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Factors Related to the Incident of Premature Rupture of Membrane among Maternity Women

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Abstract:
In the health sector related to maternal and infant mortality, one of the causes is infection which many mothers experience, most of which are the result of pregnancy complications/complications such as fever, chorioamnionitis, urinary tract infections and 65% are due to premature rupture of membranes (PROM). which causes many infections in mothers and babies. At Salak Bogor Hospital, all cases of premature rupture of membranes in 2016 were 240 cases. This research is to determine the factors associated with the incidence of premature rupture of membranes in women giving birth at Salak Bogor Hospital in 2016. This research is an analytical descriptive study with a case control study approach. The total sample in this study was 300 people divided into a 1:1 ratio, which consisted of 150 respondents in the case group and 150 respondents in the control group, using simple random sampling techniques. Data collection was carried out using secondary data taken in the maternity ward at Salak Bogor Hospital in 2016. Data analysis used the chi square test with the SPSS version 24.0 program. The results of a study of 300 samples showed that the largest group of respondents in multigravida parity was 161 (53.7%), pregnancies without twins were 280 (93.3%), pregnancies without PROM were 295 (98.3%), mothers gave birth with normal position were 247 (82 .3%). The results of analysis using the chi-square test showed that twin pregnancies (p>0.247) and PROM (>1.000) were not proven to be related with PROM. Parity (p<0.005) and fetal position (p<0.001) were found related to PROM. It is hoped that the results of this research can be used as a source of information to increase mothers' knowledge about the factors associated with the incidence of premature rupture of membranes.

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INTRODUCTION

Based on the 2014 WHO report, the maternal mortality rate (MMR) in the world in 2013 was 289,000 people. Meanwhile, the maternal mortality rate in Southeast Asian countries such as Indonesia is 190, the Philippines 170, Vietnam 160, Thailand 44, Brunei 60, and Malaysia 39 per 100,000 live births (WHO, 2014). This data shows that the maternal mortality rate in Indonesia is higher than in other countries in Southeast Asia. Premature rupture of membranes or (PROM) is the rupture of the fetal membranes before it occurs near birth, but when the membranes rupture before 37 weeks of gestation, it is called PROM (Fadlun, 2013). Most of the infections experienced by mothers are the result of pregnancy complications/complications such as febrile, chorioamnionitis, and urinary tract infections, and 65% are due to PROM, which causes many infections in mothers and babies (Syafii et al., 2022).

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Labor is the movement of the fetus, placenta, and membranes out of the uterus through the birth canal. This process begins with the opening and dilation of the cervix caused by uterine contractions with regular frequency, duration, and strength. Labor is considered normal if the process occurs at a sufficient age (after 37 weeks) without complications. In the labor process, the assistant's ability and skills greatly affect the labor's comfort and smoothness (Khoiriyah, 2021). Labor pain occurs due to the physical and psychological reflexes of the mother. Emotional tension due to anxiety will worsen the mother's perception of pain during labor. Pain that occurs during labor requires proper pain management and must be a concern for the mother, family, and health workers (Carolin et al., 2023).

Premature rupture of membranes (PROM) is the rupture of the amniotic membranes before the onset of labor, characterized by the discharge of thin fluid from the vagina without pain. Several factors cause premature rupture of membranes, including incompetent cervix, excessive uterine tension: multiple pregnancies, hydramnios, abnormal fetal position in the uterus: breech position, transverse position, possible narrow pelvis: hanging abdomen, the lowest part has not entered the upper pelvis, cephalopelvic disproportion, congenital abnormalities of the amniotic membranes, infections that cause biomechanical processes in the amniotic membranes to occur in proteolytic form, so that the amniotic membranes are more easily ruptured (Novelia et al., 2023).

Maternal deaths are divided into direct and indirect deaths. Direct deaths are caused by pregnancy, childbirth, postpartum complications, and all interventions or inappropriate management of these complications. Indirect maternal deaths are deaths due to pre-existing diseases or those that arise during pregnancy that affect pregnancy, such as malaria, anemia, HIV/AIDS, and cardiovascular diseases (Ludviyah et al., 2023). The factors that directly cause maternal death are bleeding 40-60%, preeclampsia 20-30%, infection 20-30%, and premature rupture of membranes that do not receive immediate treatment. PROM includes obstetric complications during pregnancy, obstetric complications can cause death of the mother or fetus (Jannah et al., 2020). Almost all premature rupture of membranes in preterm pregnancies will be born before term, or delivery will occur within one week after the amniotic membrane rupture (Sulaiman, 2011). This study aims to determine factors associated with the incidence of premature rupture of membranes in maternity women.

