# Analysis of Factors Affecting the Incidence of Prolonged Labor at Prof Dr Wz Johannes Hospital Kupang

Mery Yul Sui[1], Christina Olly Lada[2], Luh Putu Ruliati[3]

**ABSTRACT**

**Introduction:** Prolonged labor has an impact on both the mother and the fetus, namely increasing the incidence of life-threatening postpartum hemorrhage and can increase the incidence of asphyxia or lack of oxygen, thereby increasing the risk of death. Study objective was to analyze the determinant factors that influence the incidence of prolonged labor in maternal at Prof. DR. WZ Johannes Hospital Kupang.

**Material and methods:** This study used an observational analytic design with a case control approach, with a documentation study. The total sample was 150 consisting of 75 case groups and 75 control groups who were matched based on education level. The statistical analysis used was univariate, bivariate analysis, using simple logistic regression tests and multivariate analysis with multiple logistic regression analysis tests.

**Results:** Bivariate analysis showed that there was a significant influence between parity (p = 0.015), PROM (p = 0.024), fetal weight (p = 0.016)) with the incidence of prolonged labor and there was no effect between age (p = 0.468) and prolonged labor. The results of multivariate analysis showed a significant effect when the analysis was carried out jointly between the variables of parity, PROM, fetal weight, with the order of influence strength from greatest to smallest is parity (OR = 1.9), (fetal weight OR = 1.6), PROM (OR = 0.3).

**Conclusion:** The results of this study indicate that there is a significant effect between parity, premature rupture of membranes, fetal weight and the incidence of prolonged labor. Therefore, counseling and education efforts are needed for pregnant women and high-risk mothers to carry out regular antenatal care, and for those who have high risk factors, it is hoped that appropriate prevention and handling can be done so that they can identify problems in the mother and take action quickly and particularly appropriate in the act of prolonged labor.

**Keywords:** Prolonged Labor, Determinant Factors

## INTRODUCTION

Prolonged labor is a labor process (fetus and placenta) that is longer than 24 hours, so it can cause complications for both mother and fetus.[1] Prolonged labor is still a contributor to maternal mortality in Indonesia. The maternal mortality rate (MMR) in the world in 2015 was 216 per 100,000 live births or it is estimated that the number of maternal deaths is 303,000 deaths with the highest number in developing countries. The maternal mortality rate in developing countries is 20 times higher than in developed countries, namely 239,000 per live birth. In developed countries only 12 per 100,000 live births according to the World Health Organization.[2]

Prolonged labor has an impact on both the mother and the fetus. The impact on the mother is to increase the incidence of life-threatening postpartum hemorrhage, whereas in the fetus it can increase the incidence of asphyxia or lack of oxygen, consequently increasing the risk of death.[3] The maternal mortality rate in NTT has decreased for three consecutive years, namely in 2016 there were 182 cases, 162 cases (2017) and 158 cases (2018). The maternal mortality rate in NTT is generally caused by postpartum hemorrhage, pre-eclampsia / eclampsia, and infection.[4]

Prof. DR WZ Johannes Hospital Kupang is a referral hospital owned by the government of East Nusa Tenggara. Prof. DR WZ Johannes Hosputal also has a comprehensive obstetric and neonatal care center (PONEK). During a preliminary survey by researchers in 2019 at Prof. DR WZ Johannes Hospital Kupang, the incidence of prolonged labor tends to increase. In 2017 there were 175 cases of prolonged labor (17.1%), in 2018 there were 172 cases (17.1%), and in 2019 there were 240 cases of prolonged labor (20.8%).

Research conducted[5] shows that factors that influence labor or prolonged labor are age, parity, pregnancy spacing, uterine contractions, premature rupture of membranes, pelvic size, fetal location, and fetal weight. Research[6] which was conducted in the Maternity Room H. Moch. Ansam Saleh Hospital Banjarmasin towards 234 women giving birth showed a significant relationship between prolonged labor and the incidence of postpartum hemorrhage.

