

# Contributing Factors of Neonatal Death from Mother with Preeclampsia in Indonesia

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## ABSTRACT

**Background:** Preeclampsia is one of the main causes of maternal and neonatal morbidity and mortality in developing countries. The infant mortality rate in Indonesia has decreased but is still quite high. The purpose of this study was to analyze the factors that contribute to the death of infants from mothers with preeclampsia. **Method:** This research is a design retrospective cross-sectional study conducted in women with a history of preeclampsia are recorded in the data Dr. Soetomo hospital over a period of one year. Total respondents were 324. Demographic data on preeclamptic mothers (gestational age, age, parity and mode of delivery) and infant mortality data were collected which were then analyzed descriptively and chi-square test. **Results:** The results showed a significant relationship between maternal age with preeclampsia ( $p = 0.005$ ), age of maternal pregnancy with preeclampsia ( $p = 0.000$ ) and mode of delivery of mothers with preeclampsia ( $p = 0.000$ ) with the incidence of death in infants, and none a significant relationship between maternal parity status with preeclampsia ( $p = 0.043$ ) with the incidence of death in infants. **Conclusion:** factors that contribute to infant mortality from mothers with preeclampsia are age, gestational age, and mode of delivery.

**Keywords:** contributing factors; preeclampsia; neonatal death

## INTRODUCTION

Sustainable Development Goals (SDGs) Program in Indonesia one of which is to reduce the neonatal mortality rate and child mortality rate. Events of infant or child death in Indonesia. The number of infant mortality cases dropped from 33,278 in 2015 to 32,007 in 2016, and in 2017 there were 10,294 cases. Similarly, the maternal mortality rate dropped from 4,999 in 2015 to 4912 in 2016 and in 2017 there were 1712 cases<sup>1</sup>. Despite the decline, the figure is still high.

Data from the World Health Organization, maternal mortality in the world amounted to 289,000 in 2013, maternal deaths occurred every day about 800 women died due to complications of pregnancy and childbirth. The main trial of maternal deaths in Indonesia are bleeding, preeclampsia and infection. Preeclampsia is a hypertensive condition k late pregnancy characterized by increased blood pressure and proteinuria<sup>2</sup>. In developing countries, preeclampsia is one of the main causes of maternal mortality ranging from 1.5-2.5 percent and infants range from 45-50 percent<sup>3</sup>. Based on these data,

the percentage of infant deaths due to preeclampsia is greater than that of mothers. Infant mortality occurs due to several risk factors for preeclamptic mothers, such as preeclampsia in previous pregnancies, symptoms of chronic hypertension, pregnancies of more than 40 years, and others that have been carried out in advance<sup>4</sup>.

The impact of preeclampsia other than on the mother also affects the baby. The condition of preeclampsia can interfere with blood flow to the placenta and fetus which can cause low birth weight babies, prematurity, asphyxia, respiratory distress syndrome, apnea<sup>5</sup> and infant mortality<sup>6</sup>. Babies who survive after birth from mothers with pre-eclampsia are also at risk of developing disorders due to disturbances while still a fetus.

Some factors that cause the handling of preeclampsia in pregnant women are lacking are lack of knowledge, lack of self-awareness and poor antenatal care<sup>7</sup>. Preeclampsia conditions will increase the risk of mother and baby experiencing cardiovascular complications<sup>8</sup>, maternal age > 30 years, parity, history of hypertension, and no antenatal care<sup>9,10</sup>.

Research on preeclampsia that has been done more often looks at the risk factors of the mother and the effects on the fetus. But the contributing factors, especially in Indonesia, have not been found. The purpose of this study was to analyze the factors that contribute to infant mortality in women with preeclampsia.

