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Factors Related with the Incidence of Severe Preeclampsia at the Hospital Dr M Djamil Padang

Nissa Prima Sari¹, Bobby Indra Utama², Meilinda Agus³

¹Bachelor of Midwifery Program Faculty of Medicine Andalas University Jln. Niaga no. 56 Padang, Indonesia

²Bachelor of Midwifery Program Faculty of Medicine Andalas University Jln. Niaga no. 56 Padang, Indonesia

³Bachelor of Midwifery Program Faculty of Medicine Andalas University Jln. Niaga no. 56 Padang, Indonesia

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CORRESPONDENCE

E-mail: nissaprimasari@gmail.com

A B S T R A C T

Preeclampsia is a condition characterized by an increase in maternal blood pressure of at least 140/90 mmHg accompanied by proteinuria and other symptoms that occur after 28 weeks gestation. The incidence of preeclampsia in hospital DR M Djamil Padang reached 33%. The exact cause of preeclampsia remains unknown, but extreme maternal age, nulliparity, history of hypertension are suspected to be the risk factors for this. This study aims to determine the factors related with the incidence of severe preeclampsia in the hospital DR M. Djamil Padang.

This was observational analytic study with case control study design. The population is divided into two, the case population (all mothers with severe preeclampsia) and the control population (all mothers with no severe preeclampsia). The sample was 85 people taken by simple random sampling with the comparison between case : control (1:1). Data were taken from the patient's medical records. Data analysis was performed using univariate and bivariate using Chi square test with p value < 0,05.

The results of this study showed there was a relationship between age ($p = 0,001$), parity ($p = 0,020$) and history of hypertension ($p = 0,003$) with the incidence of severe preeclampsia in the hospital DR M Djamil Padang. While the factor that has no significant relation is multiple pregnancy.

Mothers with age <20 years old or ≥ 35 years old, nulliparity, and having a history of hypertension are more at risk for severe preeclampsia. Therefore it is expected for health workers especially midwives to increase awareness to patients especially for those who at risk of preeclampsia.

LINTRODUCTION

Health is one of the most crucial indicators in the development of a country. Therefore, the government is committed to improving health through the program "Indonesia Sehat 2025"

The goal of health development towards "Indonesia Sehat 2025" is to increase awareness, willingness, and healthy life for every person through the creation of a behavioral and healthy society, reaching quality health services fairly and equally, and have the highest health level in all areas Republic of Indonesia (Indonesia's Department of Health, 2009).

One of the indicators used in achieving this goal is to reduce maternal mortality from 262 per 100,000 live births in 2005 to 74 per 100,000 live births in 2025. But in reality the maternal mortality rate in Indonesia is still far from the target. Based on the report of Indonesia Health Demographic Survey (SDKI), the trend of maternal mortality rate from year to year has decreased significantly until 2010. The maternal mortality rate was 307 per live birth in 2002 then decreased to 228 per live birth in 2007 then decreased again to 125 per live birth in 2010. However there was a significant increase in 2012 that was 359 per live birth (SDKI, 2012). And by 2015 the maternal mortality rate dropped into 305 per live birth (Indonesia's Ministry of Health 2015)

To achieve the target of "Indonesia Sehat 2025" is certainly required a good commitment from government and society, considering that maternal mortality is still a major problem in Indonesia. According to WHO in 2016, the cause of maternal death is pre-existing condition (28%), bleeding (27%), hypertension in pregnancy (14%), infection (11%), complications of abortion (8%), prolonged labour and others (9%) and blood clots or embolism (3%).

From the data it is seen that besides bleeding, it turns out that preeclampsia also occupies the highest percentage of maternal

deaths. An estimated about 50,000 women worldwide died from preeclampsia, the number of incidents varies by country, in Israel the incidence of preeclampsia by 2.8%, in Scotland by 5.8% and 14.1% in Australia (Shamsi et al, 2013). According to Indonesia Health Demographic Survey in 2002-2003, the percentage of pregnant women had preeclampsia in Indonesia was 0.4 percent and mothers with eclampsia were 1.4 percent. In West Sumatra in 2011 the number of maternal mortality caused by eclampsia was 23 percent, in 2012 it decreased to 22.9 percent and in 2013 increased to 26.2 percent (Hanum, 2013). Meanwhile, according to the Annual Report of Padang City Health Office 2015 preeclampsia and eclampsia still remain the main cause of maternal death as much as 23.5 percent.

