



Factor Associated with Incidence of Preeclampsia at Mentawai Islands Regional General Hospital

Meldafia Idaman¹, Yeni Campisi Rosmaida BR Sitorus^{2*}, Ika Yulia Darma³,
Ramah Hayu⁴, Silvi Zaimy⁵

Universitas Syedza Saintika, Indonesia^{1,2,3,4,5}

Corresponding Email: yenicampisi3@gmail.com*

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Abstract

The World Health Organization states that the highest complications in pregnancy and childbirth are bleeding with a case number of 32.1%, followed by preeclampsia 26.7% and premature rupture of membranes with an incidence rate of 24.98. The study aimed to determine the factors associated with the incidence of preeclampsia at the Mentawai Islands District General Hospital. This type of research is analytic with a case-control design with a retrospective approach. The population is all mothers giving birth at the Mentawai Islands Hospital in 2022, totaling 279 people. Samples were taken by matching and systematic random sampling of 30 respondents, the data used were secondary data taken from medical records using a checklist. Data were analyzed univariately and bivariate with the chi-square statistical test. The results showed that 15 people had preeclampsia, 8 respondents (53.3%) had a history of hypertension, 5 respondents (33.3%) suffered from obesity, and 4 respondents (26.7%) had diabetes mellitus. The Mentawai Islands District General Hospital, a p-value of 0.020 was obtained, for the relationship between obesity and the incidence of preeclampsia at the Mentawai Islands District General Hospital, a p-value was obtained of 0.014, The Mentawai Islands District General Hospital obtained a p-value of 0.032. In conclusion, there is a relationship between a history of hypertension, obesity, diabetes mellitus, and the incidence of preeclampsia at the Mentawai Islands District General Hospital. Suggestions, it is hoped that health workers can detect preeclampsia early in pregnant women to reduce the incidence of preeclampsia in Indonesia, especially in the Mentawai Islands.

Keywords: Preeclampsia, History of Hypertension, Obesity, Diabetes Mellitus

Introduction

During pregnancy and childbirth a woman or pregnant mother is very susceptible to exposure to disease or other germs, therefore it is very important to pay attention to health

and also foods eaten by pregnant mothers to avoid the possibilities that may occur in a pregnant woman.

Preeclampsia is a syndrome characterized by an increase in blood pressure and proteinuria that occurs in the second trimester of pregnancy and always recovers in the postnatal period. Mothers with pregnancy-related hypertension ranged from 10%, 3-4 % of them had preeclampsia, 5% had high blood pressure and 1-2 per cent had chronic blood pressure (Hall & Hall, 2020).

According to a report by the World Health Organization, the highest complications in pregnancy and childbirth are bleeding with 32.1 %, followed by preeclampsia with 26.7 % and premature miscarriage with 24.98 % (WHO, 2020). The above data can indicate that very high cases of complications occur in pregnant and childbirth mothers, so it is very important in paying attention to health and nutrition that is obtained by pregnant mothers and the birth in preventing more and more complications.

According to a report by the Indonesian Ministry of Health, one of the provinces with the highest incidence of preeclampsia is the province of Western Sumatra. In 2020 there are 25.6% of cases of preeclampsia, whereas in 2021 there will be 25.81% of pregnancy cases (Kemenkes RI, 2023). Preeclampsia is one of the complications that can trigger a mother's death (Nuraena et al., 2024). Mother's deaths are due to lack of access to quality mother's health care, especially the proper emergency care that is being provided by late recognition of signs and decision-making, late access to health care and late access in health facilities. Causes are also often caused by factor 4 "too much", i.e. too old (>35 years), too young (4 children), too close to pregnancy/parity (<2 years). A study conducted by Harli (2018), entitled The relationship between pregnant women's age at risk and preeclampsia, showed that there was a relationship between the age of pregnant mothers at risk with preeclampsia with a statistic spearman test score of $p = 0,000$.

Other factors that can also affect the occurrence of preeclampsia in pregnancy are obesity and diabetes mellitus. Preeclampsia and diabetes during pregnancy caused by obesity during pregnancy (Asia et al., 2024) are characterized by the occurrence of an increase in body weight in pregnant mothers > 12-16 kg of normal body weight and consequently not good for health especially bumil, can be the cause of hypertension, hypercholesterol, hyperglycaemia known as (3H). This is supported by a study conducted by (Ratnasari, 2019) that indicates that there is a link between obesity and diabetes mellitus with the incidence of preeclampsia in pregnancy with a p value < 0.05.