### METHOD

This research is a retrospective study conducted in the public hospital area of Dr. Soetomo Surabaya. The sample of this study is medical record data of preeclampsia

patients in the period of January to December 2017 as many as 324 were taken by consecutive sampling.. Patient data is collected sequentially based on medical record numbers to avoid repetition of data and confusion when filling in data. Pre-eclampsia diagnosis is established by obstetricians. Pre-eclampsia diagnosis is blood pressure > 140/90 mmHg with proteinuria > +2. The independent variables of this study were age, gestational age, parity and mode of delivery. The dependent variable in this study was infant mortality defined as death in the first 28 days of life. Data were analyzed descriptively and chi-square test.

### RESULTS

**Table of factors that contribute to infant mortality in women with pre-eclampsia**

Variable (mother)	Infant				Total N (%)	P
	Life	%	Mortality	%		
Age (years)						0.005
<20	14	4,3	0	0,0	14 (4)	
20-35	180	55,6	31	9,6	211 (65)	
>35	72	22,2	27	8,3	99 (31)	
Age of mother's pregnancy (weeks)						0.000
<28	9	2,8	21	6,5	30 (9.3)	
28-34	91	28,1	30	9,2	121 (37.3)	
>34	166	51,2	7	2,2	173 (53.4)	
Paritas						0.463
Nulipara	96	29,6	20	6,2	116 (35.8)	
Primipara	81	25,0	14	4,3	95 (29.3)	
Multipara	89	27,5	24	7,4	113 (34.9)	
How to deliver						0.000
Spontaneous vaginal discharge	47	14,5	13	4,0	60 (18.5)	
Vaginal induction	16	4,9	12	3,7	28 (8.6)	
Vagina with instruments	9	2,8	4	1,2	13 (4)	
Perabdominam	193	59,6	26	8,0	219 (67.7)	
No data	1	0,3	3	1,0	4 (1.2)	

Most respondents are aged 20-35 years (65%). Most of the respondents' gestational age was > 34 weeks (53.4%). Most of the respondents were nullipara (35.8%) and most of them had abdominal labor (67.7%).

Most respondents with pre-eclampsia with a baby who died were aged 20-35 years as many as 31 events (9.6%). Infant mortality from preeclampsia mothers was 30 events (9.2%) from pre-eclampsia mothers with 28-34 weeks gestational age. Infant mortality in pre-eclampsia mothers was 20 events (6.2%) occurred in pre-eclampsia mothers with nulliparous parity, and infant mortality occurred as many as 26 events (8%) occurred in pre-eclampsia mothers by means of gestational birth.

Statistical test results showed a significant relationship between maternal age with preeclampsia with the incidence of infant mortality ( $p = 0.005$ ), and there was no significant relationship between the parity status of mothers with pre-eclampsia and mortality in infants ( $p = 0.463$ ). The results of statistical tests also showed a significant relationship between the age of maternal pregnancy with preeclampsia ( $p = 0.000$ ) and the method of delivery of mothers with preeclampsia (0.000) with the incidence of infant mortality.

## DISCUSSION

The age of mothers with preeclampsia has a significant relationship with the incidence of infant mortality. Infant mortality occurs in preeclamptic mothers in the age group of 20-35 years and age > 35 years.

The results of this study are in line with other studies which state that maternal age with young pre-eclampsia is associated with the risk of infant mortality<sup>11,12</sup>. Maternal age at risk of developing pre-eclampsia occurs in the age group <20 years and > 35 years.

In this study, besides that most of the respondents in this study were preeclamptic mothers aged 20-35 years. In preeclamptic mothers aged 20-35 years are included in the productive age where they are emotionally mature, especially in the face of pregnancy. In addition, the reproductive organs have also been mature and balanced<sup>13</sup>. Several other factors such as early treatment of the condition of preeclampsia and maternal conditions when treatment can affect maternal conditions.

Pregnancy age of mothers with preeclampsia has a significant relationship with the incidence of infant mortality. The infant mortality from mothers with preeclampsia most common in gestational age 28-34 weeks and <28 weeks.

The results of this study are in line with previous studies showing that the gestational age of mothers with preeclampsia is related to the morbidity and mortality of infants who born<sup>14</sup>. Other studies have shown that the high risk of infant mortality in preeclamptic mothers in the preterm period (gestational age less than 37 weeks)<sup>15,16</sup> and will be more severe at a gestational age of fewer than 24 weeks<sup>17</sup>.

