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CORRELATION OF ASPHYXIA NEONATORUM INCIDENCE AND CAESAREAN SECTION DELIVERY

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ABSTRACT

Introduction: Asphyxia neonatorum occupies second place in the cause of death of babies in East Java in 2010 and still in the top three of the cause of death of babies in Surabaya until 2016. One of the risk factors of asphyxia neonatorum was the delivery method, one of which is caesarean section delivery.

Aim: The purpose of this study was to determine the correlation between asphyxia neonatorum incidence and caesarean section delivery.

Methods: This is an observational analytical study using secondary data with retrospective approach. This study used case control design. Total population in this study were 1112 birthing mother and 1134 babies born during 1 January 2016 until 31 December 2016. A total of 125 case samples (Asphyxia) were chosen using purposive sampling technique, while 125 control samples (Non-asphyxia) were chosen using simple random sampling technique. Data were analysed with Chi-Square test.

Results: Results showed that there were no significant correlation between asphyxia neonatorum incidence and caesarean section delivery ($p = 0.591$)

Conclusion: This study showed that caesarean section delivery was not the main risk factor of asphyxia neonatorum.

Keywords: Asphyxia neonatorum, Caesarean section delivery

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INTRODUCTION

Indicator of community health and welfare is marked by the sum of maternal mortality rate (MMR), Infant Mortality Rate (IMR), and life expectancy at birth. Until now, IMR was one of priority problem in Mother and Child's Health Field. High rates of IMR also tardiness of decreasing IMR score showed that health services on Mother and Child's sector had an urgent improvement from perspective of quality and quantity on health care.⁽¹⁾

Based on World Health Organization report south Asia had the second highest IMR rates (142/1.000 population) after Africa.⁽¹⁾ In 2011, Indonesia had fifth highest MMR for ASEAN (35/1.000 population) after Myanmar (48/1.000 population), Laos and Timor Leste (46/1.000 population), and Cambodia (36/1.000).⁽¹⁾ In 2010 IMR in East Java Province showed 10,62 cases/1.000 birth, with 41,39% Low Birth Weight (LBW), 19% Asphyxia, 4,92% Infection, and 12,79% Birth Trauma.⁽¹⁾

Result from Riskesdas (Riset Kesehatan Dasar) in 2007 showed the three main causes of IMR in Indonesia were respiratory failure (35,9%), premature (32,4), and sepsis neonatorum (12%).⁽²⁾

According to WHO, there 3% of 120 million new-borns had experience asphyxia, nearly 1 million of these cases led to death. Asphyxia neonatorum was a common cause of neonatal death from 2000 to 2011 in Indonesia.⁽³⁾

Asphyxia neonatorum was defined as a condition when new-born could not breath spontaneously and regularly soon after birth, leading to disturbance in gas exchange and causing hypoxemia and hypercapnia.⁽³⁾ Result from research done

by Fahrudin (2002) mentioned that risk factors of asphyxia were Low Birth Weight (LBW), Premature Rupture of Membranes (PROM), Old Labor, Caesarea Section, mother age (<20 years old or >35 years old), history of poor obstetric, breech position, and poor *Ante Natal Care* (ANC) status.⁽⁵⁾

Caesarean section delivery method is a surgical procedure used to deliver a baby through incisions in the abdomen and uterus.⁽⁴⁾ Caesarean section is done according to indications relating to maternal and fetal conditions. Maternal indication are cephalopelvic disproportion (CPD/FDP), soft tissue dystocia, uterus dysfunction, and placenta previa. Fetal indication are macrosomia, fetal distress, and oblique/transverse lie presentation.⁽⁴⁾

According to Hansen et al., investigation of 34.000 birth in Denmark--There was 4 times higher risk of asphyxia neonatorum induced by caesarean section delivery. The purpose of this study was to determine the correlation between asphyxia neonatorum incidence and caesarean section delivery.

