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Prevalence and Associated Factors of Severe Preeclampsia Among Pregnant Women

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ABSTRACT

In Indonesia, the incidence of preeclampsia is around 5.3% or 128,273 per year. In addition, preeclampsia is still accounts for 26.9% of maternal deaths in Indonesia. Purpose : This research attempts to analyze factors associated with the prevalence of severe preeclampsia in pregnant women at Dr. M. Djamil Padang Hospital. Methods : This study took a cross-sectional approach and employed an analytical design. The sample consisted of 200 pregnant women taken using the systematic random sampling method from a total population of 705 patients. In July, data gathering was completed 2024 from medical records and examined using the chi-square test both univariately and bivariately. Result : The results showed that age (p = 0.006), parity (p = 0.001), history of preeclampsia (p = 0.005), and pregnancy spacing (p = 0.001) were significantly associated with the incidence of severe preeclampsia. However, obesity (p=0.923) showed no significant relationship. Implications : These findings imply the need for healthcare providers to prioritize early education and screening for pregnant women at risk due to age, parity, history of preeclampsia, and pregnancy spacing, in order to reduce the prevalence of severe preeclampsia and prevent further maternal and fetal complications. Conclusions: It is recommended that health workers increase prevention efforts through education and counseling on the risk of preeclampsia in pregnant women.

***Keywords**: Severe Preeclampsia, Age, Parity, Pregnancy Spacing, Obesity*

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INTRODUCTION

The maternal mortality rate is quite high, according to the WHO Maternal Mortality Rate (MMR). In 2023, almost 260,000 women would lose their lives during and after pregnancy and childbirth. By 2023, around 92% of all maternal fatalities will take place in low- and lower-middle-income nations(World Health Organization (WHO), 2025). In ASEAN, there are 235 maternal deaths for every One hundred thousand live births (Kementerian Kesehatan Republik Indonesia, 2022). According to the Indonesian Demographic and Health Survey (SDKI), maternal mortality and infant mortality data are one of the indicators to see the level of health in developing countries. The Indonesian Demographic and Health Survey data, there were approximately 500 more maternal fatalities in Indonesia in 2020 than there were in 2019. The number of maternal deaths per 100,000 live births, or MMR in Indonesia fluctuated between 1991 and 2015 and then decreased between 2018 and 2019 (Kementerian Kesehatan Republik Indonesia, 2022)(Kementrian Kesehatan Republik Indonesia, 2023).

A multisystem pregnancy condition known as preeclampsia is typified by extensive endothelial dysfunction that raises blood pressure and damages target organs in the second half of pregnancy (Tangren et al., 2018). Preeclampsia or hypertension during pregnancy is a condition in pregnant women with blood pressure ≥ 140/90 mmHg (Sutiati Bardja, 2020) . Preeclampsia is a severe pregnancy complication and occurs in around 3-8% of all pregnancies. Preeclampsia prevalence varies between 1.3 and 6% in wealthy nations and between 1.8 and 18% in developing nations. In Indonesia, preeclampsia's prevalence ranges from 5.3% or 128,273 per year (Najmia, 2022). In addition, At 26.9%, preeclampsia continues to be the leading cause of maternal mortality in Indonesia (Sari et al., 2023).

Problems during and after pregnancy and childbirth cause the deaths of pregnant women. The majority of these issues are curable or preventable, and they typically arise during pregnancy. Prior to pregnancy, other issues might exist, but they may get worse during pregnancy, particularly if they are not addressed as part of the woman's treatment (World Health Organization (WHO), 2025). Pregnancy-related high blood pressure (preeclampsia and eclampsia), postpartum hemorrhage, infections that typically follow childbirth, and botched abortions account for up to 80% of problems that result in maternal death. The three main causes of maternal death in Indonesia are infection, pregnancy-related hypertension, and postpartum hemorrhage (Kementrian Kesehatan Republik Indonesia, 2023).

