

Incidence Rate and Risk Factor Analysis of Asphyxia Neonatorum

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ABSTRACT

Asphyxia neonatorum is still the third cause of death for newborns in the first week of life. Failure to breathe spontaneously and regularly after birth if not handled properly will be fatal for the baby's life. The purpose of this study was to determine the risk factors and incidence of asphyxia neonatorum. This study uses an analytical survey with a cross sectional approach, using secondary data from the medical record installation of Muhammadiyah Hospital Palembang for the period 1 Sept to 1 Oct 2016 with a total sampling technique of 156 births. statistical analysis using chi-square. The results of the analysis of the incidence of asphyxia neonatorum was 8.3%. There was a significant relationship between amniotic fluid mixed with meconium ($p=0,000$;OR=21,719) and prolonged second stage ($p=0,002$;OR=42,600) and asphyxia neonatorum. Early detection through regular antenatal examinations can minimize risk factors and the incidence of asphyxia neonatorum.

Keywords: Asphyxia neonatorum, Risk Factors, Incidence rate

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INTRODUCTION

The World Health Organization (WHO) estimates that the neonatal mortality rate in 2007 was 40/1000 live births or about 200,000 babies per year, in other words perinatal deaths occur every 1.2-1.5 minutes (Manuaba. IBG, 2007, p. 6). Until 2008 the Death Rate (IMR) in Indonesia still ranks first in ASEAN countries, which is around 35/1000 live births, while in Vietnam 15/1000 live births, the Philippines 28/1000 live births, Malaysia 8/1000 live births and Singapore only 3/1000 live births with the most causes are neonatorum asphyxia 50-60%, low birth weight 25-30%, infection 25-30% and trauma 5-10%. (Manuaba, I.B.G, 2007, p. 17).

The results of the 2012 Indonesian Demographic and Health Survey (IDHS) showed a decrease in the neonatal mortality rate (Neonatal Mortality Rate) by 19/1000 live births. Despite a significant decline from year to year, the infant mortality rate is still high compared to other neighboring countries such as Thailand at 1,3/1000 live births, Malaysia 0.3/1000 live births and Singapore 0.06/1000 live births.

Data from the Health Service of South Sumatra Province in 2014 noted that the infant mortality rate was 3,7/1000 live births, higher than 2013 at 2,8/1000 live births. The highest infant mortality occurred in East Ogan Komering Ulu Regency (East OKU) with 74 cases and the lowest infant mortality and death occurred in Ogan Komering Ulu Regency (Provincial Health Office. South Sumatra, 2014). The number of infant deaths in the city of Palembang,

based on reports from the 2014 children's program as many as 52 infant deaths from 29,235 live births (Health Profile, Palembang City Health Office, 2015).

The infant mortality rate (IMR) is one indicator of the nation's health status. This high infant mortality rate can be an indication that mothers and babies are in unfavorable conditions, so efforts are made to reduce the infant mortality rate (Saragih, 2011).

In general, the causes of infant mortality in Indonesia are low birth weight infants (LBW), respiratory disorders (asphyxia), infections in infants, and hypothermia. Approximately 90% of newborns require routine care alone, $\pm 10\%$ of newborns require some assistance to initiate breathing and only $\pm 1\%$ require complete resuscitation for survival (intubation, chest compressions, drug administration). To be able to anticipate the possibility of asphyxia, rescuers must understand the conditions of fetal distress that preceded it so that they can prepare for resuscitation (IDAI, 2004). Therefore, it is important for rescuers to have accurate prevalence data in the population and risk factors for neonatal asphyxia, so that they can plan specific treatment patterns for the prevention and management of neonatal asphyxia in the delivery unit so that neonatal and perinatal morbidity and mortality can be significantly reduced.

Asphyxia is a condition in which newborns can not breathe spontaneously and regularly after birth. This is caused by fetal hypoxia in utero associated with factors that arise in pregnancy, childbirth and after birth (Mochtar, R., 2012).

