Relation of risk factors, management, and outcome of preeclampsia patients at Haji Adam Malik Hospital, Medan Indonesia 2014 - 2015

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ABSTRACT

Background: Preeclampsia is one of the biggest causals of the maternal and fetal mortality rate. Preeclampsia has many etiology and pathophysiology which is having its timeline during the pregnancy process. It also has many risk factors such as age, gravida status, etc. In this study, we tried to find any correlation between risk factor, management with the output of the preeclamptic patient during January 2014 to December 2015.

Methods: All of the preeclamptic patients who terminated/delivered at Adam Malik General Hospital during the period will be included (n=87). The data were collected from the medical record and served on the table to correlates between risk factor and

management with the output of the preeclamptic patient and their infant (via APGAR).

Results: The most common management were MgSO4 and Nifedipine, with the most delivery path were cesarean section. We didn't find any significant correlation between risk factor and management with the output. There was no significant correlation between Age and gravida status with 1st minute APGAR (p=0,887 and p=0,92) and 5th minute APGAR (p=0,759 and p=0,496).

Conclusion: The most common management was MgSO4 and nifedipine, cesarean section was the most delivery path. We didn't find any correlation between APGAR score and any risk factor.

Keywords: Preeclampsia, Risk factor, APGAR

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INTRODUCTION

Pre - eclampsia is a pregnancy complication characterized by an increase in blood pressure with proteinuria and or an increase in renal function, liver and decreased platelet levels in pregnant women who with no history of hypertension. This syndrome appears at the end of the second until the third semester of pregnancy. Symptoms diminish or disappear after delivery; thus, the definitive treatment will have to be terminating the pregnancy. Pre - eclampsia could impact both the mother and the fetus. Maternal complications include HELLP syndrome (hemolysis, elevated liver enzymes, low platelets), pulmonary edema, renal impairment, bleeding, placental abruption and even maternal death. Complications in infants may include premature birth, fetal distress, low birth weight or intrauterine fetal death (IUFD).[1]

The incidence of pre - eclampsia in the United States ranges from 2 - 6% of healthy nulliparous pregnant women. In developing countries, the incidence of pre - eclampsia ranges from 4 - 18%. Mild pre - eclampsia disease occurs 75%, and severe pre - eclampsia occurs 25%. Out of all the occurrences of pre - eclampsia, about 10% of pregnancies

are less than 34 weeks of age. The pre - eclampsia incidence is increasing in women with a history of pre - eclampsia, multiple pregnancies, chronic hypertension and kidney disease. In primigravida pregnant women, especially younger age is more prone to suffer from pre - eclampsia than those of multigravida. Other predisposing factors are the age of pregnant women under 25 years old or over 35 years, hydatidiform mole, polyhydramnios, and diabetes. Blood pressure is considered normal if systolic is between 100 - 120 mmHg and diastolic between 60 - 80 mmHg.[1]

The incidence rate of pre - eclampsia ranges from 5 - 15% of all pregnancies worldwide. In the Cipto Mangunkusumo hospital, there were over 400 - 500 cases or 4000 - 5000 deliveries per year. There are several hypotheses about the etiology of pre - eclampsia including ischemic placenta, immune - related and genetic factors. Recently, endothelial dysfunction is thought to play a role in the pathogenesis of pre - eclampsia.[1]

Pre - eclampsia aggravates over 5% - 7% of all pregnancies. Proteinuria and hypertension are the mostly found clinical manifestations, as kidneys

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are the most affected organ (glomerular endotheliosis). The pathogenesis of pre - eclampsia is complex; there are many interactions of genetics, immunology, and environmental factors. It has been suggested that pre - eclampsia is a two - stage disease. The first stage is asymptomatic, characterized by abnormal placental development during the first trimester resulting in placental insufficiency and the excessive release of placental material into the maternal circulation. It will lead to the second symptomatic stage, where pregnant women present with characteristics of hypertension, renal impairment, and proteinuria, all of which will cause them risk of HELLP syndrome (hemolysis, high liver enzymes and low platelet function), eclampsia, and another organ damage.[5]

Infant mortality rate (IMR) in Indonesia is still relatively high. It was recorded 51 per 1000 live births in 2003. The most frequent cause of infant mortality was reported due to perinatal disorders. There were about 2 - 27% of all perinatal deaths caused by low birth weight and premature birth.[2]

METHOD

This study is a descriptive study. Samples were obtained by examining and collecting data of all patients' medical records with severe pre - eclampsia diagnoses with or without other diagnoses of diseases. Data were tabulated and presented in the form of frequency distribution tables. Data analysis was performed by univariate and bivariate analysis with statistic program (SPSS v17).