One of the districts in West Sumatra Province with a high preeclampsia incidence is the Mentawai Islands district. According to a preliminary survey carried out by the author at the Mentawai Islands District General Hospital, which is the main reference hospital that deals with pre-eclampsia cases, the number of cases in 2019 was 130 of the mothers receiving 10 of them (7.6%) had preeclampsie, in 2020 of the 118 women receiving delivery 10 of whom (8.47%) were receiving preeclapsia, in 2021 of the 197 people there were 18 people (9.13%) having preeclampsia.

Literature Review

Preeclampsia is a group of symptoms that can arise in pregnant, giving birth and postpartum women, consisting of several diseases that can be combined with other diseases, for example: hypertension, edema, proteinuria. Severe preeclampsia is a special condition in pregnancy characterized by increased blood pressure and proteinuria. It can be associated with seizures (eclampsia) and multiple organ failure in the mother, while complications in the fetus include growth restriction and placental abrasion (Robson, 1999)

Predisposing factors for preeclampsia according to (Cunningham, 2019) include: (1) Age: primigravidas under 20 years of age and all mothers over 35 years of age are considered more vulnerable. (2) Parity: primigravidas have almost twice the incidence of hypertension. (3) Obstetric complications: multiple pregnancies, molar pregnancies or hydrops fetalis. (4) Pre-existing medical conditions: chronic hypertension, kidney disease, diabetes mellitus, antiphospholipid antibody syndrome.

Research Method

Type of analytical research with a case control design. This study used a retrospective approach to examine risk factors that could explain whether cases and controls were affected or not. The research was carried out from October 2022 to February 2023 at the Mentawai Islands District Hospital, West Sumatra. The population is all birth mothers who were treated at the Mentawai Islands District Hospital in 2022, totaling 279 people. The research sample was taken as many as 30 people, consisting of 15 people in the case group and 15 people in the control group who met the research inclusion criteria. The sampling technique for control uses matching and systematic random sampling techniques. The research instrument is a checklist sheet. The chi square test was used to analyze data with a significance level ($\alpha = 0.05$).

Result

Respondent characteristics

Table 1. Respondent characteristics

Respondent characteristics	Case group		Control group	
	f	%	f	%
Age				
< 20 years	0	0	1	6,7
20-35 years	9	60,0	14	93,3
>35 years	6	40,0	0	0
Parity				
Primigravida	5	33,3	4	26,7

Multigravida	10	66,7	11	73,3
Job status				
Work	7	46,7	5	33,3
Doesn't work	8	53,3	10	66,7

Based on table 1, it is known that the majority of respondents in the case group (60.0%) and control group (93.3%) were 20 - 35 years old, parity of respondents in the case group (66.7%) and control group (73.3%) most were multigravidas and most of the respondents in the case group (53.3%) and control group (66.7%) were unemployed.

Table 2. Frequency Distribution of respondents based on history of hypertension, obesity and diabetes mellitus

Variabel	Case group		Control group	
	%	f	%	f
History of hypertension				
Yes	8	53,3	2	33,3
No	7	46,7	13	66,7
Obesity				
Yes	5	33,3	0	0
No	10	66,7	15	100
Diabetes Mellitus				
Yes	4	26,7	0	0
No	11	73,3	15	100

Based on table 2, it is known that from the case group the majority of respondents (53.3%) had a history of hypertension, while in the control group some respondents (66.7%) did not have a history of hypertension. In the case group, the majority of respondents (66.7%) were not obese, while in the control group there were no respondents who were obese (0%). In the case group, the majority of respondents (73.3%) did not experience diabetes mellitus, while in the control group there were no respondents who experienced diabetes mellitus (0%).

