Research Article

Severe Preeclampsia – Eclampsia and their Associated Factors

Preeklamsia Berat-Eklamsia dan Faktor-Faktor Terkait

Syamsul Bahri, Donel Suheimi

Department of Obstetrics and Gynecology
Faculty of Medicine Universitas Riau
Arifin Achmad General Hospital
Pekanbaru

Abstract

Objective : : To analyse factors associated with severe preeclampsia and preeclampsia at Arifin Achmad General Hospital, Pekanbaru.

Methods : This was a cross-sectional study. Data on women who were diagnosed with severe preeclampsia or eclampsia and delivered between January 2014 and December 2015 were collected. These included maternal age, educational level, gestational age, delivery method, parity and ANC provider. Data were then analysed using chi-square test with multivariate logistic regression analysis.

Results : There were 3294 deliveries happened between January to December 2015. Prevalence of severe preeclampsia during the study period was 14.54%, and that of eclampsia was 3.28%. Mothers aged >35 have more than twice the risk of developing severe preeclampsia and eclampsia (95% CI 1.1- 4.6, p = 0.0001). Gestational age has the strongest association with eclampsia (Adjusted OR 2.4, p = 0.002, 95% CI 1.3-4.2). Severe preeclamptic-eclamptic mothers were at least five times as likely as the non-preeclamptic/eclamptic to have Cesarean Section or operative vaginal delivery (p = 0.0001).

Conclusions : Prevalence of severe preeclampsia was 14.54%, and that of eclampsia was 3.28% in the period between January 2014 and December 2015. Mothers aged >35 were three times as likely as those age ≤35 to develop severe preeclampsia-eclampsia, Term pregnancy had higher risk of severe preeclampsia-eclampsia compared with preterm pregnancy; however, preterm pregnancy has 2.4 times as likely as term pregnancy to develop a worsening severe preeclampsia/eclampsia. Finally, mothers with severe preeclampsia or eclampsia have a five times greater risk of having delivered via Cesarean Section or operative vaginal delivery compared to the non-preeclamptic – non-eclamptic ones.

Keywords : eclampsia, educational level, gestational age, parity, severe preeclampsia.

Abstrak

Tujuan : *Untuk menganalisa faktor-faktor yang berhubungan dengan preeklamsia berat dan eklamsia di RSUD Arifin Achmad Pekanbaru.*

Metode : *Penelitian ini merupakan penelitian potong lintang. Data yang diambil yaitu perempuan yang didiagnosis dengan preeklamsia atau eklamsia dan melahirkan pada Januari 2014 hingga Desember 2015. Usia ibu, tingkat pendidikan, usia kehamilan, metode persalinan, paritas dan pemberi layanan ANC juga disertakan. Data kemudian dianalisis menggunakan uji chi-square dengan analisis regresi logistik multivariat.*

Hasil : *Terdapat 3.294 kelahiran pada Januari 2014 hingga Desember 2015. Prevalensi preeklamsia berat selama penelitian ini yaitu 14,54% dan eklamsia sebesar 3,28%. Usia ibu>35 tahun memiliki risiko dua kali lebih besar untuk terjadinya preeklamsia berat dan eklamsia (95% CI 1,1- 4,6, p = 0,001). Usia kehamilan memiliki hubungan yang paling kuat dengan eklamsia (Adjusted OR 2,4, p = 0,002, 95% CI 1,3-4,2). Ibu dengan preeklamsia-eklampsia lima kali lebih besar untuk dilakukan seksio sesarea atau persalinan pervaginam dengan bantuan alat dibandingkan dengan pasien tanpa preeklamsia/eklamsia. (p = 0,0001).*

Kesimpulan : *Prevalensi preeklamsia berat adalah 14,54% dan eklampsia 3,28% pada periode Januari 2014 sampai Desember 2015. Usia ibu >35 tahun memiliki tiga kali lebih besar risiko untuk terjadinya preeklamsia-eklamsia. Kehamilan cukup bulan memiliki risiko lebih tinggi untuk terjadinya preeklamsia-eklamsia dibandingkan dengan kehamilan preterm; namun, kehamilan preterm memiliki risiko 2,4 kali lebih besar untuk mengalami perburukan preeklamsia/eklampsia dibandingkan pada kehamilan cukup bulan. Ibu dengan preeklamsia atau eklamsia memiliki risiko lima kali lebih besar untuk melahirkan dengan seksio sesarea atau pervaginam dengan bantuan alat dibandingkan dengan pasien tanpa preeklamsia atau eklamsia.*