RESULTS AND DISCUSSION

Characteristics of Women with Pre - eclampsia (PE)

Table 1 explains the characteristics of women with pre - eclampsia were found mostly in the age of 20 - 35 years (62.1%). Moreover, pre - eclampsia was found highest in pregnant women within multigravida (37.9%) and nullipara group (43.7%), while found lowest in secundigravida (20.7%) and primipara group (21.8%).

Based on hospital admission time, slightly more proportion of pre - eclampsia was found in women with gestational age ≥37 weeks (55.2%). Whereas in respect to gestational age during childbirth, slightly more proportion of pre - eclampsia found in the group of gestational age ≥37 weeks (56.3%). Most pregnant women with pre - eclampsia were found in the no risk factor group (52.9%), followed by combination of several risk factors (11.5%), history of PE (8%), age > 40 years (6.9%), twin pregnancy (5.7%), history of hypertension (4.6%), history of diabetes (2.3%) and history of IVF / TRB (1.1%) respectively.

Treatment of Patients with Pre - eclampsia

Table 2 shows the mean duration of hospital care for women with pre - eclampsia in the ward was 5.24 ± 2.706 days, whereas mean duration of care in HCU was 0.37 ± 0.79 days and mean duration of care in ICU was 0.46 ± 2.37 days. It indicates that women with pre - eclampsia were treated longer in the ward and only for a few hours in HCU or ICU. Based on table 3, most pre - eclampsia patients who were hospitalized did not use ventilators (95.4%).

Characteristics of Laboratory Results

Based on the table 4, most women with pre - eclampsia presented with proteinuria ≥ +2 (73.6%) and serum albumin <3.5 mg / dl (86.2%).

Table 1 Characteristics of Women with Pre - eclampsia

Characteristics	Frequency	Percentage (%)
Age Category		
20 - 35 years	54	62.1
<20 and >35 years	33	37.9
Gravida		
Primigravida	36	41.4
Skundigravida	18	20.7
Multigravida	33	37.9
Parity		
Nullipara	38	43.7
Primipara	19	21.8
Multipara	30	34.5
Gestational Age at Admission		
<37 weeks	39	44.8
>37 weeks	48	55.2
Gestational Age during Childbirth		
<37 weeks	38	43.7
≥37 weeks	49	56.3
Risk Factors of PE		
No risk factor	46	52.9
History of PE	7	8.0
History of hypertension	4	4.6
Twins	5	5.7
History of Diabetes	2	2.3
History of IVF/TRB	1	1.1
>40 years	6	6.9
Others	6	6.9
Combination	10	11.5
Total	87	100.0

Table 2   Mean of Length of Hospital Care for Pre - eclampsia

Length of Hospital Care	N	Mean	Std. Deviation
Ward	87	5.24	2.706
High Care Unit (HCU)	87	0.37	0.794
Intensive Care Unit (ICU)	87	0.46	2.366

Table 3   Distribution of Mothers with Pre - eclampsia Using Ventilators

Ventilator Use	Frequency	Percentage (%)
No	83	95.4
Yes	4	4.6
Total	87	100

Table 4   Proportion of Women with Pre - eclampsia Based on Proteinuria and Serum Albumin

Laboratory	Frequency	Percentage
Proteinuria		
< +2	23	26.4
≥ +2	64	73.6
Serum Albumin		
<3.5 mg/dl	75	86.2
>3.5 mg/dl	12	13.8
Total	87	100.0

Table 5   Distribution of Anti - hypertensive and Anti - Convulsive Drugs Used by Mothers with Pre - eclampsia