Table 3. Bivariate Analysis

Variabel	Occurrence of preeclampsia						<i>P value</i>
	Case group		Control group		Total		
	f	%	f	%	f	%	
History of hypertension							
Yes	8	53,3	2	13,3	10	33,3	0,20
No	7	46,7	13	86,7	30	66,7	
Obesity							

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Yes	5	33,3	0	0	5	16,7	0,014
No	10	66,7	15	100	25	83,3	
Diabetes Mellitus							
Yes	4	26,7	0	0	4	13,3	0,032
No	11	73,3	15	100	26	86,7	

Based on table 3, it is known that of the 30 respondents, in the case group there were 8 (53.3%) respondents with a history of hypertension, 5 (33.3%) respondents with obesity and 4 (26.7%) respondents with Diabetes Mellitus, whereas in The control group contained 2 (13.3%) respondents with a history of hypertension, 0 (0%) respondents with obesity and 0 (0%) respondents with Diabetes Mellitus. The results of the chi-square statistical test obtained a P value for each variable (history of hypertension, p value = 0.020, obesity, p value = 0.014 and Diabetes Mellitus p value = 0.032). This means that the P value < α , which means there is a significant relationship. Significant relationship between a history of hypertension, obesity and diabetes mellitus and the incidence of preeclampsia at the Mentawai Islands District General Hospital.

Discussion

a. Relationship between history of hypertension and incidence of preeclampsia

The results of the study showed that in the case group who had a history of hypertension there were 8 respondents (53.3%), while in the control group only 2 respondents (13.3%) had a history of hypertension and a total of 10 respondents (33, 3%), the results of the chi-square statistical test obtained a P value = 0.020, this means the P value < α , which means there is a significant relationship between a history of hypertension and the incidence of preeclampsia at the Mentawai Islands District General Hospital in 2022.

Hypertension is blood pressure of at least 140 mmHg systolic or 90 mmHg diastolic on two examinations 15 minutes apart using the same arm (Magee et al., 2014). In this study, mothers who had a history of hypertension experienced preeclampsia on average, this shows that a history of hypertension has a risk of experiencing preeclampsia.

The results of this study are in line with research conducted by (Rakhmawati & Wulandari, 2021) with the results of the Wald test obtaining a p value of $0.014 < 0.05$, meaning that there is a significant influence between a history of hypertension and pre-eclampsia in pregnant women at the Banyuanyar Community Health Center, Surakarta, the Odd value The ratio for the history of hypertension variable is 401.76, which means that mothers who have a history of hypertension are 401.76 times more likely to experience pre-eclampsia during pregnancy than mothers who do not have a history of hypertension.

The results of other research that are in line with this research are research (Gustri et al., 2016), which states that the incidence of preeclampsia will increase in mothers who suffer from chronic hypertension, because the placental vessels have been disturbed. Hypertension is caused by vasospasm (narrowing of the blood vessels), This is shown by an OR value of 13.808 and a p value of 0.004, which means that a history of hypertension has a risk of causing preeclampsia by 13-14 times and there is a significant relationship between a history of hypertension and the incidence of preeclampsia.

Researchers assume that a history of hypertension is closely related to the incidence of preeclampsia, this is because if the mother's blood pressure increases, the blood vessels narrow which can result in blood vessel damage.

b. Relationship between obesity and the incidence of preeclampsia

In this study, it was discovered that in the case group there were 5 respondents (33.3%) who were obese, while in the control group no one was obese (0%) and a total of 5 respondents (16.7%) were obese. The results of the chi-square statistical test obtained a P value = 0.014, this means the P value < α , which means there is a significant relationship between obesity and the incidence of preeclampsia at the Mentawai Islands Regency Regional General Hospital in 2022.

According to the theory, obesity triggers preeclampsia through several mechanisms, namely in the form of superimposed preeclampsia, as well as through metabolite triggers and other micro molecules (Robinson et al., 2010). The risk of preeclampsia increases 2-fold for every increase in body weight of 5-7 kg/m². In addition, the increased risk of preeclampsia increases with increasing BMI. In obesity, several damages will occur, such as insulin resistance, increased inflammation, dyslipidemia, and various changes in obese sufferers will affect the increase in ADMA and the occurrence of preeclampsia (Wafiyatunisa & Rodiani, 2016). Obesity is caused by many factors such as genetic factors, metabolic disorders and excessive food consumption. The fatter a person is, the more blood there is in the body, which means the harder the heart's pumping function is. So it can cause preeclampsia (Dewie et al., 2020)