Preeclampsia is a condition in which the onset of hypertensive symptoms in pregnancy is accompanied by proteinuria. In severe preeclampsia can lead to eclampsia with symptoms of seizures. According to Djannah (2010) the incidence of preeclampsia in developing countries is about 0.3 percent to 0.7 percent, whereas in developed countries the incidence of preeclampsia is smaller which is 0.05 percent to 0.1 percent.

The exact cause of preeclampsia is still unknown, many theories put forward as the cause of preeclampsia, but with many theories can not be explained all the things related to this disease (Wiknjosastro, 2010). Apparently preeclampsia is not associated with a single factor, but many factors. The factors that are often found as risk factors for preeclampsia are aged under 20 years and over 35 years, obesity, multiple pregnancy, history of preeclampsia descent, economic status, etc. However, among the factors found it is often difficult to determine which is the cause and which is the result (Manuaba, 2012).

Hospital DR M. Djamil Padang is a government hospital located in Padang City. Besides as an educational hospital, Hospital DR M. Djamil is also a referral hospital that receives many cases, including obstetric cases. Report Data the authors got from the medical record hospital DR M. Djamil, the number of severe preeclampsia cases in 2014 was 20.14 percent and in 2015 increased to 32.5 percent and the latest data in 2016 incidence of severe preeclampsia was 33 percent.

Based on preliminary observations in the medical record of hospital DR M. Djamil, among the risk factors associated with severe preeclampsia, the authors only chose risk factors such as age, parity, history of hypertension, and multiple pregnancy due to limitations of author and medical record of hospital DR M. Djamil Padang. Based on that, the authors were interested to know Factors Associated with the Incidence of Severe Preeclampsia at Hospital Dr M. Djamil Padang

November 2016 - December 2017. The sample size was 170 people taken by Simple random sampling with comparison between case : control (1: 1). Data were taken from the patient's medical records. The data analysis used is Chi square.

III RESULT AND DISCUSSION

The subject of this study was 170 respondents. Data collected from patient's medical record from January to August 2017.

Limitations of study

This study is inseparable from various limitations and inevitable biases such as :

1. This study used secondary data obtained from the patient's medical records, so the validity of data in this study depends on the validity of data in the medical record.
2. Not all variables that may be the risk factors for severe preeclampsia can be taken for this study, as they should be

Table 1 : Frequency Distribution Case and Control at Hospital DR M. Djamil Padang

Variable	Population	Subjects	Percentage
Case (preeclampsia)	223	85	38,49 %
Control (non preeclampsia)	1051	85	8,08 %

II METHODS

This was observational analytic study with case control design. The population is divided into two, the case population (all mothers with severe preeclampsia) and control populations (all mothers with no severe preeclampsia). The location chosen for this study is hospital RSUP DR M. Djamil Padang. The study was conducted in

based on availability for some data in the medical record format.

Table 1 showed the frequency distribution of subjects used in this study. Case group were mothers with severe preeclampsia which was 85 cases from 223 cases from January to August 2017 or 38.49%. While the control group was all mothers with other complications (non preeclampsia) which were also 85 cases from a total of 1051 non preeclamptic women 8.08%.

Table 2 : Frequency Distribution of Factors Related with the Incidence of Severe Preeclampsia at Hospital DR M. Djamil Padang

Dependent Variables		Case		Control	
		f	%	f	%
Maternal age	<20 & >35 years old	49	57,6	22	25,9
	20-35 years old	36	42,4	63	74,1
	Total	85	100	85	100
Parity	Nulliparous	44	51,8	29	34,1
	Multiparous	41	48,2	56	65,9
	Total	85	100	85	100
History of hypertension	Yes	23	27,1	7	8,2
	No	62	72,9	78	91,8
	Total	85	100	85	100
Multiple pregnancy	Yes	4	4,7	6	7,1
	No	81	95,3	79	92,9
	Total	85	100	85	100

Table 2 showed a detailed frequency distribution of factors associated with severe preeclampsia, showing that more maternal risky age to be found in severe preeclampsia group (57,6%) similarly to nulliparity dominantly found in the preeclampsia group (51,8%) while mothers with a history of hypertension accounted for 27.1% in preeclampsia group and multiple pregnancies was 4.7% in those with severe preeclampsia group.