Drug Used	Frequency	Percentage (%)
Anti - hypertensive Drugs		
Nifedipine	81	93.1
Methyldopa	1	1.1
Combination therapy	5	5.7
Anti - convulsive MgSO$_4$		
Not given	2	2.3
Dose of 1 mg/hour	85	97.7
Total	87	100.0

Characteristics of Drug Used
Table 5 shows that the most drug used to mothers with pre - eclampsia was nifedipine (93.1%) and only a small proportion received a combination of anti - hypertensive therapy (5.7%). Almost all patients also received anti - convulsive MgSO$_4$ at a dose of 1 mg/hr.

Types of Labor
Table 6 explains most women with pre - eclampsia had labored by surgical operation per abdomen (79.3%), followed by using instruments (11.5%) and spontaneous labor (8%). As for indication for labor choices, most patients had no indication (54.0%), followed by indication of deteriorating fetus condition (14.9%), laboratory deterioration (13.8%) and combinations (2.3%) respectively.

Overview of the Infants
Based on table 7, the proportions of infants with birth weight of <2500 gr (48.3%) and ≥2500 gr (51.7%) were relatively balanced. Based on APGAR score, it shows a group of APGAR scores ≥7 (64.4%) was higher than APGAR scores <7 (35,6). Moreover, regarding perinatal complications, most infants did not have a perinatal complication (62.1%), whereas 17.2% had mild asphyxia complication and the rest presented with stillbirth and moderate/severe asphyxia with 10.3% in each group.

Overview of Maternal Complications
Based on table 8, there was only one death (1.1%) out of all pre - eclampsia cases found in the hospital. Regarding maternal complications, 71.3% had no complications, 8% presented with HELLP syndrome complications, 6.9% with partial HELLP syndrome and the lowest were counted for pulmonary edema, CVA, sepsis with the percentage of 1.1% each.

The Association of Pre - eclampsia and Maternal Complication with the APGAR Score
Based on table 9, most infants in both groups of APGAR score of <7 and >7 had no complications with the percentage of 72.2% and 70.6% respectively. In the group of APGAR score <7, a small number of complications were found, such as HELLP syndrome (8.3%), Renal insufficiency/failure (5.6%), sepsis (2.8%) and partial HELLP syndrome (2.8%). Small proportions of complications were also found in the group of APGAR score >7, with partial HELLP syndrome being the most occurred complication (9.8%), HELLP syndrome (7.8%) and the lowest number of complications were Renal insufficiency/failure, pulmonary edema and CVA with 2% each.

Resemble APGAR score at minute 1; Table 10 shows most infants in both APGAR score <7 and >7 at minute 5 had no complications with the percentage of 70.6% and 71.4% respectively. In the group of APGAR score <7, a few complications occurred with other complications having the highest number (11.8%), followed by HELLP syndrome, renal insufficiency/failure and sepsis with 5.9%. No partial HELLP syndrome, pulmonary edema, CVA or combination of complications was found within the group. As for infants in the group of APGAR score ≥7, partial HELLP and HELLP syndrome shared the same proportion of 8.6%, and the lowest number of complications were pulmonary edema, CVA, and others with 1.4% each.

Table 6   Distribution of Types of Labor and Indications for Labor Choices

Labor	Frequency	Percentage (%)
Types of Labor		
Spontaneous	7	8.0
Stimulation/induction	1	1.1
With instruments	10	11.5
Per abdomen	69	79.3
Indications for Labor Choices		
No indication	47	54.0
Convulsion	5	5.7
Clinical deterioration	8	9.2
Laboratory deterioration	12	13.8
Deterioration of fetus condition	13	14.9
Combination of deteriorations	2	2.3
Total	87	100.0

Table 7   Distribution of Birth Weight and Neonatal Complications of Infants

Overview of the Infants	Frequency	Percentage (%)
Birth Weight		
<2500 gr	42	48.3
≥2500 gr	45	51.7
APGAR Score		
<7	31	35.6
≥7	56	64.4
Perinatal Complication		
No complications	54	62.1
Stillbirth	9	10.3
Mild asphyxia	15	17.2
Moderate/severe asphyxia	9	10.3
Total	87	100.0

