women were more likely to experience preeclampsia. In addition, there is a correlation between the likelihood of experiencing preeclampsia and low levels of education. Studies (Linda A. Fondjo et al., 2019) found that the knowledge of pregnant women is still relatively low with a low level of education. According to Yushida's research, pregnant women with more or less knowledge are more at risk of developing preeclampsia than pregnant women who have sufficient knowledge (Yushida & Zahara, 2020). As a result, mothers don't know much about how to have a healthy and optimal pregnancy, and health workers must help overcome the low level of education of pregnant women by teaching mothers what they should know and understand.

A study (Nasiri M et al., 2015) (Gagah B. A. Nugraha et al., 2021) reported that hemoglobin levels were an additional predisposing factor; which is part of the midwifery service standards, and the sooner the Hb level is known, it can make it easier for midwives to identify preeclampsia status. A study (Motedayen M et al., 2019) (Dorah Mrema et al., 2018) reported that nutrition before and during pregnancy is very important; Midwives must monitor the nutritional development of the mother and fetus, especially in obese mothers. In low- and high-income countries, there is a significant correlation between obesity and preeclampsia. Research (Diniyati et al., 2021) (Wagata et al., 2020) states that hypertension is more likely to occur in overweight mothers because they store fat, which makes the heart work extra to pump blood. There is a greater possibility that pregnant women with a history of hypertension will recur in the next pregnancy (Sukmawati et al., 2018). Yushida's research also reported that mothers who have a history of hypertension have a 2.50 times higher risk of developing preeclampsia (Yushida & Zahara, 2020). Studies (Taniya S. Nagpal et al., 2021) reported a history of hypertension, diabetes, and other cardiovascular diseases associated with a greater likelihood that pregnant women would develop preeclampsia. Preeclampsia is associated with cardiovascular diseases in its offspring including hypertension and changes in vascular function (Fox et al., 2019). This history should be considered from the first trimester of pregnancy because this woman must be treated appropriately immediately.

A study shows that calcium has a role where its deficiency can be at risk of developing preeclampsia (Ohseto H et al., 2023). The rules for calcium consumption can be started before pregnancy and or during pregnancy. Calcium supplements help reduce the risk of preeclampsia. Women with low calcium intake can prevent preeclampsia with low doses of less than 1 gram daily and high doses of more than 1 gram daily (Mai-Lei Woo Kinshell et al., 2022). Researchers assume that risk factors in the mother can increase the likelihood of preeclampsia because the process starts early in pregnancy, even when implantation or invasion of the placenta occurs. Based on the theory above, age, gravida status, and history of the mother's disease are very important to consider when planning a pregnancy.

## **CONCLUSION**

The characteristics of the majority of respondents were of reproductive age with a percentage of 54.7%. The results of the age logistic regression test, with a p value (0.000), showed that age was the most dominant factor related to the incidence of preeclampsia.

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