

Factors Related to Premature Rupture of Membranes (PROM)

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Abstract:

One of the contributors to morbidity and mortality rates in mothers and babies is infection caused by premature rupture of membranes (PROM), where the amniotic membrane which is a barrier to the entry of germs that cause infection is no longer there and can be dangerous for the mother and fetus. This study aims to determine the factors associated with the incidence of premature rupture of membranes at the Ciruas Health Center in 2018. The study design is cross sectional. The population is 140 childbearing women who were in the Ciruas Health Centre during study period. 33 women were selected purposively as the sample based on inclusion and exclusion criteria. The results show that the incidence of PROM at the Ciruas Community Health Center was quite high (63.6%). Most of the mothers who gave birth had a high risk of giving birth (60.6%), were primiparous (51.5%), had a term gestational age (63.6%), and lacked knowledge about pregnancy and childbirth (54.5%). There was a relationship between age ($p=0.003$), parity ($p=0.008$), gestational age ($p=0.010$), and knowledge ($p=0.027$) with the incidence of premature rupture of membranes in in childbirth women at the Ciruas Health Center in 2018. It is hoped that the community health center can provide intensive delivery services to mothers who are at high risk of experiencing PROM. Apart from that, it is also necessary to provide counseling, information, and education regarding danger signs during labor for mothers who are giving birth.

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INTRODUCTION

Every year, over 358,000 maternal deaths occur worldwide, with nearly 99% occurring in poor nations and approximately 67% occurring in developing countries such as Indonesia (Aeni, 2013). In underdeveloped nations, the maternal mortality rate (MMR) and infant mortality rate (IMR) are the highest. Pregnancy and childbirth mortality and morbidity are thus major challenges in poor countries. According to the 2012 Indonesia Demography and Health Survey (IDHS), the MMR in Indonesia was 359 per 100,000 live births, while the IMR was 32 per 1,000 live births (Indonesian Statistic, 2012). West Java Province has the highest maternal death rate (321 per 100,000 live births), which falls to 123.29 per 100,000 live births in 2009. Approximately 809 mothers died as a result of hemorrhage, pre-eclampsia/eclampsia, and infections. One of the reasons of infection is premature membrane rupture (Mahwati, 2013).

Premature rupture of the membranes (PROMs) is the disruption of fetal membranes before to the commencement of labor, characterized by a painless gush of watery fluid out of the vagina (Kohar, 2018). A PROM that occurs before 37 is referred as preterm premature rupture of membrane (PPROM). While, after 37 weeks of gestation is referred as term premature rupture of

membranes (Kuba & Bernstein, 2018). PPROM is caused by multiple pathophysiological processes including as inflammation and oxidative stress (Menon & Richardson, 2017). Although numerous factors can raise the risk of PPROM, the exact reason is unknown (Lorthe, 2018). Poor socioeconomic situation and a low level of education, smoking, harsh working conditions, and African ethnicity are all socio-behavioral and demographic risk factors for PPROM (Spinillo et al., 1994; Shen et al., 1994). There are several factors that cause premature rupture of membranes, including an incompetent cervix, excessive uterine tension: multiple pregnancies, hydramnios, abnormalities in the position of the fetus in the uterus: breech position, transverse position, possible narrowness of the pelvis: hanging stomach, the lowest part has not entered the upper pelvic, cephalopelvic disproportion, abnormalities inherited from the amniotic membranes, an infection that causes biomechanical processes in the amniotic membranes to occur in a proteolytic form, making it easier for the membranes to rupture (Manuaba, 2013).

PROM is a significant cause of poor birth outcomes and a contributing factor to the three top causes of infant mortality in Ethiopia, which are preterm birth (26%), intrapartum-related complications (30%), and sepsis (18%) (Tiruye, Shiferaw, Tura, Debella & Musa, 2021). Complications that arise due to premature rupture of membranes depend on gestational age, maternal and neonatal infections can occur, premature labor, hypoxia due to compression of the umbilical cord, fetal deformity, increased incidence of caesarean section or failure of normal delivery (Prawirohardjo, 2008).

Banten province is one of province which has a quite high maternal mortality rates in Indonesia. In 2019, maternal mortality rates in Serang City are 66 cases (Banten Health Profile, 2016). The Ciruas Health Centre is located in Serang City. The previous study found that PROM cases were found in 13,74% in 364 women (Isnawati, 2017). This number is quite high and should be aware. A study regarding factors related to PROM in this setting is very crucial. Thus, this study aimed to determine factors related to premature rupture of membrane (PROM) in Banten Province Indonesia.