Table 8   Distribution of Outcome of Women with Pre - eclampsia

Outcome	Frequency	Percentage (%)
No complications	62	71.3
HELLP syndrome	7	8.0
Partial HELLP syndrome	6	6.9
Pulmonary edema	1	1.1
CVA	1	1.1
Renal insufficiency/failure	3	3.4
Sepsis	1	1.1
Others	3	3.4
Combination	3	3.4
Total	87	100.0

The Association of Risk Factors with Labor Management

Fisher exact analysis was used to analyze the correlation of risk factor with labor management. The results of the analysis are shown in table 11.

Based on table 11, women with pre - eclampsia of age group 20 - 35 years mostly gave birth per abdomen (79,6%). It is followed by labor using an instrument (13%), and the lowest was by stimulation/induction (1,9%). As for the age group <20 and > 35 years, the majority of the patients also gave birth per abdomen (78.8%), followed by spontaneous birth (12.1%), and the lowest by using instruments (9.1%). Statistical analysis showed no significant difference between different types of the labor of women with pre - eclampsia based on age group. Based on parity, it is shown that pre - eclampsia patients within all three groups; primigravida, secundigravida and multigravida had given birth mostly per abdomen with the proportion of 76.3%, 84.2%, and 80.0% respectively. In primigravida group, it was followed by labor with instruments (15.8%) and the lowest proportion was spontaneous birth (7.9%). A similar proportion was found in secundigravida group for labor with instruments (15.8%). Whereas in multigravida group, spontaneous birth came as second highest after per abdomen birth with 13.3%, followed by labor with instruments and stimulation/induction with 3.3% each. Statistical analysis showed no significant difference between different types of the labor of women with pre - eclampsia based on parity. These results also indicate that the labor process of mothers with pre - eclampsia was generally per abdomen.

The Association of Risk Factors with Neonatal Outcomes/APGAR Score

Fisher exact analysis was used to analyze the correlation of risk factor with APGAR score at minute 1 and minute 5. The results of the analysis are shown in table 12 and table 13.

Based on table 12, infants with APGAR minute 1 score of <7 and ≥7 were mostly born from mothers with pre - eclampsia in the age group of 20 - 35 years with 61.3% and 62.5% respectively. Statistical analysis did not show any significant difference between different groups of APGAR scores at minute 1 based on age group. Regarding parity, infants with APGAR minute 1 score of <7 and ≥7 were mostly born from mothers with a history of a primigravida with 44.4% and 43.1% respectively. The lowest numbers came from mothers with a history of secundigravida parity for both groups which were 22.2% and 21.6% respectively. Statistical analysis showed no significant difference between different groups of APGAR score at minute 1 based on parity.

Table 9   Distribution of Maternal Complications Based on APGAR Score at Minute 1

| Maternal Complications | APGAR Score at Minute 1 | | Total |
	< 7	≥ 7	
No complication	26 (72.2%)	36 (70.6%)	62 (71.3%)
HELLP syndrome	3 (8.3%)	4 (7.8%)	7 (8.0%)
Partial HELLP syndrome	1 (2.8%)	5 (9.8%)	6 (6.9%)
Pulmonary edema	0 (0.0%)	1 (2.0%)	1 (1.1%)
CVA	0 (0.0%)	1 (2.0%)	1 (1.1%)
Renal insufficiency/failure	2 (5.6%)	1 (2.0%)	3 (3.4%)
Sepsis	1 (2.8%)	0 (0.0%)	1 (1.1%)
Others	2 (5.6%)	1 (1.8%)	3 (3.4%)
Combination	1 (2.8%)	2 (3.9%)	3 (3.4%)
Total	36 (100.0%)	51 (100.0%)	87 (100.0%)