In earlier research, there was a correlation between the respondent's age (p-value 0.000), parity (p-value 0.000), twin pregnancies (p-value 0.231), and history of severe preeclampsia (p-value 0.000). This suggests that during twin pregnancy has no correlation with the incidence of severe preeclampsia, age, parity, and a history of severe preeclampsia do. According to (Kumalasary, 2020), age, parity, and a history of severe preeclampsia are the factors associated with severe preeclampsia. Researchers examine the factors associated with the incidence of severe preeclampsia in pregnant women because of the rising prevalence of this condition and the significance of identifying maternal

risk factors. Therefore, this study was conducted to analyze The factors that are connected to the prevalence of severe preeclampsia in pregnant women at Dr. M. Djamil Padang Hospital.

METHODS

This research employs a cross-sectional methodology and is analytical in nature. The population is all pregnant women registered at Dr. M. Djamil Padang Hospital. A total of 200 samples were determined using the Lemeshow formula and taken using the systematic random sampling technique. This study was conducted in July 2024 so that secondary data were obtained from medical records data from July 2024. This study was analyzed univariately and bivariately with the chi-square test at a significance level of 5%. The study's instrument was a questionnaire.

RESULTS

1. Univariate

According to the table that follows, the results can be seen that of the 200 respondents, almost half, namely 92 people (46.0%), experienced severe preeclampsia.

Table 1. Frequency Distribution of Cases of Severe Preeclampsia

No.	Severe preeclampsia	f	%
1.	At risk	92	46.0
2.	No Risk	108	54.0
Total		200	100

2. Bivariate

a. Relationship Between Maternal Age and Incidence of Severe Preeclampsia

According to the table that follows, the findings of the association between how often severe preeclampsia occurs and maternal age were from 104 mothers whose age was at risk with age >35 years, there were 53 people (51.0%) pregnant women experiencing severe preeclampsia and 51 people (49%) respondents did not experience severe preeclampsia. Bivariate analysis in this study used the analysis of the results of the chi-square statistical test, namely concluding the significance of the relationship between the two variables. The chi-square test's p-value results = 0.006 (p-value> 0.05).

Table 2. Relationship Between Maternal Age and the Incidence of Severe Preeclampsia

Age	Severe Preeclampsia				Total		p-value
	Yes		No		N	%	
At risk	53	51.0%	51	49.0%	104	100	0.006
No Risk	39	40.6%	57	59.4%	96	100	
Total	92	46.0%	108	54.0%	200	100	

b. Relationship Between Parity and the Incidence of Severe Preeclampsia

The results of the study showed that 81 mothers with risky parity, 61.7% of mothers experienced severe preeclampsia. Based on the results of the chi-square test, the p-value = 0.001 (p-value> 0.05). So it can be concluded that there is a significant relationship between parity and the incidence of severe preeclampsia. These results can be interpreted in the following table:

Table 3. Relationship Between Parity and the Incidence of Severe Preeclampsia

Parity	Severe Preeclampsia				Total		p-value
	Yes		No		N	%	
Primipara	50	61.7.0%	31	38.3%	81	100	0.001
Multipara	42	35.3%	77	64.7%	119	100	
Total	92	46.0%	108	54.0%	200	100	

c. Relationship Between Pregnancy Spacing and the Incidence of Severe Preeclampsia

The results of this study obtained 56.8% of mothers who had a pregnancy spacing at risk of severe preeclampsia. Degenerative processes or weakening of the uterine and pelvic muscles raise the risk of preeclampsia if the time between pregnancies is more than 10 years. This has a substantial impact on the delivery process in cases of fresh pregnancies. The results of the *chi-square* test showed that the p value = 0.001 (p <0.05), Consequently, it can be said that there is a meaningful link spacing and severe preeclampsia so that it can be concluded that pregnancy spacing is a risk factor for the occurrence of severe preeclampsia. The results of this study can be seen in the following table:

Table 4. Relationship Between Pregnancy Spacing and the Incidence of Severe Preeclampsia

Pregnancy Spacing	Severe Preeclampsia				Total		p-value
	Yes		No		N	%	
At risk	63	56.8.0%	48	43.2%	111	100	0.001
No risk	29	32.6%	60	67.4%	89	100	
Total	92	46.0%	108	54.0%	200	100	

d. Relationship Between Obesity and the Incidence of Severe Preeclampsia

Based on the table below, The findings showed the association between the prevalence of severe preeclampsia and obesityThe findings showed the association between the prevalence of severe preeclampsia and obesity were obtained from 104 obese mothers, there were 45.2% of mothers who experienced severe preeclampsia. Obesity is a complicated chronic illness that presents health hazards due to fat accumulation that beyond the body's tolerance limitations. The bivariate analysis in this study used the analysis of the results of the chi-square statistical test, which concluded that there was no significant relationship between the two variables. The results of the chi-square test p-value = 0.923 (p-value> 0.05).