METHOD

This study is a cross sectional study. The population is all pregnant women during January to April 2008 who were registered in the Ciruas Health Centre. The sampling technique is accidental sampling. 33 pregnant women were recruited in this study. The inclusion criteria are women with premature rupture of membrane either term or preterm, had no obstetric complication. An observational sheet and medical record were used as the instrument in this study. The dependent variable was premature rupture of membrane. The independent variables are knowledge, gestation age, mothers age, and parity. The permission has been gained from the Ciruas Health Centre to conduct this study.

RESULT

Univariate Analysis

Table 1. Univariate Analysis

Variables	Experiment group	
	Frequency	Percentage
PROM		
Yes	21	63,6
No	12	36,4
Age		
At risk	20	60.6
Not at risk	13	39.4
Parity		
Primiparous	17	51.5
Multiparous	16	48.5
Gestational Age		
Preterm	12	36.4
Aterm	21	63.6
Knowledge		
Poor	18	53.5
Adequate	15	45.5
Total	33	100

Based on table 1, it can be concluded that majority of respondents were suffered from PROM (63.3%), were at risk in age (60.6%), were primiparous (51.5%), had aterm gestational age (63.6%), and had poor knowledge regarding PROM (53.5%).

The Bivariate Analysis

Table 2. The relationship between independent and dependent variables

Independent Variable	PROM				p-value
	Yes		No		
	Frequency	Percentage	Frequency	Percentage	
Age					
At risk	17	85	3	15	0.003
Normal	4	30.8	9	69.2	
Parity					
Primiparous	15	88.2	2	11.8	0.008
Multiparous	6	37.5	10	62.5	
Gestational Age					
Preterm	4	33.3	8	66.7	0.01
Aterm	17	81	4	19	
Knowledge					
Poor	15	83.3	3	16.7	0.027
Adequate	6	40	9	60	

Table 2 shows that out of 20 women whose age was at risk, majority had PROM (85%). Out of 17 women who were primiporous, majority of them had PROM (88.2%). Out of 12 women whose preterm gestational age, majority of them had no PROM (66.7). Lastly, out of 18 women who had poor knowledge about PROM, majority of them had PROM (83.3%). Table 2 shows that the relationship between independent and dependent variables. There is a significant relationship

between mothers age and PROM ($p=0.003$), there is a significant relationship between parity and PROM ($p=0.008$), there is a significant relationship between gestational age and PROM ($p=0.01$), and there is a significant relationship between mothers' knowledge regarding PROM and PROM ($p=0.027$).

DISCUSSION

Based on the research results, it is known that the incidence of premature rupture of membranes (PROM) at the Ciruas Health Center was 60.6% out of 33 deliveries. According to Sarwono (2008) premature rupture of membranes (PROM) is the rupture of the membranes before it is time to give birth. This can occur at the end of pregnancy or long before it is time to give birth. Premature rupture of membranes is an important problem in obstetrics related to the incidence of infection in mothers giving birth. Midwives, as trained care givers who are placed in the community, should be conservative, means not to intervene too much, so the most important attitude of midwives is to make referrals so that cases of premature rupture of membranes receive appropriate action. Mistakes in managing premature rupture of membranes will result in increased morbidity and mortality rates for mothers and babies. Therefore, significant supervision and care is needed for women giving birth with premature rupture of membranes.

It is known that the majority of mothers who are at a high risk of giving birth experience PROM incidents (85%), more than mothers who are at a low risk age, only 30.8% of mothers who experience PROM. The statistical test results obtained p value = 0.003, at $\alpha = 0.05$ ($p < \alpha$) it can be concluded that there was a significant relationship between age and the incidence of PROM at the Ciruas Health Center in 2018. This research is in accordance with Prawirohardjo's theory (2010) which states that the age of mothers at risk of premature rupture of membranes is under 20 years and over 35 years. Manuaba (2013) stated that age less than 20 years is a bad age for pregnancy, where the reproductive organs are not yet functioning optimally. Reproductive organs that are not optimal result in less formation of connective tissue and imperfect vascularization, resulting in thin and weak amniotic membranes which can trigger premature rupture of the membranes.