One of the efforts made by midwives in cases of prolonged labor is to detect prolonged labor using a partograph at every delivery. Although monitoring the progress of childbirth has used a partograph, the incidence of prolonged labor still occurs and the trend tends to increase from year to year. Based on the description above, the researcher is interested in knowing the factors that influence the incidence of prolonged labor at the Prof. DR WZ Johannes Hospital Kupang.

[1]Masters Program in Public Health Sciences, Nusa Cendana University, NTT Indonesia, [2]Faculty of Medicine, University of Nusa Cendana, NTT Indonesia, [3]Faculty of Public Health, Nusa Cendana University

**Corresponding author:** Mery Yul Sui, Masters Program in Public Health Sciences, Nusa Cendana University, NTT Indonesia.

## MATERIAL AND METHODS

This study is an observational analytic study with a case control approach to determine the risk factors for prolonged labor in the case and control groups. The population in this study were all women giving birth at RSU Prof. DR WZ Johannes Kupang from January to December 2019 totaling 1150 people. Sampling in this study using a sample size calculation formula and the results obtained n1 = n2 = 75 samples. Sampling in this study was carried out by means of teaching, namely education with a ratio of 1: 1. The number of samples in this study were 150 samples consisting of 75 cases and 75 control cases. The sampling technique used in this study was disproportionate stratified random sampling.

The research was carried out from April 2020 to June 2020 with the research location at the Prof. DR WZ Johannes Kupang Hospital. The type of data used in this study is secondary data with the independent variables being age, parity, pregnancy spacing, premature rupture of membranes, pelvic size, fetal location, uterine contractions and fetal weight, while the dependent variable is the incidence of prolonged labor. Collecting data in this study using checklist guidelines. The data analysis used was univariate analysis, bivariate analysis using simple logistic regression and multivariate analysis using multiple logistic regression tests. This study has passed the ethics test based on the decision of the health research ethics commission at the Faculty of Medicine, University of Nusa Cendana Kupang on March 13, 2020 with Number: 18 / UN15.16 / KEPK / 2020

## RESULTS

### Univariate Analysis

Table 1 above showed that in the group of mothers with the same level of education (the matching process), it was found that most of the respondents were not at risk, both in the control group (69.3%) and the case group, namely 74.7%. The age range that is not at risk is 20 to 35 years. Most of the mothers had jobs both in the control group (52%) and in the case group (60%).

### Bivariate Analysis

Bivariate analysis is used to see the effect of the independent variable on the dependent variable.

The results of the analysis in Table 2 showed that the control group and cases were mostly at the age without risk, where the control group was 69.3% while the case group was 74.7%. The simple logistic regression test results obtained value (p) = 0.468, which means there is no influence between maternal age and the incidence of prolonged labor with an Odss Ratio value of 1.304 (95% Cl; 0.638-2.666).

The results of the analysis in Table 3 showed that the control group and the case group were mostly at no risk parity, where the control group was 88.0% while the case group was 80.0%. The simple logistic regression test results obtained value (p) = 0.018, which means that there is an influence between maternal parity and the incidence of prolonged labor with an Odss Ratio value of 0.545 (95% Cl; 0.222-1.338). This means that mothers with parity at risk are 0.545 more likely to experience prolonged labor than those with no risk of parity.

The results of the analysis in table 4 showed that the control group and the case group were mostly without PROM, where the control group was 88.0% while the case group was 73.3%. The simple logistic regression test results obtained value (p) = 0.026, which means that there is an influence between PROM and the incidence of prolonged labor with an Odss Ratio value of 0.375 (95% Cl; 0.158-0.890). This means that women who give birth with PROM have a 0.375 chance of having prolonged labor compared to parity without PROM.

The results of the analysis in Table 5 showed that the control group and the case group mostly had normal fetal weight, where the control group was 86.7% while the case group was 74.7%. The simple logistic regression test results obtained value (p) = 0.018, which means that there is an influence between fetal weight and the incidence of prolonged labor with an Odss Ratio value of 0.893 (95% Cl; 0.567-0.997). This means that mothers who give birth with a fetal weight have a 0.893 chance of prolonged labor.

