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ANALYSIS OF THE RELATIONSHIP BETWEEN AGE, PARITY, OBESITY, AND PREECLAMPSIA

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ABSTRACT

Preeclampsia ranks among the major contributors to maternal mortality, together with bleeding and infection. This condition is characterized by hypertension and proteinuria that occurs after 20 weeks of gestation, and can cause serious complications if not treated early. This study aims to investigate the association between maternal age, parity, and obesity with the incidence of preeclampsia among pregnant women. The research method used was quantitative with a cross-sectional approach, using secondary data from medical records and analyzed univariately and bivariately using the chi-square test. The population in this study consists of all pregnant women who were recorded in the medical records or identified within the specific study period (2022–2024). Based on the context provided in the introduction, the population specifically refers to pregnant women monitored for preeclampsia risk factors (age, parity, and obesity).The total sample size used in this study is 57 pregnant women. The study utilizes secondary data derived from medical records between 2022 and 2024.The results showed that of the 19 pregnant women who experienced preeclampsia, 73.70% were in the risk age category (<20 years or >35 years), and statistical tests showed a notable association was found between age and the incidence of preeclampsia (p = 0.024; OR = 3.850). Meanwhile, there was no There is no significant relationship between parity (p = 0.851) and obesity (p = 0.255) in relation to the incidence of preeclampsia. These findings suggest that maternal age is an important risk factor that needs to be considered in efforts to prevent preeclampsia. Therefore, routine pregnancy monitoring and education about the risks of pregnancy at extreme ages are highly recommended to reduce maternal morbidity and mortality.

Keywords: age; parity; preeclampsia; pregnant women; obesity

INTRODUCTION

Preeclampsia is a major contributor to maternal mortality, alongside hemorrhage and infection. The precise etiology of this condition remains unknown and is often referred to as a disease of theories. Many risk factors contribute, and most deaths from pregnancy complications occur in developing countries, including Indonesia, which still faces high maternal and infant mortality rates (Dasarie et al., 2023). Many things can increase the risk of preeclampsia during pregnancy. Internal factors include maternal age, obesity, number of previous children, spacing between pregnancies, heredity, history of preeclampsia, stress, anxiety, and high blood pressure. While external factors include exposure to cigarette smoke, education level, antenatal care, and maternal nutritional intake during pregnancy (Amalina et al., 2022). Preeclampsia is a pregnancy-related disorder that occurs after 20 weeks of gestation, characterized by hypertension and proteinuria, and affects approximately 5% of pregnancies. Its etiology involves placental abnormalities and endothelial dysfunction, which contribute to organ damage. If not properly managed, this condition may progress to eclampsia, posing serious risks to both maternal and fetal health (Dumais et al., 2016).

Proper handling and close monitoring of the condition of the pregnant mother and fetus are very important to prevent preeclampsia from getting worse and endangering life. Many pregnant women come to the hospital when their condition is already severe, such as experiencing severe

preeclampsia, HELLP syndrome (which is characterized by red blood cell damage, impaired liver function, and decreased platelet count), or even eclampsia (seizures due to preeclampsia). At this stage, the results of treatment are often unsatisfactory. Therefore, preeclampsia should be prevented and treated early so that the results are better (Aziz et al., 2016). Previous studies have shown that preeclampsia remains one of the leading causes of maternal and neonatal morbidity and mortality, especially in developing countries. Medical record data at the Sepatan Health Center, Tangerang Regency, shows that cases of preeclampsia continue to increase from year to year. In 2019, out of 735 pregnant women examined, 93 cases of preeclampsia (12.65%) were recorded, increasing to 116 cases (13.25%) in 2020. Meanwhile, in January 2021, 35 cases of preeclampsia were found in pregnant women and 81 cases in women in labor from a total of 875 deliveries. This high prevalence reflects that preeclampsia is still a serious health problem, and requires strict treatment and monitoring to prevent more severe complications (Aulya et al., 2021).

Preeclampsia and eclampsia are influenced by various risk factors, including parity, age over 35 years, and obesity, which increase their susceptibility in pregnant women. Obese pregnant women, for example, have a 4,060 times higher risk of developing preeclampsia than those who are not obese, because this condition is associated with oxidative stress, inflammation, and changes in vascular function. Although these factors have been widely studied, there has been no study analyzing the relationship between age, parity, and obesity with preeclampsia in a specific population. This study aims to analyze the relationship between these three factors and the incidence of preeclampsia in pregnant women (Mariati et al., 2022). The primary objective of this study is to investigate the correlation between maternal age, parity, and obesity with the incidence of preeclampsia among pregnant women. Given that preeclampsia remains a leading cause of maternal and neonatal mortality

METHOD

This study uses a quantitative method with an analytical survey approach and a cross-sectional research design. Data collection techniques use secondary data and data analysis is carried out univariately and bivariately using the chi-square statistical test. (Arnani et al., 2022). This study aims to understand the meaning behind the relationship between age, parity, and obesity to preeclampsia as a social phenomenon in the context of pregnancy. Triangulation was employed as the technique for collecting data. Data were analyzed inductively, where patterns, themes, and relationships between variables were developed from the findings. Researchers attempted to explore how and why age, number of pregnancies, and obesity status contribute to the risk of preeclampsia. By prioritizing rich contextual descriptions and the meaning contained in each event, this study is expected to provide theoretical and practical contributions in the field of maternal health. (Wijaya, 2020).