The results of this study are in accordance with research conducted by Sutomo & Kuswandi (2016), that there was a significant relationship between age and the incidence of premature rupture of membrane. Pre labor rupture of the fetal membranes (PROM) is a complex and difficult problem that obstetricians face every day. The evaluation and management of a patient who has ruptured fetal membranes. One of the most contentious questions in obstetrics is the timing of the commencement of labor. The terminology has often proven perplexing. Historically, the term used by obstetricians has been preterm membrane rupture, which means before the commencement of labor, but is frequently perplexed by the reference to the preterm gestational age groupings. The latest study found that there was a correlation between heat exposure with PROM (Jiao, 2023).

In this study, majority of mothers who gave birth who had primiparous parity experienced PROM incidents (88.2%), more mothers who gave birth had multiparous parity, only 37.5% experienced PROM incidents. The statistical test results obtained p value = 0.008, at $\alpha = 0.05$ ($p < \alpha$) it can be concluded that there was a significant relationship between parity and the incidence of PROM at the Ciruas Health Center in 2018. The results of this study are in line with research conducted by Maryuni & Kurniasih (2017) which found a significant relationship between parity and the incidence of premature rupture of membranes.

It is known that of the birthing mothers whose gestations were preterm, only 33.3% experienced PROM incidents. Meanwhile, of the birthing mothers whose pregnancies were at

term, the majority experienced PROM incidents (81%). However, the statistical test results obtained p value = 0.010, at $\alpha = 0.05$ ($p < \alpha$) it can be concluded that there was a significant relationship between gestational age and the incidence of PROM at the Ciruas Health Center in 2018. A study by Manuck et al., (2009) also found that there was a significant relationship between gestational age and premature rupture of membrane (PROM).

Maria & Sari (2016) found a relationship between gestational age and PROM. Preterm gestational age is 28-36 weeks (<37 weeks) in the third trimester, the complication usually found are amniotic membrane easy rupture and weakening of the strength of the amniotic membrane. It is related to uterine enlargement, uterine contractions and fetal movements. This is because rupture of the amniotic membrane is related to changes biochemical processes that occur in the collagen matrix extracellular amnion, chorion, and membrane apoptosis fetus. The membranes and decidua react to stimuli such as infection and the role of the amniotic membrane with produces mediators such as prostaglandins, cytokinin, and hormone proteins that stimulate matrix degrading enzyme activity. PROM Prematurity is caused by external factors such as infections that spread from the vagina, cervical incompetent polyhydramnios placental abruption (Prawirohardjo, 2011 as cited in Maria & Sari, 2016).

Based on the results of the analysis of the relationship between knowledge and the incidence of PROM among mothers giving birth at the Ciruas Health Center, it is known that the majority of mothers who had poor knowledge experience PROM (83.3%), more than birth mothers who have good knowledge, only 40% experience PROM events. The statistical test results obtained p value = 0.027, at $\alpha = 0.05$ ($p < \alpha$) it can be concluded that there is a significant relationship between knowledge and the incidence of PROM at the Ciruas Health Center in 2018.

Notoatmodjo (2012) states that knowledge is an important factor in determining a person's behavior because knowledge can lead to changes in people's perceptions of habits, including in action, in this case the action of early detection of danger signs in pregnancy. Knowledge has a close relationship with early detection of danger signs of pregnancy, means that the better the mother's knowledge, the greater the mother's tendency to take action for early detection of danger signs in pregnancy. So, with good knowledge, mothers can maintain their pregnancy and this reduces the risk of premature rupture of membranes. The results of this research are in line with the results of research by Hastuti and Putri (2012) in Getas Village, Cepu District, Blora Regency, which found that there was a relationship between knowledge and the incidence of premature rupture of membranes (p value 0.000). Health care provider need to educate mothers to improve their knowledge regarding the pregnancy complication especially PROM.

CONCLUSION

It can be concluded that the incidence of premature rupture of membranes (PROM) at the Ciruas Health Center was still high. Majority of women were had risk age, were primiparous, had preterm gestational age, and had poor knowledge regarding Premature Rupture of Membranes. The variables which have significant relationship with Premature Rupture of Membranes (PROM) are mothers' age, parity, gestational age, and knowledge regarding PROM. This study suggests further study to analyze other variables which might contribute to PROM. Health care worker need to pay attention for the pregnant women who have the risk factors of PROM such as age, parity, gestational age, and also knowledge regarding PROM. Midwife should strengthen their roles in education of pregnant women regarding the prevention of PROM in pregnancy.

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CONFLICT OF INTEREST

There is no conflict of interest in conducting this study.