### Multivariate Analysis

The multivariate test results using multiple logistic regression analysis obtained the most dominant variable that influenced the incidence of prolonged labor. After calculating the change in the OR value, one variable was excluded, namely the mother's weight gain. The results of the multivariate analysis recapitulation can be seen in table 5 below.

Table 6 showed that the variables included in the multivariate modeling selection were parity, PROM, and fetal weight. The most dominant determinant of the incidence of prolonged labor was parity with a significance value (p = 0.015), meaning that there was an influence between maternal parity and the incidence of prolonged labor. The parity coefficient (-0.660) showed the direction of the negative influence between maternal parity and the incidence of prolonged labor. The value of Exp (B) showed that mothers with parity at risk had a 1.9 times chance of experiencing prolonged labor. Meanwhile, the close determinants that influenced the incidence of prolonged labor were PROM and fetal weight with their respective significance values (p = 0.024; 0.016), meaning that there was an influence between PROM during labor and fetal weight with the incidence of prolonged labor. The value of the PROM coefficient (-1.013) showed the direction of the negative influence between the PROM incidence and prolonged labor. The value of Exp (B) showed that mothers who experience PROM had a 0.3 times chance of experiencing prolonged labor. Meanwhile, fetal weight showed a positive effect on the incidence of prolonged labor (B = 0.515) and mothers with abnormal fetal weight were 1.6 times more likely to experience prolonged labor compared to normal fetal weight.

| General Characteristics | Control | | Case | | Total |
|---|---|---|---|---|---|
| | n | (%) | n | (%) | |
| Age | | | | | |
| At Risk (< 20 & ≥ 35 years old) | 23 | 30,7 | 19 | 25,3 | 42 |
| Not at Risk (20 – 35 years old) | 52 | 69,3 | 56 | 74,7 | 108 |
| Total | 75 | 100 | 75 | 100 | 150 |
| **Education Level** | | | | | |
| Elementary, Junior High Schools (basic education) | 2 | 2,7 | 2 | 2,7 | 4 |
| High School | 60 | 80,0 | 60 | 80,0 | 120 |
| College | 13 | 17,3 | 13 | 17,3 | 26 |
| Total | 75 | 100 | 75 | 100 | 150 |
| **Type of Jobs** | | | | | |
| No Jobs (housewives) | 36 | 48,0 | 30 | 40,0 | 66 |
| Have Jobs (Private, Civil Servant) | 39 | 52,0 | 45 | 60,0 | 84 |
| Total | 75 | 100 | 75 | 100 | 150 |

**Table** 1. General Characteristics of Respondents in the Maternity Ward at Prof. DR. WZ Johannes Hospital Kupang

| Age | Control | | Case | | Total | p-value | OR | 95% Cl | |
|---|---|---|---|---|---|---|---|---|---|
| | n | (%) | N | (%) | | | | lower | upper |
| At Risk (< 20 & ≥ 35 years old) | 23 | 30,7 | 19 | 25,3 | 42 | 0,468 | 1,304 | 0,638 | 2,666 |
| Not at Risk (20 – 35 years olf) | 52 | 69,3 | 56 | 74,7 | 108 | | | | |
| Total | 75 | 100 | 75 | 100 | 150 | | | | |

**Table-2:** The Effect of Age on the Incidence of Prolonged Labor in the Maternity Ward at Prof. DR. WZ Johannes Hospital Kupang

| Parity | Control | | Case | | Total | p-value | OR | 95% Cl | |
|---|---|---|---|---|---|---|---|---|---|
| | n | (%) | n | (%) | | | | Lower | upper |
| At Risk (> 3 times) | 9 | 12,0 | 15 | 20,0 | 24 | 0,018 | 0,545 | 0,222 | 1,338 |
| Not at Risk (≤ 3 times) | 66 | 88,0 | 60 | 80,0 | 126 | | | | |
| Total | 75 | 100 | 75 | 100 | 150 | | | | |

