

# ANALYSIS OF PROLONGED LABOR AND PREMATURE RUPTURE OF MEMBRANES RISK FACTORS ON THE OCCURRENCE OF ASFIKZIA IN A NEW BORN BABIES IN MAMUJU DISTRICT, 2017 - 2018

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## ABSTRACT

According to the World Health Organization (WHO), Asphyxia causes 23% of all neonatal deaths worldwide and the fifth largest cause of death at the age of under five years (8%). The causes of Infant Mortality Rate (IMR) in Indonesia include the slow growth of the fetus (23.53%), lack of oxygen in the womb (intra uterine hypoxia) (21.24%), neonatal asphyxia (29.23%). AKB in West Sulawesi Province in 2015 amounted to 337 deaths or 13.24 / 1000 Births. The prolonged labor contributes to maternal mortality and newborn mortality. The prolonged labor will cause infection, dehydration, and run out of energy can sometimes cause post partum bleeding which can cause maternal death. Premature rupture of membrane affects asphyxia due to the occurrence of oligohydramnios which suppresses the umbilical cord so that the umbilical cord is narrowed and the blood flow that carries maternal oxygen to the baby is hampered causing neonatal asphyxia or hypoxia in the fetus. The aim of the study was to analyze the risk factors for Old Partus and Premature rupture of membrane on the incidence of asphyxia in Newborns in Mamuju District Hospital and West Sulawesi Regional Regional Hospital. This type of research is an analytical study with a Case Control Study design. Time of study in August - September of 2018. Population cases were all infants born and experiencing asphyxia, the control population was all infants born and not experiencing asphyxia in the Regional General Hospital of Mamuju Regency and General Hospital of West Sulawesi Province. Case sample size = 36 and control sample = 72, with a ratio of 1: 2, the total sample size is 108 people using purposive sampling technique. The results showed that mothers who experienced prolonged labor risk 9,609 times. Preventive efforts need to be made by providing good knowledge to pregnant women during antenatal care regarding the high risk of pregnancy that can lead to prolonged parturition asphyxia so that if it occurs it can be treated early.

**Keywords:** prolonged labor, premature rupture of membrane, Asphyxia

## INTRODUCTION

Several factors can affect the Infant Mortality Rate (IMR), according to the World Health Organization (WHO), Asphyxia causes 23% of all neonatal deaths worldwide and is the fifth largest cause of death under five years among children (8%) . Asphyxia contributes 920,000 neonatal deaths each year from 1.1 million deaths in the intra-partum period (Gane et al. 2013).

The cause of death of newborns in Indonesia, one of which is asphyxia, which is equal to 27%. The causes of high infant mortality include the slow growth of the fetus (23.53%), lack of oxygen in the womb (intra uterine hypoxia) (21.24%), and failure to breathe spontaneously and regularly at birth or shortly after birth (neonatal asphyxia) that is equal to (29.23%) and other health problems during the perinatal period (Depkes RI 2010).

IMR in West Sulawesi Province in 2015 amounted to 337 infant deaths or 13.24 / 1000 live births. When compared with 2014 there was a significant increase in infant mortality, wherein infant mortality in 2014 was 313 deaths. Polewali Mandar Regency is the district with the highest number of dead babies compared to other districts (Dinkes Provinsi Sulawesi Barat 2015).

The prolonged labor contributes to maternal mortality and newborn mortality.

The prolonged labor is labor that lasts more than 2 hours in primigravida and 18 hours in multigravida which starts with signs of labor. The prolonged labor will cause infection, dehydration, and run out of energy can sometimes cause post partum bleeding which can cause maternal death. The fetus will result in asphyxia, injuries and infections that can cause an increase in infant mortality. The prolonged labor can endanger the life of the mother and baby (Manuaba 2013).