Table 5. Relationship Between Obesity and the Incidence of Severe Preeclampsia

Obesity	ere Preeclampsia				Total		p-value
	Yes		No		N	%	
Obesity	47	45.2%	57	54.8%	104	100	0.923
Not Obese	45	46.9%	51	53.1%	96	100	
Total	92	46.0%	108	54.0%	200	100	

DISCUSSION

A. Relationship Between Maternal Age and Incidence of Severe Preeclampsia

The results of this study indicate that there is a relationship between the rate and the mother's age of preeclampsia with a p-value = 0.006 (p-value > 0.05). Preeclampsia incidence is influenced by a number of variables is the age factor, because a non-risk pregnancy is a pregnancy at the age of 20 to 35 years. At that age the mother is in a healthy and safe reproductive status.According to study by Deshinta Utari , 3 (3.6%) of the respondents were under the age of 20, 63 (75%) were between the ages of 20 and 35, and 18 (21.4%) were between the ages of 20 and 35 (Deshinta Utari, 2022). The results of the investigation showed a strong correlation between the incidence of preeclampsia and pregnant women's age, with a p value of 0.000 (<0.05). Furthermore, this study by Kumalasari revealed that the age group of 20 to 35 years old had the highest incidence of severe preeclampsia. Based on the findings of the chi-square statistical test, there is a correlation between the prevalence of severe preeclampsia and age, with a p value of 0.000(Kumalasary, 2020).

The mortality rate of pregnant women and children under 20 years is two to five times higher than pregnant women aged 20 to 29 years. Maternal mortality increases again after the age of 30-35 years (Saifuddin, 2017) . Age factors affect the occurrence of preeclampsia/eclampsia. Age that is too young, namely <20 years, will cause a risky pregnancy that causes complications because the mother's reproductive organs are not yet mature, the mother's age that is too old >35 years will also cause complications to the mother's pregnancy such as complications during labor (bleeding, placenta previa, etc.) and complications during pregnancy such as (preeclampsia, anemia, hypertension, premature rupture of membranes and others) (Klungsøyr et al., 2018) . Therefore, mothers should plan a family planning program, especially for mothers aged >35 years so that this can prevent pregnancy at an age that is at risk.

B. Relationship Between Parity and the Incidence of Severe Preeclampsia

According to the study's findings, it showed that 81 mothers with risky parity, 61.7% of mothers experienced severe preeclampsia. Based on the results of the chi-square test, the p-value = 0.001 (p-value> 0.05). So it can be concluded that there is a significant relationship between parity and the incidence of severe preeclampsia.

Research By Hutahaean revealed that 12 individuals (40.0%) had primiparous parity with mild preeclampsia, while 6 individuals (20.0%) had severe preeclampsia. There were three individuals (10.0%) in the multiparous parity category with mild preeclampsia and nine (40.0%) in

the multiparous parity category (>35) with severe preeclampsia. According to the Chi-square test results, there is a correlation between preeclampsia at the Sudarlis Medan Pratama Mertua Clinic in 2022 and the parity of the laboring mother, with a sig p-value of 0.030 <0.05 (Hutahaean, 2022).

In addition, This study is consistent with studies carried out by The parity variable test results indicated that (p) 0.013, which means that parity has an effect on the incidence of severe preeclampsia in pregnant women in the Obstetrics Emergency Room of Torabelo Hospital, Sigi Regency, Central Sulawesi(In & Midwifery, 2022) . Most respondents have multiparity parity with no severe preeclampsia as many as 41 respondents (56.9%). However, this contrasts with the study that was done Hermawati which was carried out at RSIA Banda Aceh and RS Kesdam IM Banda Aceh, it can be said that the incidence of preeclampsia and pregnant women's parity do not significantly correlate (p-value = 0.489) (Hermawati, 2020).