Many factors cause asphyxia, namely maternal factors, umbilical cord factors and infant factors (Ahmad, 2000). Maternal factors include preeclampsia and eclampsia, abnormal bleeding, prolonged or obstructed labor (long term II), fever during labor, severe infection, postmature pregnancy, and maternal age. Fetal factors include premature babies, congenital abnormalities and amniotic fluid mixed with meconium. Umbilical cord factors include the presence of umbilical cord entanglement, short umbilical cord, umbilical cord knot, and umbilical cord prolapse (Indonesian Ministry of Health, 2009).

The results of Fitria and Utami's study showed a significant relationship between amniotic conditions (p-value 0.000, OR= 5.788), time of membrane rupture (p-value 0.04, OR= 1.840 and the incidence of neonatal asphyxia. (Fitria & Utami, 2016) Results Previous research at the Salatiga Hospital showed data that 90.9% of mothers who gave birth with meconium-mixed amniotic fluid gave birth to babies with asphyxia (Septiana, nd, 2012). Research conducted by Dewiyanti at Salatiga Hospital in 2010 also showed a significant relationship between prolonged second stage of labor and the incidence of asphyxia neonatorum p value 0.000 (Dewiyanti, 2010), as well as the results of research by Katiandagho, N and Kusmiyati, 2015 which showed a significant relationship between prolonged second stage labor and the incidence of asphyxia neonatorum (Katiandagho, N and Kusmiyati, 2015).

Data obtained from Palembang Muhammadiyah Hospital in 2013 found the number of babies with asphyxia 47/2446 live births, in 2014 the number of babies with asphyxia 95/2486 live births, in 2015 the number of babies with asphyxia 111/2483 live births and the period January – September 2016 the number of babies with asphyxia was 43/1458 live births. Based on the data above, the incidence of asphyxia neonatorum at Muhammadiyah Hospital Palembang in the last 3 years tends to increase. The high incidence of asphyxia and the poor handling of healthy newborns will cause abnormalities that result in lifelong disabilities, even leading to death (Dewi, 2010). Therefore identification of risk factors for asphyxia is important in mediating the health consequences of infants with asphyxia after birth and also in reducing the prevalence of asphyxia. Based on this description, the authors are interested in conducting a study entitled "Incidence Rate and Risk Factor Analysis of Asphyxia Neonatorum at Muhammadiyah Hospital Palembang.

METHODS

This study is an analytic survey study with a cross sectional approach to determine the incidence and risk factors for asphyxia neonatorum. Data collection was carried out at Muhammadiyah Hospital Palembang. The study population was all births in the period 1 September-1 October 2016 using secondary data from the medical record installation. Samples were taken from a population that met the inclusion criteria of 156 births. Sampling with total sampling technique. The dependent variable in this study was infants with asphyxia neonatorum and the independent variables observed were meconium-stained amniotic fluid, labor with prolonged second stage and maternal age. Data analysis was conducted to determine the relationship between maternal characteristics and the incidence of neonatal asphyxia using univariate analysis and bivariate analysis with chi-square which aims to test whether the observed independent variables are associated with the incidence of Asphyxia neonatorum

RESULT

Univariate analysis describes the distribution of the frequency variables studied, both independent and dependent variables

Table 1. Frequency distribution of respondents' characteristics based on independent and dependent variables (N=156)

Variabel	Frequency (n)	%
Asphyxia neonatorum		
Yas	13	8,3
No	143	91,7
Amniotic fluid mixed with meconium		
Yas	9	5,8
No	147	94,2
The second stage was prolonged		
High risk	4	2,6
Low risk	152	97,4
Mother's Age		
High risk(<20 atau >35 th)	27	17,3
Low risk(20-35 th)	129	82,7

Based on table 1, it shows that the incidence of neonatal asphyxia is 8.3%, there are 9 deliveries (5.8%) with amniotic fluid mixed with meconium, 4 deliveries (2.6%) indicating prolonged second stage of labor and 27 respondents (17.3). giving birth at a high-risk age (<20 or >35 years)