Table 10   Distribution of Maternal Complications Based on APGAR Score at Minute 5

| Maternal Complications | APGAR Score at Minute 5 | | Total |
	< 7	≥ 7	
No complication	12 (70.6%)	50 (71.4%)	62 (71.3%)
HELLP syndrome	1 (5.9%)	6 (8.6%)	7 (8.0%)
Partial HELLP syndrome	0 (2.8%)	6 (8.6%)	6 (6.9%)
Pulmonary edema	0 (0.0%)	1 (1.4%)	1 (1.1%)
CVA	0 (0.0%)	1 (1.4%)	1 (1.1%)
Renal insufficiency/failure	1 (5.9%)	2 (2.9%)	3 (3.4%)
Sepsis	1 (5.9%)	0 (0.0%)	1 (1.1%)
Others	2 (11.8%)	1 (1.4%)	3 (3.4%)
Combination	0 (0.0%)	3 (4.3%)	3 (3.4%)
Total	17 (100.0%)	70 (100.0%)	87 (100.0%)

Table 11   Association of Risk Factors of Women with Pre - eclampsia with Types of Labor

| Risk Factors | Types of Labor | | | | P - value* |
	Spontaneous	Stimulation/ induction	With instruments	Per abdomen	
Patients Age					
20 - 35 years	3 (5.6%)	1 (1.9%)	7 (13.0%)	43 (79.6%)	0.661
<20 and >35 years	4(12.1%)	0 (0.0%)	3 (9.1%)	26 (78.8%)	
Parity					
Primigravida	3 (7.9%)	0 (0.0%)	6 (15.8%)	29 (76.3%)	
Sekundigravida	0 (0.0%)	0 (0.0%)	3 (15.8%)	16 (84.2%)	0.251
Multigravida	4(13.3%)	1 (3.3%)	1 (3.3%)	24 (80.0%)	
Total	7(100.0%)	1 (100.0%)	10 (100.0%)	69 (100.0%)	

Fisher exact test

Based on table 13, infants with APGAR 5 minutes score of <7 and ≥7 were mostly born from mothers with pre - eclampsia of age group 20 - 35 years with 58.8% and 62.9% respectively. Statistical analysis did not show any significant difference between different groups of APGAR score at minute 5 based on age group. Based on parity, the majority of infants with APGAR 5 minutes score of <7 and ≥7 were born from mothers with pre - eclampsia with a history of primigravida which were 52.9% and 41.4% respectively. The lowest number of births came from mothers with partial secundigravida with 11.8% and 24.3%

Table 12 Association of Risk Factors of Women with Pre - eclampsia with APGAR Score at Minute 1

Risk Factors	APGAR Score at Minute 1		P - value*
	<7	≥7	
Patients Age			
20 - 35 years	19 (61.3%)	35 (62.5%)	0.887
<20 and >35 years	14 (38.9%)	19 (37.3%)	
Parity			
Primigravida	16 (44.4%)	22 (43.1%)	
Secundigravida	8 (22.2%)	11 (21.6%)	0.982
Multigravida	12 (33.3%)	18 (35.3%)	
Total	36 (100.0%)	51 (100.0%)	

* Fisher exact test

Table 13 Association of Risk Factors of Women with Pre - eclampsia with APGAR Score at Minute 5

Risk Factors	APGAR Score at Minute 5		P - value*
	<7	≥7	
Patients Age			
20 - 35 years	10 (58.8%)	44 (62.9%)	0.759
<20 and >35 years	7 (41.2%)	26 (37.1%)	
Parity			
Primigravida	9 (52.9%)	29 (41.4%)	
Secundigravida	2 (11.8%)	17 (24.3%)	0.496
Multigravida	6 (35.3%)	24 (34.3%)	
Total	17 (100.0%)	70 (100.0%)	

*Fisher exact test

for score group of <7 and ≥7 respectively. Statistical analysis showed no significant difference between groups of APGAR score at minute 5 based on parity.

CONCLUSION

This study shows that most pre - eclampsia patients at Haji Adam Malik Hospital gave birth per abdomen despite a different history of parity and most patients did not present with any complications. No relation was found between risk factors of pre - eclampsia, management or types of labor and neonatal outcome in this study.

CONFLICT OF INTEREST

The authors declare that they don't have any competing interest regarding manuscript

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