**Table-3:** The Effect of Parity on the Incidence of Prolonged Labor in the Maternity Ward at Prof. DR. WZ Johannes Hospital Kupang

| PROM | Control | | Case | | Total | p-value | OR | 95% Cl | |
|---|---|---|---|---|---|---|---|---|---|
| | n | (%) | n | (%) | | | | lower | upper |
| PROM | 9 | 12,0 | 20 | 26,7 | 29 | 0,026 | 0,375 | 0,158 | 0,890 |
| No PROM | 66 | 88,0 | 55 | 73,3 | 121 | | | | |
| Total | 75 | 100 | 75 | 100 | 150 | | | | |

**Table-4:** The effect of PROM on the Incidence of Prolonged Labor in the Maternity Ward at Prof. DR. WZ Johannes Hospital Kupang

| Fetal Weight | Control | | Case | | Total | p-value | OR | 95% Cl | |
|---|---|---|---|---|---|---|---|---|---|
| | n | (%) | n | (%) | | | | lower | upper |
| Weight< normal (< 2.500 gram) | 10 | 13,3 | 11 | 14,7 | 21 | 0,018 | 0,893 | 0,567 | 0,997 |
| Normal Weight (2.500-4.000 gram) | 65 | 86,7 | 56 | 74,7 | 121 | | | | |
| Weight > normal (> 4. 000 gram) | 0 | 0 | 8 | 10,7 | 8 | | | | |
| Total | 75 | 100 | 75 | 100 | 150 | | | | |

**Table-5:** The Effect of Fetal Weight on the Incidence of Prolonged Labor in the Maternity Ward at Prof. DR. WZ Johannes Hospital Kupang

| Variable | B | Wald | p-value | Exp(B) | 95% Cl | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Parity | -0,660 | 1,997 | 0,015 | 1,935 | 0,775 | 4,835 |
| PROM | -1,013 | 5,129 | 0,024 | 0,363 | 0,151 | 0,873 |
| Fetal Weight | 0,515 | 1,675 | 0,016 | 1,674 | 0,767 | 3,655 |

**Table-6:** Results of Multivariate Logistic Regression Analysis

## DISCUSSION

### Factors Affecting Prolonged Labor

#### Age

Pregnant women who are less than 20 years old can adversely affect the health of the mother as well as the growth and development of the fetus because the reproductive organs are still immature for pregnancy. Adolescent pregnancy complication (<20 years) is higher than during healthy reproductive period (20-35 years). This situation will be difficult when coupled with psychological, social, and economic stress. Mothers with health over 35 years of age, the function of their reproductive organs have begun to decline and many other diseases can make the mother's condition week, thereby disrupting the mother's blood circulation to the fetus.[7]

The result of statistical test showed that there was no significant effect (p = 0.468) between age and prolonged labor. This is not in line with the research conducted[8] at Arifin Achmad Pekan Baru Hospital towards 48 respondents with a study design using case control and bivariate analysis using chi-square showed results (p <0.05) which means that there was a relationship between maternal age and the incidence of prolonged labor.

According to researchers, not all mothers who are less than 20 years old or more than 35 years old are confirmed to have prolonged labor, but in some women who are still young, their reproductive organs are still not perfect and the hormonal functions associated with childbirth are also imperfect. also. Meanwhile, over 35 years of age, it is known that the work of the reproductive organs has begun to decrease and this will make it difficult for the mother to push, which in the end the mother continues to lose energy, causing prolonged labor. Thus, it is necessary to increase education for periodic ANC examinations, especially for pregnant women with a risky age so that they can detect complications early.