The results of this study are in line with research conducted by, (Dewie et al., 2020) with the results that there is a relationship between obesity in pregnant women and the incidence of preeclampsia in the working area of the Kampung Baru Health Center, Luwuk City (p-value = <0.001) with an OR value = 9, 9, which means that pregnant women who are obese are 9-10 times more likely to experience preeclampsia compared to pregnant women who are not obese. Other research that is in line with this research is the research of (Kurniasari & Arifandini, 2015), with the results of statistical tests of data analysis using the chi-square test, p-value = 0.000 (p < 0.05), which means that Ho is rejected and Ha is accepted, meaning There is a relationship between diabetes mellitus in pregnant women and the incidence of preeclampsia and eclampsia. The results of the analysis also obtained an Odd Ratio of 14.37, meaning that mothers who had diabetes mellitus had a 14.37 times chance of experiencing preeclampsia compared to mothers who did not have diabetes mellitus.

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Researchers assume that obesity can trigger preeclampsia in pregnant women because the more the mother's weight increases, the more calories there will be in the mother's body accompanied by excess fat, protein, sugar, salt which can trigger other diseases such as diabetes mellitus and preeclampsia.

c. Relationship between Diabetes Mellitus and Preeclampsia

The results of the study showed that, in the case group, 4 respondents (26.7%) suffered from diabetes mellitus, while in the control group no one suffered from diabetes mellitus (0%), and a total of 4 respondents suffered from diabetes mellitus (13.3%). The results of the chi-square statistical test obtained a P value = 0.032, this means that the P value $< \alpha$, which means there is a significant relationship between diabetes mellitus and the incidence of preeclampsia at the Mentawai Islands Regency Regional General Hospital in 2022. Diabetes mellitus is one of the factors risk of preeclampsia. Preeclampsia affects 2-7% of pregnancies in non-diabetic women but women with a history of type 1 diabetes, type 2 diabetes and gestational diabetes have an increased risk of preeclampsia in developed countries. Known risk factors for preeclampsia in women with type 1 and type 2 diabetes include nulliparity, advanced maternal age and poor blood sugar control (Valdés et al., 2014)

This research is in line with research by (Aulia et al., 2019) , it is known that of the 32 respondents who experienced preeclampsia at RSUD DR. H Abdul Moeloek Lampung Province, there were 12 respondents (37.5%) who had diabetes mellitus and there were 20 respondents (62.5%) who did not have diabetes mellitus.

Other research that is in line with this research is research conducted by (Kurniasari & Arifandini, 2015) with results from 29 mothers with diabetes mellitus who experienced severe preeclampsia as much as 86.2% (25 pregnant women) and who experienced mild preeclampsia as much as 13.8% (4 pregnant women). Meanwhile, of the 33 pregnant women who did not have diabetes mellitus, 69.7% (23 pregnant women) experienced mild preeclampsia and 30.3% (10 pregnant women) experienced severe preeclampsia. This means that mothers with diabetes mellitus have a greater risk of preeclampsia compared to mothers who do not have diabetes mellitus.

The results of this study are in line with research conducted (Kurniasari & Arifandini, 2015), with the aim of determining the relationship between diabetes mellitus in pregnant women and the incidence of preeclampsia eclampsia using the chi-square test and obtained a p-value = 0.000 ($p < 0.05$), which means that H_0 is rejected and H_a is accepted, meaning that there is a relationship between diabetes mellitus in pregnant women and the incidence of preeclampsia, eclampsia, the results of the analysis also obtained an Odd Ratio of 14.37, meaning that mothers who have diabetes mellitus have a 14.37 times chance of experiencing preeclampsia compared to mothers who do not have diabetes mellitus.

Researchers assume that diabetes mellitus can be one of the causes of preeclampsia in pregnant women. This is because mothers who suffer from diabetes during pregnancy cause metabolic and hormonal changes which are also influenced by pregnancy hormones.

Conclusion

Based on the research results, it was concluded that a history of hypertension, obesity and diabetes mellitus was significantly related to the incidence of preeclampsia in pregnant women. Pregnant women with a history of hypertension, obesity and diabetes mellitus have a higher risk of experiencing preeclampsia. Therefore, early detection and appropriate management of these conditions is needed so that it can help in preventing or treating preeclampsia during pregnancy.

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