This literature review was conducted to examine the relationship between age, parity, and obesity to the incidence of preeclampsia based on relevant national and international literature sources. The search protocol followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) principle to ensure transparency and reproducibility of the review process. The review questions were formulated based on the PECOT framework, namely: P (pregnant women), E (age/parity/obesity), C (do not have these risk factors), O (incidence of preeclampsia), and T (pregnancy period). Article searches were conducted through databases such as PubMed, Google Scholar and OALib Journal. The data collection process utilized a triangulation technique, focusing on key variables such as the relationship of age to preeclampsia, the relationship of parity to preeclampsia, and the association between obesity and preeclampsia.

This study utilizes a quantitative research method with a case control approach. This research performs primary statistical analysis on a dataset of 57 respondents (19 cases and 38 controls). The study employs bivariate analysis using the Chi-Square test to determine the relationship between maternal age, parity, and obesity with the incidence of preeclampsia. While literature is used to support the discussion, the core findings are derived from the statistical calculation of Odds Ratios (OR) and p-values based on secondary medical record data from 2022–2024.

RESULT AND DISCUSSION

Relationship between Age Range and Risk of Preeclampsia

Table 1.

Frequency Distribution of Preeclampsia Incidents Based on Age

Age	Preeclampsia Occurrence				Total		OR
	Case		Control				
	f	%	f	%	f	%	
No Risk	5	26,30	22	57,90	27	47,40	3,850
at risk	14	73, 70	16	42,10	30	52,60	
Total	19	100	38	100	57	100	
Test Chi-Square p = 0, 024 (p < α = 0,05)							

Of the 19 pregnant women who experienced preeclampsia, 14 people (73.70%) were in the risk age category. Meanwhile, of the 38 pregnant women who did not experience preeclampsia, there were 16 people (42.10%) who were also in the risk age category. The results of the analysis using the chi-square test with a significance level of $\alpha = 0.05$ showed a p-value of 0.024. This means that there is a significant relationship between the age of pregnant women and the incidence of preeclampsia. The Odds Ratio (OR) value of 3.850 with a confidence range (CI) of 1.151 - 12.875 shows that pregnant women with a risk age (<20 years and >35 years) are 3.850 times more likely to experience preeclampsia compared to pregnant women of non-risk age (20-35 years) (Rahmatika et al., 2025).

Hypertension in pregnancy, especially that which develops into preeclampsia or eclampsia, is one of the most common pregnancy disorders that causes maternal death. Globally, hypertension contributes to around 10–22% of maternal deaths, and in developing countries the figure can reach up to 99%. In Indonesia, based on the 2007 Riskesdas, the prevalence of hypertension in pregnant women reached 12.7%. The 2019 National Health Working Meeting (Rakerkesnas) also stated that preeclampsia/eclampsia is one of the five main causes of maternal death, along with severe bleeding, infection, prolonged/obstructed labor, and unsafe abortion. Hypertension in pregnancy is divided into four types, namely gestational hypertension, chronic hypertension, preeclampsia/eclampsia, and preeclampsia with chronic hypertension. This condition not only endangers the mother, but also the fetus because it can cause disruption of oxygen flow to the placenta, fetal growth retardation (IUGR), premature birth, placental abruption, stillbirth, and neonatal death. In addition, preeclampsia can also cause complications such as asphyxia and prematurity in newborns. Research shows that around 70% of women who experience hypertension during pregnancy give birth prematurely. One factor that has been shown to be associated with the incidence of preeclampsia is the age of the pregnant mother. Mothers who are at risk, namely under 20 years or over 35 years, are 3.85 times more likely to experience preeclampsia than mothers who are not at risk (20–35 years), so that maternal age is an important factor that needs to be considered in efforts to prevent preeclampsia (Safitri & Djaiman, 2021).