Based on the results of a study conducted by Komsiyati in Ambarawa Hospital, that 31.2% of respondents experienced premature rupture of membranes, 69.4% of respondents experienced asphyxia. Of the 68.8% of respondents who did not experience premature rupture of membranes, 15.7% were asphyxia. With a value of  $p < 0.05$  which means there is a relationship between premature rupture of the membranes and asphyxia in newborns (Komsiyati 2014). There is a relationship between premature rupture of membranes with neonatal asphyxia, where infants with premature rupture of membranes are at risk of 2,809 times more likely to develop neonatal asphyxia than infants without premature rupture of membranes (Lestariningsih & Ertiana 2017).

Based on the description above, it is necessary to further study the prolonged labor and early rupture of membranes in their contribution to increase the risk of asphyxia in Mamuju Regency, West Sulawesi Province.

## METHODS

The type of research used is an analytical study with a Case Control Study design. This research was conducted at the Regional General Hospital of Mamuju Regency and West Sulawesi General Hospital. The time of the study was conducted from August to September 30, 2018. The population of the cases were all infants born and experiencing asphyxia, the control population was all babies born and not experiencing asphyxia in the Regional General Hospital of Mamuju Regency and General Hospital of West Sulawesi Province. Case sample size = 36 and control sample = 72, with a ratio of 1: 2, the total sample size is 108 people using purposive sampling technique..

## RESULTS

**Table 1 Distribution of Respondents based on Education Levels, Occupation, Prolonged Labor Risk and Premature Rupture of Membrane Hospital in Mamuju District Hospital and West Sulawesi Provincial Regional Hospital in 2017 – 2018**

Research Variables	Case		Control		Research Variables	Case		Control	
	n	%	n	%		n	%	n	%
<b>Level of education</b>					<b>Prolonged Labor</b>				
Not completed in primary school	0	0	3	4,2	Yes	13	36,1	4	5,6
Elementary school	11	30,6	12	16,7	Not	23	63,9	68	94,4
Middle/equivalent	8	22,2	15	20,8					
High school/ equivalent	14	38,9	31	43,1	<b>Premature Rupture of Membrane</b>				
College	3	8,3	11	15,3	Yes	11	30,6	21	29,2
<b>Work</b>					Not	25	69,4	51	70,8
Housewife	30	83,3	57	79,2					
Civil servants	2	5,6	8	11,1					
Honorary entrepreneur	2	5,6	4	5,6					

### Bivariable Analysis Results

Based on the calculation of Odds Ratio (OR) obtained OR = 9,609 at the level of belief (CI) = 95% with the value of Lower Limit (LL) = 2,847 and Upper Limit (UL) = 32,426. Because the LL and UL values do not include the value of one, the value of 9.609 is considered statistically significant. In addition, the results of the statistical analysis obtained p value = 0,000 which means there

### Characteristics of Respondents

The results of this study indicate that the distribution of respondents based on the level of education, the largest case group at the level of high school education/equivalent amounted to 14 people (38.9%) while the control group was also the highest at the level of high school education/equivalent of 31 people (43.1%). Based on the type of work, the largest proportion were housewives, namely 30 people (83.3%) in cases and 57 people (79.2%) in the control group with a total of 87 people (80.6%).

Distribution of respondents based on the incidence of prolonged labor, most of the respondents did not experience prolonged childbirth as many as 91 people (84.3%) consisting of 23 people (63.9%) and 68 people (94.4%). Based on the incidence of premature rupture of membrane, the highest cases and control groups were not experiencing premature rupture of membrane as many as 76 people (70.4%) consisting of 25 cases (69.4%) and 51 (70.8%) control groups. To be more clear, can be seen in table 1 below:

is a relationship between the old partus and the incidence of asphyxia. Thus, mothers who experience prolonged labor have a risk of 9,609 times greater to experience Asphyxia than mothers who do not experience prolonged labor.

Based on the calculation of Odds Ratio (OR) obtained OR = 1.069 at the level of belief (CI) = 95% with the value of Lower Limit (LL) = 0.447 and Upper Limit (UL) = -

2.557 Therefore the value of LL and UL includes the value of one, then a value of 1,000 is considered not statistically significant. In addition, the results of statistical analysis obtained p value = 1.069, which means there is no relationship between the incidence of premature rupture of membrane and the incidence of asphyxia. It can be said that the incidence of premature rupture of membrane has a non-significant relationship as a risk factor for Asphyxia.