REFERENCES

- Aeni, N. (2013). Faktor risiko kematian ibu. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal)*, 7(10), 453-459.
- Dinkes Provinsi Banten [Banten Health Profile]. (2016). Retrieved from <https://dinkes.bantenprov.go.id/read/profilkesehatan-provinsi-bant/137/PROFIL-KESEHATAN-BANTEN-TAHUN-2017.html>
- Iswanti, T. (2017). Faktor-faktor yang Berhubungan Dengan Kejadian Ketuban Pecah Dini pada Ibu Bersalin. *IMJ (Indonesian Midwifery Journal)*, 1(1).
- Jiao, A., Sun, Y., Sacks, D. A., Avila, C., Chiu, V., Molitor, J., ... & Wu, J. (2023). The role of extreme heat exposure on premature rupture of membranes in Southern California: A study from a large pregnancy cohort. *Environment International*, 173, 107824.
- Prawirohardjo, S. (2008). *Ilmu Kebidanan*. Yayasan Bina Pustaka.
- Konar, H. (2018). *DC Dutta's textbook of obstetrics*. JP Medical Ltd.
- Kuba, K., & Bernstein, P. S. (2018). ACOG practice bulletin no. 188: prelabor rupture of membranes. *Obstetrics & Gynecology*, 131(6), 1163-1164.
- Lorthe, E. (2018). Epidemiology, risk factors and child prognosis: CNGOF Preterm Premature Rupture of Membranes Guidelines. *Gynecologie, Obstetrique, Fertilité & Senologie*, 46(12), 1004-1021.
- Maharrani, T., & Nugrahini, E. Y. (2017). Hubungan usia, paritas dengan ketuban pecah dini di Puskesmas Jagir Surabaya. *Jurnal Penelitian Kesehatan Suara Forikes*, 8(2).
- Maria, A., & Sari, U. S. C. (2016). Hubungan Usia Kehamilan dan Paritas Ibu Bersalin dengan Kejadian Ketuban Pecah Dini. *Jurnal Vokasi Kesehatan*, 2(1), 10-16.
- Mahwati, Y. (2013). Pemanfaatan pelayanan kesehatan ibu di Jawa Barat. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal)*, 7(6), 257-264.
- Manuaba. (2013). *Maternal dan Neonatal*. Yayasan Bina Pustaka Sarwono Prawirohardjo.
- Manuck, T. A., Eller, A. G., Esplin, M. S., Stoddard, G. J., Varner, M. W., & Silver, R. M. (2009). Outcomes of expectantly managed preterm premature rupture of membranes occurring before 24 weeks of gestation. *Obstetrics & Gynecology*, 114(1), 29-37.
- Menon, R., & Richardson, L. S. (2017, November). Preterm prelabor rupture of the membranes: a disease of the fetal membranes. In *Seminars in perinatology* (Vol. 41, No. 7, pp. 409-419). WB Saunders.
- Notoatmodjo, S. (2012). *Promosi Kesehatan, Teori dan Aplikasi*. PT. Asdi Mahasatya.
- Prawirohardjo, S. (2010). *Ilmu kebidanan*. Yayasan Bina Pustaka.
- Prawirohardjo, S. (2008). *Ilmu kebidanan*. Yayasan Bina Pustaka.
- Shen, T. T., DeFranco, E. A., Stamilio, D. M., Chang, J. J., & Muglia, L. J. (2008). A population-based study of race-specific risk for preterm premature rupture of membranes. *American journal of obstetrics and gynecology*, 199(4), 373-e1.

- Spinillo, A., Nicola, S., Piazzzi, G., Ghazal, K., Colonna, L., & Baltaro, F. (1994). Epidemiological correlates of preterm premature rupture of membranes. *International Journal of Gynecology & Obstetrics*, 47(1), 7-15.
- Statistik [Indonesian Statistic], I. B. P. (2012). Survei demografi dan kesehatan Indonesia [Indonesian Health and Demographic Survey], 2012.
- Sutomo, O., & Kuswandi, K. (2015). Analisis Faktor Yang Berhubungan Dengan Kejadian Ketuban Pecah Dini Di Rumah Sakit Umum Daerah Dr. Adjidarmo Kabupaten Lebak Tahun 2013. *Jurnal Medikes (Media Informasi Kesehatan)*, 2(1), 23-38.
- Tiruye, G., Shiferaw, K., Tura, A. K., Debella, A., & Musa, A. (2021). Prevalence of premature rupture of membrane and its associated factors among pregnant women in Ethiopia: A systematic review and meta-analysis. *SAGE open medicine*, 9, 20503121211053912.