Table 2. Bivariate analysis of factors that influence the incidence of asphyxia neonatorum (N=156)

Variabel Independen	Asfiksia				Total		<i>p value</i>	OR
	Ya		Tidak		n	%		
	n	%	n	%				
Amniotic fluid mixed with meconium								
Yes	5	55,6	4	44,4	9	100	0,000	21,719
No	8	5,4	139	94,6	147	100		(4,868-96.89)
The second stage was prolonged								
Yes	3	75	1	25	4	100	0,002	42,600
No	10	6,6	142	93,4	152	100		(4,054-447.69)
Mother's Age								
High riski (<20 atau >35 th)	2	7,4%	25	92,6%	27	100	0,603	0,858
Low risk (20-35 th)	11	8,5	118	91,5	129	100		

Table 2 shows that there is a significant relationship between amniotic fluid mixed with meconium and the incidence of asphyxia neonatorum (p value 0,000; OR = 21,719), there is a significant relationship between prolonged second stage of labor and the incidence of asphyxia neonatorum (p value 0,002; OR = 42,600) but there is no significant relationship between maternal age and the incidence of asphyxia neonatorum (p value 0,603; OR = 0,858)

DISCUSSION

Neonatal asphyxia is a condition of newborns can not breathe spontaneously and regularly, so it can reduce oxygen and further increase the level of carbon dioxide that can have bad consequences in later life. Neonatal asphyxia is a neonatal emergency that can result in hypoxia (low oxygen supply to the brain and tissues) and possibly brain damage or death if not treated properly. Knowing the risk factors for asphyxia neonatorum can minimize the incidence of asphyxia in newborn.

The results showed that the incidence of asphyxia neonatorum was 8.3%. This figure, according to the research, is quite high considering that the data processed only comes from medical records for childbirth in 1 month. The results of the bivariate analysis showed that there was a significant relationship between amniotic fluid mixed with meconium and neonatal asphyxia where p value was 0,000 with OR = 21,719, meaning that delivery with meconium-mixed amniotic fluid had a risk of 21,719 times causing neonatal asphyxia. The amniotic fluid plays an important role as long as the fetus is in the womb, under certain conditions, the membranes can also threaten the life of the fetus. One of them is a condition in which the fetus has amniotic fluid poisoning or meconium aspiration syndrome. This occurs when the fetus or newborn has mixed with the first stool (meconium). This event can take place before, during, or after the birth process.

Meconium aspiration syndrome is a serious, life-threatening condition that occurs in about two to five percent of all births. Although the infant mortality rate from this syndrome has decreased, infants are at high risk for lifelong medical complications, especially if not treated promptly. The results of Xu, ZZ (2006) research on 68 infants with meconium aspiration syndrome found 26 infants experienced complications of brain injury, 14 infants with heart failure, 11 infants with shock, 12 infants with kidney failure, 3 with gastrointestinal dysfunction, and 3 with cardiac arrest. From this data, it can be said that infants with syndromic syndrome have a poor prognosis ($H=25,55308$, $X^2=5,6210$, $P<0.01$) if they do not get proper treatment in the form of oxygen therapy, antibiotics, and surfactant administration (Xu, ZZ, 2006).

Given the magnitude of the danger of amniotic air poisoning or meconium aspiration, the best step is to carry out routine pregnancy checks and prevent stress on the fetus, so that any disturbances can be detected and anchored early. If pregnant women have risk factors that can increase the risk of meconium aspiration, such as hypertension or diabetes, it is recommended to undergo therapy given by a doctor on a regular basis. Pregnant women are also required to maintain their health and avoid exposure to smoking smoke during pregnancy, because smoking can increase the risk of oxygen flow disturbances, and even lack of oxygen to the fetus.

