



## The Role Of Corticosteroid Administration On The Incidents Of Asphyxia Neonatorum Among Mothers With Preterm Delivery In Ponck RSUD Jombang

Rini Hayu Lestari<sup>1</sup>, Niken Grah Prihartanti<sup>2</sup>, Mamik Ratnawati<sup>3</sup>

<sup>1,2,3</sup> Stikes Pemkab Jombang, Jombang, Indonesia

### ARTICLE INFORMATION

Received: September, 5, 2020  
Revised: December, 2, 2020  
Available online: February, 2021

### KEYWORDS

Corticosteroid, Asphyxia Neonatorum, Preterm Delivery

### CORRESPONDENCE

E-mail: [hanifsaify1998@gmail.com](mailto:hanifsaify1998@gmail.com)  
No. Tlp: +62885607565275

### A B S T R A C T

The causes of death for newborns 0-6 days in Indonesia are 36.9% respiratory disorders, 32.4% premature birth, 12% sepsis, 6.8% hypothermia, and 6.6% neonatal jaundice. A preliminary study in Comprehensive Emergency Services Neonatal Obstetric (PONEK) of Jombang Regional Public Hospital (RSUD Jombang) reported that the incidence of asphyxia neonatorum was 295 cases in 2016 and 341 cases in 2015. There were 98 cases of preterm delivery in 2016. This study aims to prove the effect of corticosteroid administration on neonatal asphyxia in mothers with preterm delivery. This study was an analytical study using a one-group after only design. The population was all women giving birth at RSUD Jombang with preterm labor diagnosis in January-May 2017, while the sample was 82. The instruments utilized questionnaires and checklists. The bivariate analysis applied the chi-square association test. Based on the results of the chi-square test  $\chi^2 = 4.622 > \chi^2$  table;  $p = 0.009 < \alpha (0.05)$ . There was a correlation between corticosteroid administration and the incidence of asphyxia neonatorum in women with preterm delivery. This study's results could be an input for primary health care facilities to prevent neonatal asphyxia. Further research should develop other similar variables and increase the number of respondents.

## INTRODUCTION

Asphyxia neonatorum is a condition that occurs when a baby doesn't get enough oxygen before, during, or after birth (Manuaba, 2007). Asphyxia can cause neonatal mortality about 8-35% in developed countries and 31-56.5% in developing countries. The incidence of neonatal asphyxia in the first minute is 47/1000 live births and in the next 5 minutes is 15.7 / 1000 live births for all neonates. The incidence of asphyxia neonatorum in Indonesia is approximately 40/1000 (Depkes, 2009).

According to the 2012 IDHS, the Infant Mortality Rate (IMR) for newborns in Indonesia was 32 / 1,000 live births (Depkes, 2009). Meanwhile, according to data from the Statistics Indonesia of East Java Province, IMR in 2009 was 31.41 per 1,000 live births, while starting in 2010 it decreased to 29.99 per 1,000 live births, in 2011 it reached 29.24 per 1,000 live births. In 2012 the IMR estimation came 28.31 per 1,000 live births. Over the past three years, the IMR rate decreased, although not significant. One of the causes of infant mortality in Indonesia was asphyxia neonatorum, around 27%. Several facts revealed that 47% of infant deaths die during the neonatal period. In East Java province, the number of babies with asphyxia reached 26.75% (Timur, 2013). In Jombang, the number of babies with asphyxia neonatorum reached 21.4% (Jombang, 2014). In Comprehensive Emergency Services Neonatal Obstetric (PONEK) of

Jombang Regional Public Hospital (RSUD Jombang), the number of babies who experienced asphyxia in 2012 was 28.9%. In 2013 it increased to 29.2%, while the period from January to March 2014 was 27.7% (RSUD Jombang, 2014). A preliminary study in PONEK RSUD Jombang showed that the incidence of asphyxia neonatorum in 2016 was 295 cases, and in 2015 was 341 cases. For two years, the incidence of neonatal asphyxia fell by 46 cases. There were 98 cases of preterm delivery in 2016.

Preterm delivery tends to the incidence of neonatal asphyxia. From its background, it is necessary to conduct research that analyzes the corticosteroid administration's effect on the incidence of neonatal asphyxia in mother with preterm delivery at PONEK RSUD Jombang.