Based on table 3 the percentage respondents who had maternal risky age for severe preeclampsia (57,6%) is greater compare to respondents who didn't had severe preeclampsia (25,9%).

Statistical analysis showed there was a significant association between maternal age with severe preeclampsia incidence ($p = 0,000$). From the analysis we knew that risky maternal age was 3,989 times more likely to develop preeclampsia compare to unrisky maternal age.

This is agreed with a study by Nursal (2015) at Hospital M. Djamil which also found most of respondents were at risky age which was 55,9% in case group and 20,6 % in control group and p value 0,006 and $OR=8,3$ which means mother with risky age 8,3 times more likely to develop severe preeclampsia compare to non risky mother.

Another study by Langelo (2013) showed maternal's age >20 and ≥ 35 were 3.37 times more likely develop preeclampsia with p value 0,000 which statistically means there was a significant relationship between maternal age with severe preeclampsia incidence.

But different findings found by Kashanian study in 2011 which showed that risky maternal age has no relationship with severe preeclampsia with p value 0,75 and $OR = 0,9$ which means mothers with advanced age >31 years old is 0,9 times more likely to develop severe preeclampsia compare to younger mother (<31 years old).

This is agreed based on theory in Cunningham et al (2014) which stated that maternal age <20 or > 35 years old is more at risk for complication during pregnancy which bad for both mother and fetus. Maternal age <20 years old, the uterine size is not normal yet, so the likelihood of complication in pregnancy become greater. While maternal age >35 years old there is degeneration process which leads to structural and functional changes in peripheral blood vessels which responsible for increased of blood pressure and making it more likely to experience preeclampsia

Based on the results of this study that risky maternal age is more likely to develop preeclampsia. Maternal age <20 years and >35 years will affect maternal health in pregnancy and childbirth. It is therefore very important for mothers to know a safe age for pregnancy and to know various risks of pregnancy at such risky ages. Therefore, it is

without preeclampsia (32.9%). Statistical analysis showed a significant relationship between maternal parity with the incidence of severe preeclampsia ($p = 0,020$). From that it is known that nulliparous mother has a probability of 2,185 times to experience severe preeclampsia compared with multiparous mother

Tabel 3 : Factors Related with the Incidence of Severe Preeclampsia at Hospital DR M. Djamil Padang

Dependent Variables			Case		Control		OR (95% CI)	<i>p value</i>
			f	%	f	%		
Maternal age	<20 years old	&>35 years	49	57,6	22	25,9	3,898 (2,038-7,456)	0,000
	20-35 years old		36	42,4	63	74,1		
	Total		85	100	85	100		
Parity	Nulliparity		44	51,8	29	34,1	2,185 (1,174-4,065)	0,020
	Multiparity		41	48,2	56	65,9		
	Total		85	100	85	100		
History of hypertension	Yes		23	27,1	7	8,2	4,134 (1,665-10,263)	0,003
	No		62	72,9	78	91,8		
	Total		85	100	85	100		
Multiple pregnancy	Yes		4	4,7	6	7,1	0,650 (0,177-2392)	0,746
	No		81	95,3	79	92,9		
	Total		85	100	85	100		

important to prepare for a safe age during pregnancy to avoid maternal complications including preeclampsia

Table 3 also showed that the percentage of respondents in the nulliparous mother group who experienced severe preeclampsia (51.8%) was higher than those

This finding is in agreement with the finding of others. Astrina's study (2015) in Panembahan Bantul Hospital concluded that there was a significant relationship between nulliparity with the incidence of preeclampsia with OR = 2,999 which means the probability of nulliparous mother is 2,999

times to develop preeclampsia compared with multiparous mother. Study by Indriani (2011) which revealed nulliparous mothers is 1.222 times more likely to develop preeclampsia and Afridasari study (2013) which concluded there was a significant relationship between the status of gravida with the incidence of severe preeclampsia with OR = 2,881 which means nulliparous mother were 2,881 times to develop preeclampsia than multiparous mother. But these findings is contrary to Nursal study (2014) which concluded that multiparous mothers are more at risk for preeclampsia than nullipara mothers

Young and nulliparous women are particularly vulnerable to experience preeclampsia, and the incidence of preeclamptic women between 3 to 10 percent. different from multiparous women with fewer incident percentages. (Cunningham, 2014). In theory, nulliparous woman is more at risk to develop preeclampsia than multiparous woman because preeclampsia usually occurs in women who are first time exposed to chorionic villi. This occurs because in those women the immunologic mechanisms of blocking antibody formation performed by HLA-G (human leukocyte antigen G) to placental antigen have not been fully formed, so the process of trophoblast implantation into the mother's decidua tissue becomes disturbed. Nulliparous woman is also vulnerable to stress during labor which will stimulate her body to produce cortisol. The effect of cortisol is to improve the sympathetic response, so that cardiac output and blood pressure will also increase (Irianti, 2013).