## **DISCUSSION**

### **Prolonged Labor Risk**

The prolonged labor is one component that can occur during labor. The old part is labor that lasts more than 24 hours at the primary, and more than 18 hours in multi. The old part can increase the risk and complications of the mother or fetus.

This study found that mothers who experienced prolonged labor had a risk of 9,609 times greater to experience Asphyxia than mothers who did not experience prolonged labor. The results of multivariate analysis with logistic multiple regression test found a probability value of 92% of old parturition to be a risk factor for Asphyxia. This result is in accordance with the causal mechanism of the labor duration factor for the incidence of asphyxia in accordance with the theoretical concept (Oxorn & Forte 2010), that the prolonged labor increases the harmful effects of both the mother and child. The severity of the injury continues to increase with the length of labor. The longer the labor, the higher the fetal morbidity and mortality. Prolonged labor has more severe effects on the fetus, resulting in the incidence of anoxia, brain damage, asphyxia, and higher intrauterine death.

The prolonged labor will cause infection, run out of energy, dehydration in the mother. In the long term, postpartum hemorrhage can also occur which can cause maternal death. In the fetus there will be infection, injury and asphyxia which can increase infant mortality (Wahyuningsih 2010). The prolonged labor also causes postpartum hemorrhage, which is the most important cause of maternal death in Indonesia (Baktiyani et al. 2016).

Most prolonged labor show lengthening one time. One cause of prolonged labor is due to abnormal uterine contractions such as hypotonic, hypertonic uterine contractions and uncoordinated uterine contractions. The changing nature of

the contraction causes the supply of oxygen to the fetus to be inadequate, while also increasing the incidence of intracranial bleeding that can cause asphyxia (Mochtar & Sofian 2012). The prolonged labor increases the harmful effects of both the mother and child. The severity of the injury continues to increase with the length of labor. The longer the labor, the higher the fetal morbidity and mortality. Prolonged labor has more severe effects on the fetus, resulting in the incidence of anoxia, brain damage, asphyxia, and higher intrauterine death (Oxorn & Forte 2010).

The results of this study are supported by research (Nyoman et al. 2018) who found that there was an increased risk of 6.27 times asphyxia events or with an incidence of asphyxial events that would increase 6-fold for mothers who experience prolonged labor. Likewise with the results of the study (Tahir et al. 2012) who stated that 9 mothers who experienced prolonged labor had a risk of 3.41 times giving birth to neonatal asphyxia compared to mothers who did not experience long labor with LL values and UL (95% CI 1.541-7.576).

Duration of delivery is an important risk factor for asphyxia. Research (Ugwu 2010) shows that prolonged labor is the most common cause of asphyxia. This research is in line with the research conducted by (Shireen et al. 2009) who reported that the main cause of asphyxia Neonatorum is prolonged labor. Mothers who have a duration of labor more than 12 hours are about three times more likely to have a neonatal who has asphyxia born than women who have less than 12 hours. Long labor is active labor with regular uterine contractions and progressive cervical dilation, lasting more than 12 hours in multipara and primigravida labor. When the labor process exceeds 12 hours, this causes a woman to experience many difficulties that cause a reduced supply of oxygen to the fetus, giving birth to asphyxia. The first stage of management must be managed properly using partographs so that early deviations are detected so as to reduce the possibility of birth asphyxia (Kibai 2017).

### **Premature Rupture of Membrane Risk**

Premature Rupture of Membrane (P-ROM) affects asphyxia because of the occurrence of oligohydramnios which suppresses the umbilical cord so that the umbilical cord experiences constriction and

blood flow that carries maternal to infant oxygen is obstructed causing asphyxia or hypoxia. There is a relationship between the occurrence of fetal distress and the degree of oligohydramnios, the less amniotic fluid, the more severe the fetus (Prawirohardjo 2014).