## METHOD

This study was an analytical study using a one-group after only design. The population was all women diagnosed with preterm labor at RSUD Jombang in January-May 2017, as many as 109 cases. Based on the sample size estimate calculation, the minimum number of samples was 41, so there were 82 respondents in this study. The instruments utilized questionnaires and checklists. The bivariate analysis applied the chi-square association test to determine the significance of the two research subjects' hypotheses.

## RESULTS

Description of the Characteristics of Respondents of Premature Maternity in RSUD Jombang

Table 1 Characteristics of respondents

Characteristics of respondents	n	%
Age		
< 20 year	11	13.4%
20 – 35 year	56	68.3%
>35 year	15	18.3%
Parity		
1 time	28	34.1%
>1 time	54	65.9%
Gestational Age		
> 30 week	66	80.5%
< 30 week	16	19.5%

Table 1 shows that most respondents are 20-35 years old, multipara, and have a gestational age of more than 30 weeks.

Table 2 Crosstabulation of Asphyxia Neonatorum by Characteristics of Respondents at PONEK RSUD Jombang.

Charakteristics of respondents	Mild Asphyxia		Moderat Asphyxia		Severe Asphyxia	
	n	%	n	%	n	%
Age						
< 20 year	4	36.4%	6	54.5%	1	9.1%
20 – 35 year	30	53.6%	15	26.8%	11	19.6%
>35 year	6	40.0%	3	20.0%	6	40.0%
Parity						
1 time	25	46.3%	16	29.6%	13	24.1%
>1 time	15	53.6%	8	28.6%	5	17.9%
Gestational Age						
> 30 week	39	59.1%	18	27.3%	9	13.6%
< 30 week	1	6.3%	6	37.5%	9	56.3%

Table 2 describes that 40% of mothers aged > 35 years deliver babies diagnosed with severe asphyxia. At the same time, 56.3% of deliveries with gestational age <30 weeks have severe asphyxia. Besides, primipara mothers tend to give birth to a baby with mild asphyxia at 53.6%.

Table.3 Correlation between Administering Corticosteroids and Asphyxia Neonatorum Incident at PONEK RSUD Jombang.

Charakteristics of respondents	Mild Asphyxia		Moderat Asphyxia		Severe Asphyxia	
	n	%	n	%	n	%
Administering corticosteroids						
Yes	22	53.7%	14	34.1%	5	12.2%
No	18	43.9%	10	24.4%	13	31.7%
$\chi^2 = 4,622; p = 0,009$						

53.7% of respondents with administering corticosteroids gave birth to a baby with mild asphyxia. In comparison, 43.9% of respondents without administering corticosteroids gave birth to a baby with mild asphyxia. The research analysis results showed  $\chi^2 = 4,622; p = 0.009$  (table 3). There was a significant difference between the group with administering corticosteroids and without corticosteroids.

## DISCUSSION

Based on the research results in mothers with preterm delivery at PONEK RSUD Jombang, the total number of respondents was 82 mothers. Of this number, almost half of the respondents in the age group > 35 years delivered babies diagnosed with severe asphyxia, namely 40%. The result is in line with research conducted by Lee (2008), which reported that babies born to mothers aged 20-29 years had a lower risk of experiencing death due to asphyxia neonatorum compared to infants of mothers with high-risk age groups (<20 years or > 35 years). There is a tendency of uteroplacental complications that occur in mothers of high-risk age. Physically, mothers aged more than 35 years experience a setback to undergo pregnancy and are a predisposing factor for decreased blood flow to the placenta resulting in impaired placental function. It can result in the asphyxia of the newborn and fetal distress due to lack of oxygenation (Wiknjastro, 2007).

This study showed that almost all (56.3%) deliveries with gestational age <30 weeks had severe asphyxia. (Wiknjastro, 2007) suggests that placental function reaches its peak at 38 weeks of gestation and begins to decline after 42 weeks – decreased estriol and placental lactogen levels. Apart from this, the reduced amniotic fluid results in abnormal changes in the fetal heart. Eventually, the fetus experiences hypoxia, sometimes accompanied by aspiration of meconium and asphyxia neonatorum. This study is in line with research conducted by Mardiyaningrum (2005). Its result showed a significant correlation between gestational age and the incidence of neonatal asphyxia. Another similar study was conducted by Lee (2008) which stated that premature babies had a greater risk of death due to neonatal asphyxia. The risk increased 14.33 at <34 weeks' gestation.