Therefore, both multiparous and nulliparous woman should have counseling for contraception to a professional health worker in order to control the number of births, as to prevent and avoid the risk of preeclampsia. Based on table 3 it can be seen that the percentage of respondents who had history of hypertension who experienced severe preeclampsia (27.1%) more than

respondents who did not experience severe preeclampsia (8.2%).

The Result of statistical analysis showed a significant relationship between history of maternal hypertension with severe preeclampsia incidence ($p = 0,003$). From the analysis it is seen that mothers with a history of hypertension had a likelihood 4.134 times to develop severe preeclampsia compared with mothers with no history of hypertension before.

This study is in agreement with Radjamuda study (2014) which concluded that women with prior hypertension history were at risk for preeclampsia with p value 0.02 which means there was a significant relationship between history of hypertension with severe preeclampsia. Similarly, the results of Moghadam study conducted in Iran in 2012 revealed that there was a significant relationship between mothers with a history of chronic hypertension with the incidence of severe preeclampsia and p value 0.001 and OR = 3.17 which means women with a history of hypertension 3.17 times to develop severe preeclampsia compared with normotension women.

Hypertension is a disorder of the blood vessels that result interference in oxygen supply and nutrients carried by the blood obstructed to the body tissues that need it. In general, hypertension is an asymptomatic state, where high blood pressure in the arteries can leads to increased risk for cardiovascular-related diseases such as stroke, renal failure, heart attack, and kidney damage (Widyaningrum, 2012).

A history of chronic hypertension, previous hypertensive vascular disease or essential hypertension is risk factors for the incidence of preeclampsia (Poston et al., 2006). Thus, the likelihood of having preeclampsia will increase in women with a history of chronic hypertension, because the placental blood vessels have been impaired. Therefore, mothers with a history of hypertension should be alert as early as possible for preeclampsia with optimal antenatal care. From table 3 it can be seen that the percentage of respondents in the

multiple pregnancy group who experienced severe preeclampsia (4.7%) was less than those who did not have severe preeclampsia (7.1%).

The results of statistical analysis showed there was no significant relationship between multiple pregnancy with severe preeclampsia ($p = 0,744$). With OR = 0.650 or OR value <1 which means OR protective risk is caused because the percentage of multiple pregnancy is less in case group than control group.

This is in agreement with Andriani's study in 2009 revealed that there was no significant relationship between multiple pregnancies and the incidence of preeclampsia with OR = 1,460 and Hanum's study in 2013 concluding that there was no significant association between multiple pregnancies and severe preeclampsia. However, the results of this study differed from a multicentre study by Sibai in 2000 revealed that women with multiple pregnancies were more likely to have gestational hypertension and preeclampsia. This is not in agreement with the theory that preeclampsia is more common in multiple pregnancies, this is because the increase of placental mass in multiple pregnancies can lead to an increase in circulating levels of tyrosine kinase-1, which is antiangiogenic circulating in the origin of the placenta, and may play an important role in the pathophysiology preeclampsia. (Magee, Dadeelszeen et al, 2016)

In this study there was no relationship between multiple pregnancies and severe preeclampsia. This may be due to the small frequency distribution of multiple pregnancy in both groups and may also be due to the frequency distribution of multiple pregnancy mothers who did not develop preeclampsia is more than frequency distribution of multiple pregnancy mothers with preeclampsia.

hypertension were found to be associated with severe preeclampsia incidence in this study. Therefore it suggested for health workers, especially midwives to increase the frequency of counseling either personal or group regarding the impact and prevention of preeclampsia for mothers and early detection for all pregnant women to avoid maternal complications such as preeclampsia and can refer them as soon as possible

IV CONCLUSION

Risky maternal age <20 years and >35 years, nulliparity, and history of

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