Original Research Article

Risk factor for premature rupture of membranes: a clinical study

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ABSTRACT

Background: Premature rupture of membranes (PROM) is the rupture of the amniotic membrane before the onset of labour. Based on the time of occurrence, PROM can be divided into two, namely Premature Rupture of Membranes (PROM) and Preterm Premature Rupture of Membranes (PPROM). PROM occurs at or after 37 weeks gestation. PPROM, occurs before 37 weeks gestation.

Methods: This study is a descriptive retrospective analytical observational study with cross sectional method. This research uses SPSS data processing. Data were taken from the medical records of inpatients in the maternity ward at Bima Hospital in the period January-December 2023.

Results: The results of the analysis showed that there was a significant relationship in the maternal age factor of less than 20 years by 70.6%. Risk factors in the education sample were most prevalent in low education level at 62.7%. The risk factor of gestational age of the sample was mostly found in preterm gestation (less than 37 weeks) showing a significant relationship to the incidence of PROM by 66.6%. In the risk factor of parity most in primigravida is 66.6%.

Conclusions: In this study there is a relationship of risk factors that affect the occurrence of premature rupture of membranes in the maternity ward of Bima Hospital, namely maternal age less than 20 years, low education level, with preterm gestational age or less than 37 weeks and primigravida parity.

Keywords: Gestational, Premature rupture, Preterm premature rupture, Primigravida

INTRODUCTION

Premature rupture of membranes (PROM) is the rupture of the amniotic membrane before the onset of labour. Based on the time of occurrence, PROM can be divided into two, namely Premature Rupture of Membranes (PROM) and Preterm Premature Rupture of Membranes (PPROM). PROM occurs at or after 37 weeks of gestation and is also called at term PROM. PPROM, also known as preterm PROM, occurs before 37 weeks gestation.[1-4]

According to data from the World Health Organization (WHO) in 2014 the incidence of premature rupture of membranes (PROM) ranges from 5-10% of all births. Preterm PROM is 1% of all pregnancies and 70% of PROM cases occur in a term pregnancies. In 30% of cases PROM is the cause of premature birth. According to WHO, the incidence of premature rupture of membranes in the world reaches 12.3% of total deliveries, all spread in developing countries in Southeast Asia such as Malaysia, Myanmar, Thailand and Indonesia.[1,2,3,5]

Risk factors associated with premature rupture of membranes are fetal malpresentation, multiple pregnancy, infection, excess amniotic fluid, cervical incompetence and abdominal trauma. Risk factors for premature rupture of membranes are related to maternal knowledge, low socioeconomic status, smoking, sexually transmitted diseases, history of premature labour, history of premature rupture of membranes in previous pregnancies and history of vaginal bleeding.[3-6]

There are many risk factors associated with the occurrence of preterm rupture of membranes and high mortality and morbidity data in preterm, so this study will reveal the risk factors of preterm rupture of membranes in terms of age, education, parity, gestational age, type of pregnancy (single or multiple). The purpose of this study was to determine the incidence and characteristics of pregnancies with premature rupture of membranes in Maternity Ward Hospital.

METHODS

This study is a retrospective descriptive cross sectional analytical observational study. Data were collected using medical records of inpatients in the Maternity Ward at Bima Hospital in the period January-December 2023. This research not required any ethical approval and all the data based on medical records.

The sampling technique used nonpropability method followed by purposive sampling method. There were 136 samples consisting of 68 samples of patients with PROM and 68 samples of patients without PROM. The data processing method with SPSS data analysis Ch-squere method with significant results of p value <0.05.

Inclusion criteria

Identity of patients with and without PROM, including maternal age, education level, parity (number of pregnancies), and gestational age were included.

Exclusion criteria

Incomplete and unclear patient identity, having comorbidities during pregnancy were excluded.

RESULTS

In this study obtained data as many as 68 samples, which met the inclusion criteria, namely patients with PROM with each age factor characteristic, namely age <20 years as many as 24 patients with a percentage level of 35%, age 21-34 years as many as 28 patients with a percentage level of 41.2%, and for age >35 years as many as 16 patients with a percentage level of 23% (Table 1).

Based on the education factor, it is known that there are 37 patients with a percentage level of 54.4% for low-level education (elementary and junior high school), and 31

patients with a percentage level of 45.6% for high-level education (high school-college) (Table 1).

Table 1: Characteristics of study respondents.