Parity history correlates with the incidence of neonatal asphyxia. This study indicated that a pregnant mother for the first time (primipara) with a diagnosis of preterm labour tended to give birth to a baby with mild asphyxia (53.6%). This condition is possible because the uterine muscles are still stiff. Besides, women who get pregnant for the first time after being married for years show a low conception ability. The most common complication is preeclampsia. Preeclampsia is a hypotonic disorder and stiff birth canal muscles. Impaired blood flow to the uterus reduces due to hypotonic so that there is a decrease in oxygen flow to the placenta and fetus. It causes the birth of babies with asphyxia. Teenage pregnancy is also at risk in pregnancy and childbirth because the uterus is not yet perfect, which will cause premature birth so that the baby experiences homeostatic disorders – especially in the respiratory system – and asphyxia neonatorum.

Most respondents with administering corticosteroid injections delivered babies with mild asphyxia (53.7%) or as many as 22 babies. Meanwhile, almost half of women without corticosteroid injection gave birth to a baby with mild asphyxia, namely 43.9%. This study also explained that only a small proportion of preterm births with administering corticosteroid injection experienced severe asphyxia in babies, namely five respondents or 12.2%. In contrast, preterm delivery incidence without corticosteroid injection showed that nearly half of the baby's respondents experienced severe asphyxia, namely 13 babies (31.7%). Corticosteroid administration to pregnant mothers with a premature risk helps ripen the baby's lungs – suppressing Respiratory Distress Syndrome (RDS). The risk of RDS in term pregnant women is lower because there is already cortisol formation. Administering corticosteroids can reduce Respiratory Distress Syndrome (RDS) incidence to reduce perinatal morbidity in early delivery.

The research analysis results showed  $\chi^2 = 4,622$ ;  $p = 0.009$ . There was a significant difference of asphyxia neonatorum between preterm delivery mothers with and without corticosteroid injection. This study's result is in line with several studies that prove corticosteroids' effectiveness in preventing neonatal asphyxia in preterm delivery. A survey conducted by the National Institute of Health Consensus Conferences and various implementation projects in the UK investigated 685 women with severe

preeclampsia. A systematic review explained that the corticosteroid administration effectively reduced premature delivery risk in pregnant women with premature babies risk. So corticosteroid administration could prevent the incident of neonatal asphyxia (Yuniar, 2013).

The reason for not giving corticosteroid injections at PONEK RSUD Jombang is that the patient came in the second stage of labor. Besides, the patient has been given corticosteroids at the pre-referral site. Another reason is a possible error in the management procedure for premature delivery. The role of midwives is to prevent preterm delivery. But this contradicts the Indonesian Pediatric Society (IDAI), which alludes to midwives' role in providing corticosteroid therapy, which implementation should not be under the authority of midwives. Midwife roles are detecting and carrying out the referral process. There is a consideration of antenatal steroids (ACS) administration in certain conditions, so it must still be an integrated package to prevent complications and prolong the gestational age with tocolytic administration. Based on the results of the chi-square test analysis, the value of  $\chi^2 = 4.622 > \chi^2$  table;  $p = 0.009 < \alpha (0.05)$ . There was a difference in the incident of asphyxia neonatorum after administering corticosteroids in preterm delivery.

## CONCLUSIONS

There is an effect of corticosteroid administration on asphyxia neonatorum in women with preterm labor at PONEK RSUD Jombang. This study's results could be an input for primary health care facilities to prevent neonatal asphyxia. Further research should develop other similar variables and increase the number of respondents.

## REFERENCES

- Depkes (2009) *Profil Kesehatan Indonesia*.
- Jombang, D. K. (2014) *Profil Kesehatan Jombang*.
- Lee, et al. (2008) 'Risk Factors for Neonatal Mortality Due to the birth Asphyxia in Southern Nepal: A Prospective, Community-Based Cohort Study', *Journal Pediatrics*, 121(5).
- Mardiyaningrum, D. (2005) *Hubungan Umur Kehamilan Dengan Kejadian Asfiksia Neonatorum di badan RSUD Banjarnegara kabupaten Banjarnegara tahun 2005*. Semarang: Fakultas Kesehatan Masyarakat Universitas Diponegoro.
- Timur, D. K. P. J. (2013) *Profil Kesehatan Jawa Timur*.
- Wiknjosastro, H. (2007) *Ilmu Kebidanan Edisi 4*. Jakarta: YBP-SP.
- Yuniar, Y. (2013) *Kajian Pemberian Antenatal Kortikosteroid Untuk Ibu Hamil Yang Berisiko Melahirkan Bayi Prematur*. Badan Litbangkes.