Kata kunci : *eklamsia, paritas, preeklamsia berat, tingkat pendidikan, usia kehamilan.*

Correspondence author : Syamsul Bahri; sbr.spog@gmail.com

INTRODUCTION

Preeclampsia, also known as 'Toxaemia of Pregnancy', is a hypertensive; multisystem disorder of pregnancy associated with vasospasm, increased peripheral vascular resistance and decreased in organ perfusions[1]. When a seizure or coma happened in severe preeclampsia, it is termed eclampsia. Being one of the major causes of perinatal morbidity and mortality, severe preeclampsia is still a challenging health problem to be dealt with in both developing and developed countries. In Indonesia, the incidence of severe preeclampsia ranges from 3-10%, of which 39.5% led to death in 2001 and 55.56% in 2002[2,3]. A research done in several hospitals in Jakarta showed that nulliparous has 78% higher risk of severe preeclampsia compared to multiparous women[2]. It also found that less educated women were more at risk compared to the moderate and highly educated ones[2]. Another research about severe preeclampsia in low and middle-income countries showed that sociodemographic characteristics and maternal age above 30 increased the risk of severe preeclampsia and eclampsia[4]. However, a research done using a small sample in our unit showed that there were no correlations among age, parity and the incidence of preeclampsia[5]. This study intended to analyse further on factors associated with severe preeclampsia and eclampsia at Arifin Achmad General Hospital, the tertiary referral teaching hospital in Pekanbaru, Riau.

METHOD

This was a cross-sectional study using database from the Department of Obstetrics and Gynecology at Arifin Achmad General Hospital, Pekanbaru. Further data collection was taken from medical records from January 2014 to December 2015. All pregnant women who were diagnosed with severe preeclampsia and eclampsia and gave birth at our department between those periods were recruited. We excluded those whose medical records were incomplete. Definition of severe preeclampsia was taken from WHO guidelines in 2011, which was the presence of increased in blood pressure ≥160/100, heavy proteinuria or substantial maternal organ dysfunctions[6]. These organ dysfunctions could present with varied features, which include eclampsia and HELLP syndrome (hemolysis, elevated liver function and low platelet count)[6]. Eclampsia was defined as the occurrence of generalised seizures in women with preeclampsia, provided that the tonic-clonic seizures are not attributable to other causes such as epilepsy[6]. The socio-demographic characteristics collected include maternal age and educational level. The maternal age was the age of the mother at the time of delivery. Educational level was divided into 4 levels: elementary school, junior high school, senior high school and bachelor degree. The obstetric factors analysed consisted of gestational age, delivery method, parity and antenatal clinic provider. Antenatal clinic provider would be categorised into midwives/community health centre and obstetricians/hospital. Research data obtained were recorded, tabulated and analysed using SPSS. Multivariate analysis was performed with logistic regression.

RESULTS

A total of 3294 deliveries happened between the periods of January 2014 – December 2015. Out of 3294 subjects, 479 were classified as severe preeclampsia, and 108 were of eclampsia, and 2707 (82.18%) patient was non-severe preeclampsia-eclampsia. In the period between January 2014 and December 2015, the prevalence of severe preeclampsia was 14.54 %, and that of eclampsia was 3.28%.

For the purpose of study analysis, 339 of the severe preeclamptic and 64 of the eclamptic group met the inclusion and the exclusion criteria. Control was taken at random from the non-severe preeclamptic – non-eclamptic group with the ratio of 1:1. Proportion of the sample can be seen in table 2.