The incidence of neonatal infection after premature rupture of the membranes in more than 24 hours is an increase of about 1% to 4% in premature rupture of membranes. Premature rupture of membranes, maternal genitourinary infections, perinatal asphyxia and male gender are risk factors for early neonatal sepsis (Altuncu et al. 2005). According to (Mercer BM, 2005), Fetal morbidity can occur after Premature Rupture of Membranes (P-ROM) caused by maternal intrauterine infection, compression of the cord, placental abruption, and prolonged fetal compression caused by oligohydramnios. In this situation, in addition to the fetus at a higher risk of developing fetal death also at risk of perinatal asphyxia (Dars et al. 2014).

The results of this study indicate that the incidence of Premature Rupture of Membranes (P-ROM) has a non-significant relationship as a risk factor for Asphyxia. This is different from the research conducted (Wiradharma & Wyn 2013) which shows that there is a significant relationship between the duration of Premature Rupture of Membranes and asphyxia. Asphyxia odds ratio in Premature Rupture of Membranes  $\geq 12$  hours 9.7 times with p value 0.004.

In theory there are various complications in infants due to P-ROM, including less months of labor, fetal distress, oligohydramnios, umbilical cord

compression, respiratory distress syndrome, and risk of infection. The longer the P-ROM, the greater the risk of complications that occur. Asphyxia can occur due to umbilical cord compression, oligohydramnios, fetal distress, respiratory distress syndrome or infection. So, the longer the P-ROM the greater the complications that occur, resulting in a risk of occurrence of asphyxia in the fetus, also increasing.

This research is in line with research (Muntari 2009) in RSUD. Dr. R. Koesma Tuban In July 2010, there were still many cases of premature rupture of membranes and asphyxia of newborns, but these two events were not always the cause of each of these events. If the membranes have ruptured prematurely it will endanger the fetus because the amniotic water is useful to maintain or provide protection against the baby from the impact caused by the environment outside the uterus.

With this incident, the possibility of asphyxia can occur. The data analysis used in the study was the Fisher Exact test, where  $p = 0.064$  where  $p > 0.05$ ,  $H_0$  was accepted, meaning that there was no significant relationship between premature rupture of the membranes and the incidence of asphyxia in newborns. Although these two factors are very related, but not always premature rupture of the membranes causes asphyxia as well as asphyxia is not always caused by premature rupture of the membranes because there are still other factors that can cause asphyxia including prolonged labor, preeclampsia and eclampsia, overdue pregnancy, bleeding abnormal and others.

**Table 2 Risk Factors Prolonged Labor and Premature Rupture of Membrane against Occurrence Asphyxia in Mamuju District Hospital and West Sulawesi Provincial Regional Hospital in 2017 – 2018**

Research Variable	Case		Control		Total		95% CI LL-UL p-Value	OR
	n	%	n	%	n	%		
<b>Prolonged Labor</b>								
Yes	13	36,1	4	5,6	17	15,7	2,847 – 32,426 0,000	9,609
Not	23	63,9	68	94,4	91	84,3		
<b>Premature Rupture Of Membrane</b>								
Yes	11	30,6	21	29,2	32	29,6	0,447 – 2,557 1,000	1,069
Not	25	69,4	51	70,8	76	70,4		

## CONCLUSION

1. Mothers who experience prolonged labor have a risk of 9,609 times greater to

experience Asphyxia than mothers who do not experience long labor.

2. Premature Rupture of Membrane has a relationship that is not statistically significant so that the risk is not significant as an increased risk of occurrence of asphyxia events.

#### SUGGESTION

1. Preventive efforts need to be made by providing good knowledge to pregnant women when antenatal care regarding the high risk of pregnancy that can lead to asphyxia such as prolonged labor so that if it occurs it can be treated early.
2. In order to be able to handle cases of prolonged childbirth precisely in accordance with operational standards, so that potential diagnoses such as the incidence of asphyxia and infections can be prevented as early as possible.
3. All forms of hospital services (outpatient / inpatient) should write complete documentation in the medical record in accordance with their respective authorities, so that the medical record can be used properly.

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