METHODS

This study used observational analytic with case control design to investigate the relation of asphyxia neonatorum incidence with caesarean section delivery. Independent variable for this study were; caesarean section. Dependent variable is asphyxia neonatorum.

Sample of this study were secondary data (medical records) with normal born and asphyxia neonatorum case that fulfilled inclusion and exclusion criteria in one private hospital in Surabaya between 1 January 2016 - 31 December

2016. Based from calculation, minimum sample for this study were 125 each for case and control groups. Sample were taken using purposive sampling based on inclusion criteria for case: all asphyxia neonatorum cases with or without caesarean section procedure. Exclusion criteria for case of this study were twin pregnancy and missing data from medical records. Inclusion criteria for control were all normal birth without asphyxia incidence delivered by all procedure. Exclusion criteria for control were twin pregnancy and missing data from medical records.

Samples were taken in maternity unit in a private hospital in Surabaya. This study used chi-square test for hypothesis test.

RESULT

This report based on a total of 1.112 delivery from 1st January 2016 to 31st December 2016. The number of surviving new-borns were 1.116, and death were 18. There were 384 delivery using section caesarean method. 1.003 new-borns were normal, meanwhile 131 new-borns experienced asphyxia neonatorum.

Table 1. Ante Natal Care (ANC) data from all delivery on 1st January 2016 to 31st December 2016.

	Yes n(%)	no n(%)	Total n(%)
<i>Ante Natal Care (ANC)</i>	1106 (99,46%)	6 (0,54%)	1112 (100%)

As shown in **Table 1**, there were 6 (<1%) mother who didn't do ANC.

Table 2. Distribution of asphyxia neonatorum based on maternal age during 1st January 2016 to 31st December 2016.

Maternal Age	Case	Control	Total
	Asphyxia n (%)	Not Asphyxia n (%)	n (%)
<20	1 (50,0%)	1 (50,0%)	2 (100%)
20-35	107 (48,4%)	114 (51,6%)	221 (100%)
>35	17 (63,0%)	10 (37,0%)	27 (100%)
Total	125 (50,0%)	125 (50,0%)	250 (100%)

As shown in **Table 2**, there were no significant difference of in asphyxia incidence based on maternal age.

Table 3. Distribution of Asphyxia Neonatorum incidence based on parity status during 1st January 2016 to 31st December 2016.

Parity	Case	Control	Total
	Asphyxia n (%)	Not Asphyxia n (%)	n (%)
Primipara	102 (49,8%)	103 (50,2%)	205 (100%)
Multipara	22 (51,2%)	21 (48,8%)	43 (100%)
Grande multipara	1 (50,0%)	1 (50,0%)	2 (100%)
Total	125 (50,0%)	125 (50,0%)	250 (100%)

Shown in **Table 3**, there were no significant difference in asphyxia incidence based on parity status in either groups.

Table 4. Distribution of Asphyxia Neonatorum based on birth weight during 1st January 2016 to 31st December 2016.

Birth Weight	Case	Control	Total
	Asphyxia n (%)	Not Asphyxia n (%)	n (%)
LBW	30 (83,3%)	6 (16,7%)	36 (100%)
Not LBW	95 (44,4%)	119 (55,6%)	214 (100%)
Total	125 (50,0%)	125 (50,0%)	250 (100%)

Asphyxia incidence were lower on normal weight new-borns (44,4%) than Low Birth Weight (LBW) new-borns (83,3%) as shown in table 4.

Table 5. Distribution of Asphyxia Neonatorum based on Caesarean Section Delivery during 1st January 2016 to 31st December 2016.

Caesaeen Section	Case	Control	Total
	Asphyxia n (%)	Not Asphyxia n (%)	n (%)
Yes	39 (47,0%)	44 (53,0%)	83 (100%)
No	86 (51,5%)	81 (48,5%)	167 (100%)
Total	125 (50,0%)	125 (50,0%)	250 (100%)

Asphyxia neonatorum incidences were lower on Caesarean Section delivery (47,0%) than normal delivery (51,5%) as shown in table 5.