Table 1. Proportion of Severe Preeclampsia, Eclampsiaand non-severe preeclampsia- non eclampsia

Characteristics		Non-Severe Preeclampsia and Eclampsia		Severe Preeclampsia and Eclampsia		OR	CI	*P-value*
		n	%	n	%			
Age	< 20	22	5.5	17	4.2	ref	ref	0.0001
	20-35	309	76.7	257	63.8	1.07	0.55 - 2	
	> 35	72	17.9	129	32.0	2.3	1.1 – 4.6	
Educational level	Bachelor	39	9.43	38	9.43	ref	ref	0.53
	Senior high school	199	49.38	182	45.16	0.9	0.5 – 1.4	
	Junior high school	93	23.08	110	27.3	1.18	0.69 - 2	
	Elementary school	73	18.11	73	18.11	1	0.57 – 1.7	
Gestational age	Aterm	312	77.42	296	73.45	1.2	0.9 – 1.7	0.19
	Preterm	91	22.58	107	26.55			
Parity	Multiparous	273	67.74	279	69.23	0.93	0.69 – 1.2	0.64
	Nullipara	130	32.26	124	30.77			
Antenatal care	Obstetricians	77	19.11	57	14.14	1.4	0.98 - 2	0.058
(ANC)	Midwives	326	80.89	346	85.86			
Delivery method	spontan	194	48.14	53	13.15			0.0001
	forceps	3	0.74	28	6.95			
	vacuum	54	13.4	54	13.4			
	caesarian	170	42.18	268	66.5			

When compared with the control group, mothers ages >35 have higher risk of developing severe preeclampsia and eclampsia compared to those ages <20 (95% CI 1.1- 4.6, p = 0.0001). Multivariate analysis using logistic regression model were done to find out which variable has the strongest association with severe preeclampsia and eclampsia.

Preeclamptic-eclamptic mothers were found to be at least five times as likely as the non-preeclamptic/eclamptic to have Cesarean Section or operative vaginal delivery (p = 0.0001). The final model was shown on the table below.

Table 2. Final Regression Model of Characteristic Association

Characteristics		OR	Adjusted OR	95% CI	*P-value*
Age	<20	ref	ref		
	20-35	1.07	1.3	0.65-2.5	0.447
	>35	2.3	3	1.4-6.4	0.004
Parity	Mutipara Primipara	0.93	1.27	0.91-1.7	0.152
ANC	Obgyn midwives	1.4ref	1.46	1-2.1	0.049

Final analysis showed that characteristic with the strongest association with severe preeclampsia-eclampsia was age >35. Mothers aged >35 were three times as likely as those age ≤35 to develop severe preeclampsia-eclampsia (Adjusted OR 3, 95% CI 1.4-6.4, p = 0.004). For ANC provider, even though p was <0.05, it was not considered clinically significant since the 95% CI included 1.

Sub-analysis was done among the characteristics to see if there was any difference between severe preeclampsia and eclampsia.

Table 3. Characteristic Differences between Severe Preeclampsia and Eclampsia

Characteristics		Severe Preeclampsia		Eclampsia		OR	CI	*P-value*
		n	%	n	%			
Age	< 20	12	3.5	5	7.8	ref	ref	0.34
	20-35	217	64.0	40	62.5	0.44	0.14 – 1.32	
	> 35	110	32.4	19	29.7	0.41	0.13 – 1.3	
Educational level	Bachelor	31	9.14	7	10.94	ref	ref	0.38
	Senior high school	159	46.9	23	35,94	0.64	0.25 – 1.6	
	Junior high school	88	25.96	22	34.38	1.1	0.43 – 2.84	
	Elementary school	61	17.99	12	18,75	0.87	0.31 – 2.43	0.0029
Gestational age	Term	259	76.4	37	57.8	2.3	1.3 – 4.1	0.49
	Preterm	80	23.6	27	42.2			
Parity	Multiparous	237	69.91	42	65.23	1.2	0.69 – 2.1	0.98
	Nullipara	102	30.09	22	34.38			
Antenatal care (ANC)	Obstetricians	48	14.16	9	14.06	1.008	0.46 – 2.1	
	Midwives	291	85.84	55	85.94			

In the sub-analysis comparing severe preeclampsia and eclampsia, the two groups were similar in characteristic profile except that the term pregnancy had higher risk of severe preeclampsia-eclampsia compared with the preterm pregnancy (p = 0.0029, 95% CI 1.3-4.1). Multiple logistic regression analysis was performed to control for any potential confounding variables and to find out which variable influenced eclampsia the most.