Marriage under the age of 20 or early marriage often occurs due to lack of knowledge from parents who encourage their children to marry young, and because children do not yet understand the negative impacts of early marriage. This condition is also often experienced by teenagers who drop out of school and do not have jobs or supporting activities. Early marriage

can carry various risks, especially in terms of health. Young mothers generally have physical conditions that are not ready for pregnancy, so they are more susceptible to miscarriage, low birth weight babies, bleeding, and malnutrition. In addition, the mother's age being too young has also been shown to be related to the risk of preeclampsia. Pregnant women under the age of 20 are included in the risky age category, which according to research has a greater chance of experiencing preeclampsia compared to mothers who are pregnant at the ideal age (20-35 years). This shows that early marriage not only has social impacts, but also increases the risk of pregnancy complications such as preeclampsia (Isnaini & Sari, 2019)

The Relationship between Parity and the Risk of Preeclampsia

Table 2.
Frequency Distribution of Preeclampsia Incidents Based on Parity

Parity	Preeclampsia Occurrence				Total	
	Case		Control			
	f	%	f	%	f	%
Safe	10	52,60	21	55,30	31	54,40
Not safe	9	47,40	17	44,70	26	45,60
Total	19	100	38	100	57	100
	Test Chi-Square p = 0, 851 (p > α = 0,05)					

Of the 19 pregnant women who experienced preeclampsia, there were 9 people (47.40%) who had unsafe parity. Meanwhile, of the 38 pregnant women who did not experience preeclampsia, there were 17 people (44.70%) with unsafe parity. Using the Chi-square test with a significance threshold of $\alpha = 0.05$, the analysis produced a p-value of 0.851, indicating no statistically significant association. Because the p-value is greater than α, it can be concluded that there is no significant relationship between parity and the incidence of preeclampsia (Rahmatika et al., 2025).

Parity is the number of births a woman has ever had with a viable baby. Parity is divided into three, namely primigravida (a woman who is pregnant for the first time), multigravida (a woman who has been pregnant several times), and grandemultipara (a woman who has been pregnant or given birth 4 times or more). To prevent preeclampsia, pregnant women should routinely undergo regular and comprehensive pregnancy check-ups (antenatal care). It is also important to recognize the symptoms of preeclampsia early so that it can be treated immediately, so that the condition does not get worse. If the mother has risk factors, she must be more aware of the possibility of preeclampsia (Wilujeng, 2018).

Preeclampsia is a condition characterized by high blood pressure that appears after 20 weeks of pregnancy and is accompanied by the presence of protein in the urine (proteinuria). In cases of preeclampsia, placental development is not perfect due to trophoblast cell invasion that only reaches part of the blood vessels in the myometrium layer. As a result, there is a disruption in blood flow to the placenta which causes the supply of oxygen and nutrients to the fetus to be suboptimal. This can cause fetal growth retardation or Intrauterine Growth Restriction (IUGR), which is one of the causes of low birth weight (LBW). Pregnant women with preeclampsia require strict supervision and treatment to prevent serious risks to both the mother and the fetus during pregnancy and childbirth. Preeclampsia may present with symptoms such as persistent severe headaches that do not subside with rest. It is considered one of the most serious complications of pregnancy and significantly contributes to maternal mortality. The risk of preeclampsia also increases in mothers with risk ages, such as under 20 years or over 35 years, so gestational age is an important factor that needs to be considered in the prevention and treatment of preeclampsia (Haslan & Trisutrisno, 2022).

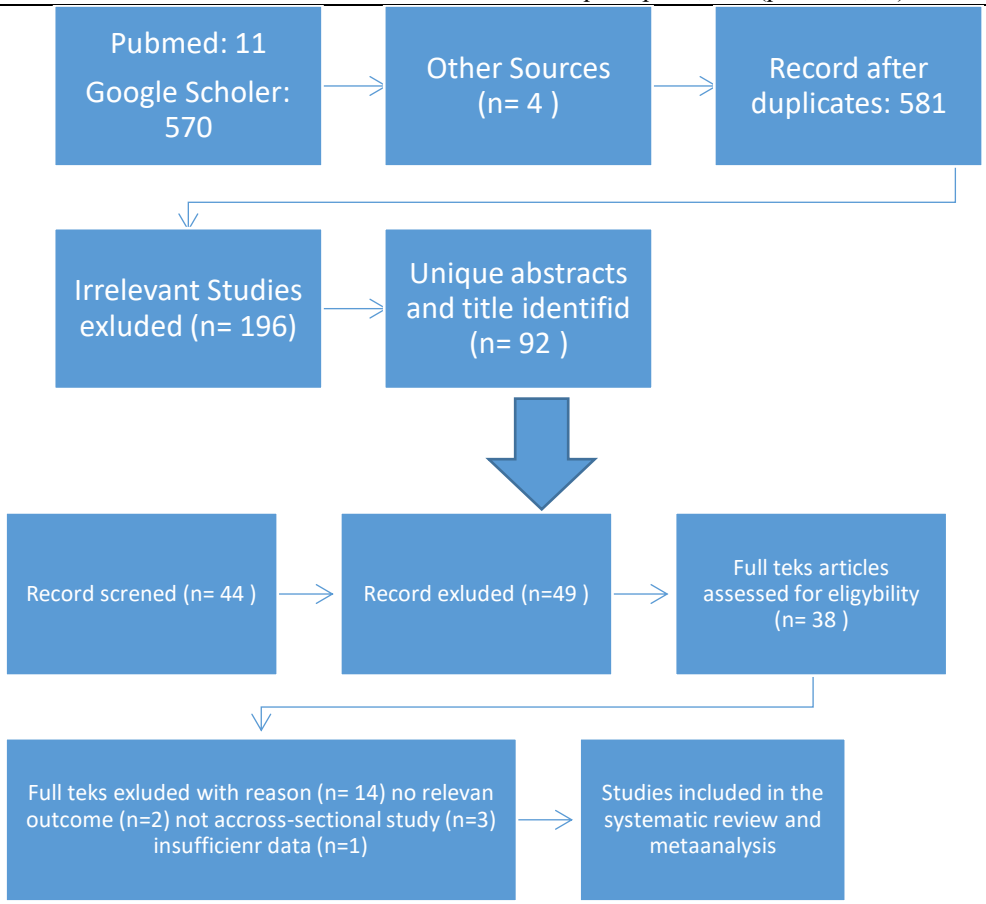
Although this study did not find a significant relationship between parity and the incidence of preeclampsia, parity remains a factor that needs to be considered in antenatal care. Several literatures state that pregnant women who are pregnant for the first time or who have given birth frequently (grandemultipara) have a higher risk of various pregnancy complications, including preeclampsia. Therefore, regular and comprehensive pregnancy check-ups are very important for early detection of the possibility of preeclampsia, especially in the group of mothers with extreme parity.