Subject characteristics	N	Percentage
Premature preterm rupture of membrane	68	100
Risk factors		
Age (years)		
<20	24	35.3
21-34	28	41.2
>35	16	23.5
Education		
Low (elementary-middle school)	37	54.4
Higher school-college (SMA-SARJANA)	31	45.6
Pregnancy age		
Preterm	28	41.2
Aterm	24	35.3
Posterm	16	23.5
Parietas (number of pregnancies)		
Primigravida	30	44.1
Multigravida	38	55.9

Based on the pregnancy age factor, it is known for preterm gestational age as many as 28 patients with a percentage level of 41.2%, for aterm gestational age as many as 24 patients with a percentage level of 35.3%, and for posterm gestational age as many as 16 patients with a percentage level of 23.5% (Table 1). Based on the parietas factor (number of pregnancies) it is known that for primigravida there are 30 patients with a percentage level of 44.1%, and for multigravida there are 38 patients with a percentage level of 55.9% (Table 2).

Table 2: Incidence of PROM based on characteristics of study respondents.

Variables	PROM		Percent PROM	OR (95% CI)	Sig.
	Yes	No			
Age (years)					
<20	24	10	70.6	10,570	
21-34	28	27	50.9	(10,467-10,830)	0.005
>35	16	31	34		
Education					
Low	37	22	62.7	6.736	
High	31	46	40.2	(5,867-6,797)	0.009
Pregnancy age					
Preterm	28	14	66.6	7,828	
Aterm	24	38	38.7	(2,656-7,946)	0.020
Posterm	16	16	50		
Parietas (number of pregnancies)					
Multigravida	30	23	56.6	1,515	
Primigravida	38	45	45.8	(1,113-1,518)	0.218

DISCUSSION

Premature rupture of membranes (PROM) is the spontaneous rupture of the amniotic membrane before 37 weeks gestation that occurs before the onset of labour. The rupture has various causes, intrauterine infection, DNA damage due to oxidative stress, and premature cellular ageing are the main predisposers. Associated risk factors include low socioeconomic status, body mass index <19.8, nutritional deficiencies, and smoking. Women with PROM have an increased risk for recurrence in subsequent pregnancies.[1,2,5,7,8]

This study showed that most of the risk factor variables namely maternal age, maternal education, gestational age and parity showed an association with the incidence of PROM. The results of the analysis showed a significant relationship in maternal age <20 years by 70.6%. This is because maternal age <20 years is a very young age where at this age the uterus is less mature for childbirth, so it is very risky to suffer from premature rupture of membranes. The risk factor in the education sample was mostly at the low education level at 62.7%, compared to mothers with a high education level of 40.2% in case PROM. The higher of the mother's education, the mother will tend to have a stronger awareness to maintain their own health so that they will more quickly detect any danger during pregnancy, one of which is if there is premature rupture of membranes, they will immediately come to health services. The higher of the mother's education level, the easier it is for the mother to detect risks and complications during pregnancy. Preterm gestational age showed a significant relationship to the incidence of PROM by 66.6%. The incidence of PROM occurred mostly at less than full-term gestational age.

Like the previous study by Hermin et al reported a sample size of 47 pregnant women with preterm PROM at Ulin Hospital, it was found that most of the risk factor variables, namely age, education, gestational age and parity, showed an association with the incidence of preterm PROM. The results of the analysis showed there was a significant relationship in the age of the mother 18-20 years by 63.6%. Risk factors in the education sample were most prevalent in low education level at 65.1%, compared to high education level mothers at 37.3%.[9]

Similar research conducted by Stefani Mellisa, reported research conducted at Bahteramas General Hospital in 2015 showed that mothers with age <20 years and age >35 years had a 4.95% greater risk of experiencing PROM compared to maternal age between 20-35 years. Mothers with a parity of up to or more than 4 years had an 8.94% greater chance of having a PROM compared to mothers with a parity of less than 4 years. Mothers with an education level below high school had a 2.43% greater chance of experiencing PROM compared to mothers with an education level above high school.[10]

Sahu et al, in this study, Primigravida accounted for 52.20% of the total cases of PROM at less than 34 weeks of gestation.[9] Based on the research of Waode et al, the age of the mother giving birth at Regional General Hospital of West Muna has a risk of premature rupture of membranes, which is less than 20 years and more than 35 years. The results of statistical calculations found a relationship between maternal age and the incidence of premature rupture of membranes. Furthermore, mothers with a parity of only one or more than five have a risk of premature rupture of membranes. Moreover, the results of statistical calculation tests find a relationship between maternal parity and the incidence of premature rupture of membranes.[11,12]

CONCLUSION

There is an association between the risk factors of maternal age less than 20 years, low education level, preterm gestation and multigravida pregnancy with the incidence of premature rupture of membranes at Maternity Ward of Bima Hospital.

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