Chi-square tests indicated there were no significant correlation between asphyxia neonatorum incidence and

caesarean section delivery method, table 5 ($p=0,591$)

DISCUSSION

In this study the majority of mothers in the case sample (48,4%) and control sample (51,6%) were 20-35 years old (low risk) suggesting asphyxia neonatorum were unlikely to occur within mothers with low risk factor. Wahyu (2015) in his study showed mother age was not the only factor that directly cause asphyxia neonatorum. Maternal factor that were identified to affect asphyxia neonatorum were nutrition, pre-eclampsia history, and/or other complication during delivery.⁽⁸⁾

High parity could be a factor of pregnancy complication and delivery, that could disturb Oxygen transport from mother to fetus and cause asphyxia that can be measured from APGAR score.⁽⁶⁾ Multigravida (high parity) can cause decreasing elasticity of tissue thus tend to causing oblique/transverse lie presentation or abnormality of placental growth and fetus growth. This could disturb nutrition or oxygen supply to fetus and lead to asphyxia neonatorum during birth.⁽⁹⁾

In this study most of the mothers were primipara in parity status. This result contradict with study done by Wahyu (2015). Based from Wahyu study, mother with primipara could cause asphyxia neonatorum because of reproductive tissue stiffness or psychology of maternal that isn't ready to go through delivery event.⁽⁸⁾

Birth weight is related to gestation period. The shorter the gestation period and the lower the infant weight, the higher morbidity and mortality rates. LBW prognosis depend on fetal weight during

perinatal period. The lower the infant weight, the more frequent asphyxia neonatorum and respiratory syndrome could occur. Asphyxia or failure on spontaneous breathing after delivery are common problem of infants with LBW. These problem caused by deficiency of surfactant (lecithin or sphingomyelin less than 2), lung growth and development that was not completed, respiratory muscles that were still weak, and pliable thorax.⁽⁹⁾

In this study, asphyxia neonatorum occurred more frequently on normal delivery and other delivery except section caesarean. This result shown in table 5 where 86 (51,5%) new-borns had asphyxia on normal or other delivery methods except section caesarean and 81 (48,5%) new-borns did not have asphyxia on normal or other delivery methods except section caesarean.

Chi-square indicated that there were no significant correlation between asphyxia neonatorum incidence with section caesarean delivery. These results may caused by :

1. Mother who gave birth in the hospital where this research held were routinely doing Ante Natal Care (ANC). Mothers condition were controlled from the beginning so the risks were reduced. This statement were suitable with table 5.1 where 6 from 1123 mother didn't do ANC routinely in the hospital.
2. Section caesarean in this hospital were, so there is less complication. This statement contradict with research done by Zulkarnaen et al. on 2013 where asphyxia neonatorum were frequent on section caesarean delivery methods (60 (51,7%) of 105 new-borns), whilst lowest incidence were forceps extraction method (2 (1.9%) new-borns). From Chi-square test, there

were significant difference in asphyxia neonatorum incidence from variety of delivery methods. The high incidence of asphyxia neonatorum incidence reported may be caused by the fact that in the study, caesarean section were done on emergency situation (CITO) without sufficient operative treatment and planning, suggesting that there may be other contributing factors (eg : eclampsia, pre-eclampsia, late partus, cephalopelvic disproportion, etc.)⁽¹⁰⁾

3. Hospital where this research was done is in urban area. Advances in technology had equipped people with better knowledge on health. This may allow mothers to anticipate post-partum complication.⁽¹¹⁾

CONCLUSION

1. Number of section caesarean delivery methods done on this study were one third of total samples, and two third were normal delivery.
2. The study found no correlation between asphyxia neonatorum incidence with caesarean section delivery nor normal delivery method.

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