The Relationship between Obesity and the Risk of Preeclampsia

Table 3.

Frequency Distribution of Preeclampsia Incidents Based on Obesity

Weight Gain	Preeclampsia Occurrence				Total	
	Case		Control			
	f	%	f	%	f	%
Normal	9	47,40	24	63,20	33	57,90
Abnormal	10	52,60	14	36,80	24	42,10
Total	19	100	38	100	57	100
Test Chi-Square p = 0, 255 (p > α = 0,05)						



Of the 19 pregnant women who experienced preeclampsia, 10 people (52.60%) experienced abnormal weight gain. Meanwhile, of the 38 pregnant women who did not experience preeclampsia, there were 14 people (36.80%) with abnormal weight gain. At a significance level of α = 0.05, the Chi-square test yielded a p-value of 0.255, indicating no statistically significant association. Because the p-value is greater than α, it can be concluded that there is no significant relationship between weight gain in pregnant women and the incidence of preeclampsia (Rahmatika et al., 2025).

Factors that can increase the risk of preeclampsia include first pregnancy (primigravida), previous history of preeclampsia, family history of hypertension, multiple pregnancies, certain medical conditions, presence of protein in the urine (proteinuria), maternal age over 40 years, obesity, and parity. Obesity itself is a condition of excess fat accumulation in the body that causes body weight to exceed normal limits. Obesity has been widely associated with the risk of preeclampsia through various mechanisms. Every 5–7 kg weight gain can increase the risk of preeclampsia by two-fold, and this risk also increases with increasing Body Mass Index (BMI) (Dewie et al., 2020).

Obesity during pregnancy can occur in women of all ages, but is more common in pregnant women over 35 years old. The recommended weight gain during pregnancy is approximately 12–16 kilograms. Exceeding this range may place the pregnant woman at risk for obesity. Obesity in pregnant women can increase the risk of various diseases, such as gestational diabetes, high blood pressure in pregnancy, and preeclampsia. Obesity can also cause various complications, both in the mother and the fetus. In early pregnancy, obesity can cause miscarriage and birth defects such as nerve and heart defects. In late pregnancy, the risk of hypertension, preeclampsia, premature birth, and stillbirth also increases. In addition, obese mothers are at greater risk of undergoing cesarean delivery and experiencing complications during surgery. To prevent this, pregnant women need to maintain a healthy diet and do regular physical activity to keep their weight under control and prevent high blood pressure and high cholesterol. (Supatmi et al., 2024).

CONCLUSION

Based on the study findings, it can be concluded that there is a significant association between maternal age and the incidence of preeclampsia. Pregnant women of high-risk age groups (<20 years or >35 years) are 3.85 times more likely to develop preeclampsia compared to those in the non-risk age group (20–35 years). Conversely, no significant relationship was observed between parity or excessive weight gain (obesity) and the occurrence of preeclampsia. Nevertheless, extreme parity and obesity remain important factors to monitor, as they may increase the overall risk of pregnancy complications. Therefore, preventive efforts should prioritize pregnant women in high-risk age categories and be reinforced through regular and comprehensive antenatal care. Health workers consisting of midwives, nurses and doctors to increase continuing education for women of childbearing age so that they can control the factors that trigger maternal mortality.

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