Babies born in the preterm period have a high risk of experiencing low birth weight babies, respiratory disorders such as asphyxia<sup>18</sup> that occur due to pulmonary growth disorders<sup>6</sup>, intrauterine growth restriction (IUGR) and hematological disorders. Epidemiological research states that babies born to mothers with preeclampsia have a high risk of developing diabetes and cardiovascular disorders. The condition of preeclampsia can aggravate the baby's condition which is probably caused by impaired placental function due to preeclampsia or maternal system response to placental inability.

The method of delivery of mothers with pre-eclampsia has a significant relationship with the incidence of infant mortality. The majority of preeclamptic mothers in this study gave birth to a method of palpation. As well as the incidence of infant mortality from preeclamptic mothers occurred in the group of preeclamptic mothers who gave birth to a method of domination.

Previous studies have suggested that abdominal methods of childbirth will increase the risk of respiratory distress in infants that can cause infant death<sup>19,20</sup>. In addition, the method of childbirth with abdominal can increase the risk of respiratory disorders in infants compared with childbirth with vaginal delivery. Previous studies have shown that abdominal delivery<sup>21</sup> cannot improve maternal and perinatal outcomes or reduce mortality and morbidity<sup>22</sup>.

Most mothers with preeclampsia do the method of labor by abdominal. The reason for the majority of methods of delivery per abdominal is because abdominal labor is the definitive treatment in patients with severe pre-eclampsia. The risk of childbirth in women who experience severe pre-eclampsia is very high because it can threaten the life of the mother and baby, so it is necessary to end the pregnancy by giving birth per abdominal. The condition of preeclampsia which has a negative impact on the baby as well as ways of abdominal delivery which increase the risk of disorders

in infants can increase the risk of infant mortality from mothers with preeclampsia.

The parity status of mothers with preeclampsia does not have a significant relationship with the incidence of infant mortality. The total parity status of preeclamptic mothers in the study was almost the same in the nullipara, primiparous and multiparous groups.

Previous studies have shown that the status of nulliparous parity will increase the risk of the occurrence of preeclampsia<sup>23</sup> that would increase the risk of death in infants. Nulliparous pregnancies experience angiogenic imbalances so they are prone to pre-eclampsia compared to multiparous pregnancies<sup>24</sup>. The results of this study indicate that the incidence of infant mortality from mothers with pre-eclampsia occurs in nulliparous parity status although there is no statistically significant relationship.

This study has several limitations because it is done retrospectively such as some data relating to maternal preeclampsia conditions such as income, increased maternal weight during pregnancy, or other diseases that can worsen the condition of preeclampsia.

The results of this study have implications for policies related to health interventions and treatment of women with preeclampsia, maternal complications, and complications in infants. This study has limitations, the severity of preeclampsia is still not differentiated and several other factors such as antenatal care visits, knowledge, and accompanying complications have not been measured. So it needs further study of these factors related to the incidence of infant mortality from mothers with preeclampsia.

### CONCLUSION

Preeclampsia can threaten the mother and baby and can increase morbidity and mortality in infants. Factors that contribute to infant mortality from mothers with preeclampsia are maternal age, maternal gestational age, and maternal delivery method. The need for early antenatal care needs to be conveyed to pregnant women in order to screen crews for risk of preeclampsia and prevent worsening of the disease.

### RECOMMENDATION

Preeclampsia is a preventable medical condition. Early pregnancy screening early and appropriate antenatal

care can reduce the risk of morbidity and mortality in infants of mothers who experience pre-eclampsia. Increasing public awareness and health workers on the prevention of pre-eclampsia needs to be done through health education or including pre-eclampsia screening at standard examinations in pregnant women.

**Ethical Clearance:** This research has received ethical approval from the ethics committee of the general hospital health research area of Dr. Soetomo Surabaya number 0171 / KEPK / IV / 2018.

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