Parity of the mother in labor will trigger preeclampsia according to earlier research. The number of fetuses born alive or dead that weigh more than or equal to 500 grams is known as parity. The gestational age, which is 24 weeks, is utilized if the weight is unknown. According to the Perdiknakes-WHO-JPHIEGO classification of parity for mothers who are still pregnant or have previously been pregnant, a woman is classified as primigravida if this is her first pregnancy, multigravida if she has been pregnant more than five times, and grande multigravida if she has been pregnant more than five times.

C. Relationship Between Pregnancy Spacing and the incidence of severe preeclampsia

This study obtained results that 56.8% of mothers who had a pregnancy spacing at risk of severe preeclampsia. The chi-square test results revealed that the p value = 0.001 (p <0.05), so it can be concluded that there is a significant relationship between spacing and severe preeclampsia so that it can be concluded that pregnancy spacing is a risk factor for the occurrence of severe preeclampsia.

According to research by Kartikadewi, the analysis's findings indicated a significant correlation between the amount of time between births and the occurrence of preeclampsia (p-value of 0.00). In the meantime, preeclampsia affected 34.7% of moms whose births were separated by more than five years (Kartikadewi et al., 2019). The findings of the chi square statistical test yielded a p-value = 0.005 (P 0.05), indicating a correlation between the incidence of preeclampsia and pregnancy spacing, which is also consistent with studies (Wahyuni et al., 2023). This is because the endometrium, the inner layer of the uterus, is not yet ready to receive at a pregnancy spacing of less than two years.

Mothers who give birth need 2 to 10 years to get pregnant again to recover physiologically from the previous pregnancy and childbirth. If the gestational age gap is > 10 years, the risk of preeclampsia increases because the degenerative process or weakening of the uterine and pelvic muscles, greatly affects the labor process in cases of new pregnancy (Prawirohardjo, 2018) . This is very important to prepare yourself for the next pregnancy. The smaller the gap between two

pregnancies, the greater the risk of experiencing preeclampsia because a short pregnancy gap has a uterine function that has not returned perfectly, but the next pregnancy has occurred again.

D. Relationship between obesity and the incidence of severe preeclampsia

Based on the results of the study that obesity with the incidence of severe preeclampsia was obtained from 104 obese mothers, there were 45.2% of mothers who experienced severe preeclampsia. Using bivariate analysis in this research used the analysis of the results of the chi-square statistical test, which concluded that there was no significant relationship between the two variables. The results of the chi-square test p-value = 0.923 (p-value> 0.05).

This research is backed by studies by Sari At Pambalah Batung Hospital, the data analysis findings indicated no correlation between the prevalence of preeclampsia in women who are pregnant and obesity(Sari et al., 2023). Pregnancy-related weight gain is largely caused by the uterus and its contents, breasts, and increased extravascular fluid and blood volume. The prevalence of preeclampsia among expectant mothers at Trikora Salakan Hospital, however, is inversely correlated with body mass index (BMI), as BMI is one of the factors that contributes to preeclampsia, and an excessive BMI is linked to decreased organ perfusion because of vasospasm and endothelial activation (Handayani & Nurjanah, 2021).

Obesity is defined as a medical condition with long-term mismatch between energy intake and expenditure leads to excessive body fat formation, which can interfere with health. Obesity is a complex chronic disease characterized by fat accumulation that exceeds the body's tolerance limit and poses a health risk (Kementrian Kesehatan Republik Indonesia, 2023).

Preeclampsia is a multifactorial condition that is not only influenced by body mass index (BMI) or obesity, but also by genetics, immunology, inflammatory status, history of hypertension, and environmental factors. According to Sibai et al, although obesity is a frequently mentioned risk factor, not all obese women experience preeclampsia, indicating that there are other factors that are more dominant or interactive (Sibai et al., 2005) . Several studies emphasize that immunological incompatibility between mother and fetus, as well as family history, contribute more to preeclampsia than obesity. Even women with normal BMI can experience preeclampsia due to these immunological factors (Slade et al., 2025) . So it can be concluded that the cause of preeclampsia is not due to obesity but is triggered by other factors such as maternal age, parity, history of preeclampsia and pregnancy spacing.

CONCLUSIONS

In this research maternal age, parity history, and pregnancy spacing are recognized to be risk factors for severe preeclampsia in pregnant women at Dr. M. Djamil Padang Hospital, according to the research findings preeclampsia is not associated with obesity.

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