#### Parity

Parity shows the number of children a woman has ever born. Parity is an important factor in determining the fate of the mother and fetus both during pregnancy and childbirth.[1] High parity will be more at risk of experiencing sagging in the uterine wall so that it will be more susceptible to having a long labor.[9] A parity number of 1 or more than 3 has been shown to increase the incidence of prolonged labor compared to mothers with parity of 2-3. Mothers with parity 1 or> 3 tended to experience complete opening longer than mothers with parity 2-3.[5]

The logistic regression test results showed a significance value (p = 0.015), it means that there was an influence between maternal parity and the incidence of prolonged labor. The parity coefficient (-0.660) showed the direction of the negative influence between maternal parity and the incidence of prolonged labor. The value of Exp (B) showed that mothers with parity at risk had a 1.9 times chance of experiencing prolonged labor. This is in line with research[10] where in his research, there was a significant relationship (p = 0.042) between parity and prolonged labor. The results of the study are in line with the research conducted by[11] towards 187 respondents using a cross-sectional research design and bivariate chi-square analysis, which showed a p value <0.05, meaning that there was a relationship between parity and the incidence of prolonged labor. This research was conducted at the PONED Health Center, East Lampung.

Based on the research that has been done, it proves that the previous theory and research conducted by researchers have the same results and are in line with research that has been previously revealed that parity is related to the incidence of prolonged labor. Thus, the researcher argues that there is a need for efforts of pregnant women with high risk of doing antenatal care regularly and who have high risk factors to carry out regular monitoring, prevention and proper handling so that the occurrence of prolonged labor can be prevented.

### Premature Rupture of Membranes (PROM)

Premature rupture of membranes (PROM) is the premature rupture of the amniotic, that is, if the cervical opening is less than 3 cm and in multiparous less than 5 cm, if the latent period is too long in premature rupture of membranes, an infection will occur which can lead to prolonged labor which can lead to death in mother and fetus.[12]

The logistic regression test results showed a significance value (p = 0.024), which means that there is an influence between PROM and the incidence of prolonged labor. The PROM coefficient value (-1.013) showed the direction of the negative relationship between PROM and the incidence of prolonged labor. The value of Exp (B) showed that mothers with PROM had a 0.3 times risk of experiencing prolonged labor. This study is in line with the research conducted[13] at the Demang Sepulau Raya Regional Hospital, which resulted in a relationship between PROM and prolonged labor (p = 0.000) with an OR value: 7,817. This means that mothers who experienced PROM were 7-8 times more likely to experience prolonged labor. Dipta's research[14] at Santa Elisabet Hospital Medan found that one of the characteristics of mothers who experienced prolonged labor was PROM, namely 67.3% of mothers with PROM out of 615 mothers with prolonged labor. Research that has different results from this research is a research conducted[11] with the title "Factors Associated with Prolonged Labor at Poned Health Center East Lampung" in 187 respondents the results obtained value p> 0.05 which means there is no relationship between PROM and prolonged labor.

According to researchers, there is a need for education about danger signs during pregnancy, one of which is about the rupture of the membranes before delivery so that mothers can immediately go to health facilities to get help on time.

### Fetal Weight

According to[15] every baby who has a bigger body has complications during labor. The risks can be in the form of difficulty in passing the baby through the birth canal resulting in prolonged labor, postpartum bleeding due to a tear in the birth canal, or shoulder trouble which makes it difficult for the baby to breathe. Babies with large body size are caused by many factors, including conditional factors or

only suspected causes. Other factors are pregnant women who suffer from diabetes mellitus, factors of mothers who are overweight (obesity), and factors of mothers who experience excess months.[13]

The logistic regression test results showed a significance value (p = 0.016), which means that there was an influence between fetal weight and the incidence of prolonged labor. The value of the fetal weight coefficient (0.515) showed the direction of the positive relationship between fetal weight and the incidence of prolonged labor. The value of Exp (B) showed that mothers with abnormal fetal weight had a 1.6 times chance of experiencing prolonged labor. The results of this study are in line with[16] on 344 respondents (172 cases of respondents, 172 respondents in control) at Abdul Moelok Hospital, Lampung, which showed that there was a relationship between fetal weight and prolonged labor (p-value 0.005). While the OR test results obtained a value of 2.005 (95% Cl: 1.254-3.2050), meaning that respondents with abnormal fetal weight had a risk of prolonged labor of 2.005 times compared to normal fetal weight.