Table 4. Characteristic Differences between Severe Preeclampsia and Eclampsia

Characteristics		Severe Preeclampsia		Eclampsia		OR	Adjusted OR	*P-value*	95% CI
		n	%	n	%				
Age	<20	12	3.5	5	7.8	ref	ref	ref	
	20-35	217	64.0	40	62.5	0.44	0.406	0.406	0.12-1.33
	<35	110	32.4	19	29.7	0.43	0.39	0.39	0.1-1.51
Gest	Term	259	76.4	37	57.8	2.4	2.4	2.4	1.3-4.2
	Preterm	80	23.6	27	42.2				
Parity	Multiparous	237	69.91	42	65.23	1.08	1.07	1.07	0.54-2.09
	Nullipara	102	30.09	22	34.38				

Table 4 showed that gestational age had the strongest association with eclampsia (Adjusted OR 2.4, p = 0.002, 95% CI 1.3-4.2). Preterm pregnancy had 2.4 times as likely as term pregnancy to develop a worsening preeclampsia/eclampsia.

DISCUSSIONS

In this cross-sectional study, it was shown that the prevalence of severe preeclampsia was 14.54% and that of eclampsia was 3.28%. The prevalence of severe preeclampsia in Arifin Achmad General Hospital was higher compared to the national number, which was only ranging between 3-10%[2,3]. This fact may be due to Arifin Achmad being the tertiary referral hospital in the province of Riau. As a referral hospital, the obstetrics and gynecology department accepts referral mostly from midwives/community health care in the area.

Our study showed that there was an increase in the risk of severe preeclampsia and eclampsia in mother aged ≥35 (OR 2.3, 95% CI 1.1- 4.6, *p* = 0.0001). The logistic regression analysis further indicated that mothers aged >35 were three times as likely as those age ≤35 to develop severe preeclampsia-eclampsia (Adjusted OR 3, 95% CI 1.4-6.4, p = 0.004). This was in line with the previous secondary analysis done by World Health Organization (WHO) in low and middle-income countries[7]There are several hypotheses trying to explain about this obstetric risk factor, one of them being theory about ageing-related

vascular damage[8,9]. However, since 'age' is a risk factor that cannot be changed or modified, but can easily be identified during antenatal check-up, risk screening and a low threshold of referral to obstetricians at early stage could help reduce the incidence of severe preeclampsia/eclampsia and its adverse outcomes.

In this study, we found that term pregnancy had higher risk of severe preeclampsia-eclampsia compared with preterm pregnancy (p = 0.0029, 95% CI 1.3-4.1). Further multiple, multi-level regression analysis concluded that preterm pregnancy has 2.4 times as likely as term pregnancy to develop a worsening preeclampsia/ eclampsia (Adjusted OR 2.4, p = 0.002, 95% CI 1.3-4.2). Diagnosis of preeclampsia before 34 weeks not only elevates the rate of preterm birth, but it also increases adverse pregnancy outcomes[10].

A multicenter study done in South Australia reported that women with pre-existing hypertension, gestational hypertension and superimposed preeclampsia have high incidence of cesarean section[11]. We found similar results on the mode of delivery among the severe preeclamptic–eclamptic mother. Comparing with the non-severe preeclamptic–non-eclamptic group, mothers who suffered from severe preeclampsia or eclampsia have five times increased in the risk of having delivered via caesarian section or operative vaginal delivery (p = 0.0001).

We found no associations among severe preeclampsia-eclampsia and mother's educational level, parity, as well as ANC providers (p>0.05). These results were in contrast to the previous study done in selected hospitals in Jakarta, which described an increased risk of preeclampsia between the nullipara and those who have low education[2].

CONCLUSIONS

Prevalence of severe preeclampsia was 14.54%, and that of eclampsia was 3.28% in the period between January 2014 and December 2015. Mothers aged >35 were three times as likely as those age ≤35 to develop severe preeclampsia-eclampsia. Term pregnancy had a higher risk of severe preeclampsia-eclampsia compared with preterm pregnancy; however, preterm pregnancy has 2.4 times as likely as term pregnancy to develop a worsening severe preeclampsia/ eclampsia. Finally, mothers with severe preeclampsia or eclampsia have a five times greater risk of having delivered via Cesarean Section or operative vaginal delivery compared to the non-preeclamptic – non-eclamptic ones.

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