The results of the analysis showed a significant relationship between labor and the second stage of labor with the incidence of asphyxia neonatorum where the results were obtained ($p = 0,002$; OR = 42,600). This shows that the second time that causes the baby to have a 42,600 times greater risk of developing asphyxia neonatorum. The results of this study are in line with previous studies which stated that a prolonged second stage of labor had a 9.4 times greater risk of causing asphyxia (Chandra, S., et al., 1997). Research conducted by Chiabi, Andreas, et al., (2013), Majeed, Rehana, et al., (2007) and Widiani, A. et al., (2016) has

confirmed the same thing that prolonged second stage of labor is a risk factor for asphyxia found in the intrapartum phase. Long labor is the time from the first stage to the birth of a baby that lasts more than 20 hours for mothers who have given birth for the first time and more than 14 hours for mothers who have given birth more than once.

The longer second stage labor causes compression of the umbilical cord and uterine contractions that last a long time so that it can cause inadequate oxygen delivery conditions to the fetus so that the baby will have difficulty breathing, weak heart rate, weak or limp muscles, and organ damage, especially the brain. When this condition is severe, the baby can have problems with the brain, heart, lungs or kidneys that have the potential to endanger his life. Based on the adverse effects caused, preventive action is an important step that must be taken by pregnant women and health workers, where during prenatal visits information and communication with pregnant women must be strengthened. The next step that must be taken to reduce the incidence of asphyxia is skilled birth attendants and appropriate care for premature and low birth weight neonates (Aslam, H. M., et al., 2014).

The results of the analysis showed that there was no significant relationship between maternal age and the incidence of asphyxia neonatorum ($p=0,603$). However, based on the frequency distribution of maternal age, the incidence of neonatal asphyxia mostly occurred in mothers with low risk age (20-35 years) as many as 11 people (8.5%) and from high-risk maternal age with an age range of <20 or >35 years, the incidence of asphyxia neonatorum only 2 people (7.4%). In terms of maternal health aged <20 years and >35 years, the reproductive system is not as good as when mothers aged 20-35 years. Pregnancy at a young age or adolescents under the age of 20 years will cause fear and anxiety about pregnancy and childbirth, this is because at this age the mother is not ready to have children and the mother's reproductive organs are not ready to get pregnant and give birth. While maternal age >35 years is non-reproductive age or that age is at high risk for pregnancy and childbirth because the reproductive organs are too old to conceive or give birth. This will have an impact on the condition of the mother and fetus in the womb.

Age during pregnancy greatly affects the mother's readiness to accept responsibility as a mother so that the quality of human resources is increasing and readiness to care for the next generation can be guaranteed (Prawirohardjo, 2007). Theoretically, mothers with an age range of 20-35 years are considered less at risk of experiencing neonatal asphyxia than mothers with an age range of <20 or >35 years. However, in this case there is a gap between theory and research results because most of the ages of mothers with asphyxia neonatorum babies are actually in the low-risk age range (20-35 years). The results of this study are in line with the research of Lee, A. C., et al (2008), Pitsawong, C., & Panichkul, P. (2011), Onyearugha, C. N., & Ugboma, H. A. (2012) and Aslam, H. M., et al., (2014), where mothers at the age of 20-25 have a higher risk of experiencing birth asphyxia compared to younger or older mothers (<20 or >25) (OR 0,30; 95% CI 0,07-1,21). Other factors that play a role in the occurrence of asphyxia neonatorum include the regularity of a mother in checking her pregnancy can help the mother and also medical personnel in early detection of pregnancy disorders, and anticipate abnormalities that may occur in the future.

CONCLUSION

Based on the results and discussion in this study, it can be concluded that the incidence of asphyxia neonatorum is 8.3% with the most dominant variable causing the occurrence of asphyxia neonatorum is labor with a prolonged second stage where the risk is 42,600 times and meconium-mixed amniotic fluid has a risk of 21,719 times causing neonatal asphyxia. Regular visits during pregnancy (at least 4 visits) are very important so that problems and complications can be detected early during pregnancy and childbirth. It is hoped that health workers (midwives/nurses) should be able to find signs and symptoms of maternal and fetal

emergencies so that they can plan special care patterns for the prevention and management of neonatal asphyxia in the maternity unit so that neonatal and perinatal morbidity and mortality can be significantly reduced.

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