Based on the research that has been done, it proves that the previous theory and the research conducted by the researcher have the same results and are in line with previous research, that a large fetus is associated with prolonged labor. Thus, the researchers argue that the birth weight of the fetus is one of the factors causing prolonged labor. Therefore, during pregnancy, the mother should always perform ANC routinely with the aim of monitoring the condition and health of the fetus and the weight of the fetus to prepare for labor.

## CONCLUSION

The results of this study indicate that there is a significant influence between parity, premature rupture of membranes, fetal weight with the incidence of prolonged labor, therefore it is necessary to plan the number of children in the family as well as efforts to increase supervision during pregnancy and childbirth to make it easier to detect the determinant factors in the incidence of prolonged labor.

### Recommendations

The results of this study indicate that parity, premature rupture of membranes, and fetal weight have a significant effect on the incidence of prolonged labor, therefore it is necessary to plan the number of children in the family as well as efforts to increase monitoring during pregnancy and childbirth to make it easier to detect these risk factors for incidence old labor

## REFERENCES

1.  Ritno, P. Factors Associated with Old Labor. Journal of Nursing. 2016; 13: 156-160.
2.  WHO. Maternal Mortality. Word Health Organization. 2015.
3.  Fitria, N Puspitasari, A. Relationship and Risk Factors for Old Labor Postpartum Hemorrhage History and Large Birth Weight with Postpartum Hemorrhage Incidence. Journal of Biometrics and Population. 2016; 1: 118-124.
4.  Dinkes NTT. Regional Health Profile of East Nusa Tenggara 2018. NTT: Dinkes. 2018.
5.  Yohana, W. Analysis Of Factors Related To The Old Labor. 2013; 1: 1-14.
6.  Rahmawati, D. The Relationship of Old Labor and Anemia with the Incidence of Postpartum Hemorrhage in the Maternity Room at Dr. H. Moch. ANSAM Saleh Banjarmasin. Health Dynamics, Journal of Midwifery and Nursing. 2016; 7: 1-10
7.  Manuaba. Obstetrics, Gynecology, and Family Planning. In Obstetrics, Disease, Gynecology, and Family Planning. 2012.
8.  Yusmaharani. Relationship between Parity and Maternal Age with the Incidence of Old Labor Yusmaharani, D-III Midwifery Study Program, Abdurrab University Jalan Riau Ujung. 2017; 1: 35–40.
9.  Ardhiyanti, Yulrina, en Susi Susanti. "Maternal Factors Associated with Old Labor at RSUD Arifin Achmad Pekanbaru". Journal of Community Health. 2016; 3:83–87.
10. Kurniawan, Renaldi, en Soenarnatalina Melaniani. Relationship between Parity, Childbirth Assistance and Pregnancy Distance with Infant Mortality Rate in East Java. Journal of Biometrics and Population. 2019; 7:113.
11. Riyanto. Factors associated with prolonged labor in PONED East Lampung Puskesmas. Metro Sai Wawai Health Journal. 2014; 7: 15-21.
12. Oxorn, H. Midwifery Science: Pathology and Physiology of Labor. Yogyakarta: Yayasan Essentia Medika. 2012.
13. Falinda, Fitri Ekasari, en Devi Kurniasari. Analysis of the Factors Associated with the Incidence of Old Labor in the Midwifery Room of the Penggala Regional General Hospital, Tulang Bawang Regency, Lampung Province, 2013. World Health Journal. 2014; 3: 257–62.
14. Dipta. Characteristics of mothers with non-progressive labor at Santa Elisabeth Medan Years 2005-2009. 2010.
15. Astriana, Ratna Dewi Putri, Herlina Aprilia. "1.) Lecturer at the Midwifery Study Program at the University of Malahayati B. Lampung 2.) The Midwifery Study Program at the University of Malahayati B. Lampung". 2015;1:143–47.
16. Dewi, Yuliasari. Factors Associated with the Incidence of Old Labor at Abdul Moeloek Hospital, Lampung Province in 2013. 2016; 2: 7-12.