METHOD

The design of this study is case-control. Analytical surveys are surveys or research that explore how and why health phenomena occur and then analyze the dynamics of the correlation between phenomena or between risk factors and effect factors (Notoadmojo, 2010). Besides that, this study's dependent and independent variables are parity, multiple pregnancies, fetal position, and cephalopelvic disproportion (CPD) as independent variables, and the incidence of premature rupture of membranes as the dependent variable. Data collection in this study used secondary data through medical record data from January - December 2016 with the help of a checklist sheet that recorded the categories of parity, multiple pregnancies, fetal position, and Cephalopelvic Disproportion (CPD) as independent variables and the incidence of premature rupture of membranes, describing or explaining a situation in a community or society in this study to see a picture of the incidence of PROM based on factors related to the incident of CPD in the maternity room at Salak Bogor Hospital in 2016 (Notoadmodjo, 2010). The population in this study was all maternity women who came to the delivery room at Salak Bogor Hospital in 2016, and the total population was 240. The sample in this study were maternity women who came to the delivery room at Salak Bogor Hospital in 2016 and met the inclusion and exclusion criteria. The sample in

this study used a 1:1 ratio of 150 mothers who gave birth with premature rupture of membranes as cases and 150 mothers who gave birth without premature rupture of membranes as controls. The sample is part of the number and characteristics of the population. The sampling technique used in this research was simple random sampling. The research instrument in this study was a medical record to obtain data on the general characteristics of respondents, including maternal gravida status, fetal position, multiple pregnancies, cephalopelvic disproportion (CPD), and diagnosis of PROM. Research ethics includes the researcher's behavior or treatment of the subject and what the researcher produces for society.

RESULT

Table 1. Frequency Distribution of Respondents' Characteristics (n=300)

Variable	Frequency (f)	Percentage (%)
Parity		
Primigravida	139	46.3
Multigravida	161	53.7
Multiple Pregnancies		
Yes	20	6.7
No	280	93.3
CPD		
Yes	5	1.7
No	295	98.3
Fetal location		
Normal Location	247	82.3
Abnormal Locations	53	17.7

Table 1 shows that most respondents (53.7%) were multigravida, the majority of respondents (93.3%) were women with non-twin pregnancies, the majority of respondents (98.3%) were mothers who gave birth without CPD, and the majority of respondents (82.3%) were mothers who gave birth with normal fetal position.

Table 2. The Relationship between Parity, Multiple Pregnancies, CPD, Fetal Location, and Premature Rupture of Membranes (n=300)

Variable	Premature Rupture of Membranes				Total		p-value	OR
	Yes		No					
	f	%	f	%	f	%		
Parity								
Primigravida	57	38	82	54.7	68	45.3	0.005	0.508
Multigravida	93	62	139	46.3	161	53.7		
Multiple Pregnancies								
Yes	7	4.7	13	8.7	20	6.7	0.247	0.516
No	143	95.3	137	91.3	280	93.3		
CPD								
Yes	2	1.3	3	2.0	5	1.7	1.000	0.662
No	180	98.7	147	98.0	295	98.3		
Fetal location								
Normal	135	90	112	74.7	247	82.3	0.001	3.054
Abnormal	15	10	38	25.3	53	17.7		

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Table 2 shows that the highest number of maternity women who experienced Premature Rupture of Membranes were maternity women with multigravida parity at 62% compared to maternity women with primigravida. In addition, more maternity women did not experience premature rupture of membranes in primigravida parity, 54.7%, compared to multigravida maternity women. The Chi-Square test results obtained p value = 0.005. This means there is a significant relationship between parity and the incidence of premature rupture of membranes at Salak Bogor Hospital 2016.

Maternity women who experienced premature rupture of membranes mostly had non-twin pregnancies at 95.3% compared to maternity women with twin pregnancies. In addition, maternity women who did not experience Premature Rupture of Membranes were more often than maternity women with non-twin pregnancies by 91.3% compared to maternity women with twin pregnancies. The Chi-Square test results obtained p value = 0.247. This means that there is no significant relationship between twin pregnancies and the incidence of premature rupture of membranes among maternity women at Salak Bogor Hospital in 2016.

The highest number of maternity women experienced Premature Rupture of Membranes without CPD at 98.7% compared to maternity women with CPD. The Chi-Square test results obtained p value = 1,000. This means that there is no significant relationship between CPD and the incidence of premature rupture of membranes in maternity women at Salak Bogor Hospital in 2016.

About 90% of mothers who experienced premature rupture of membranes were women who gave birth in a normal position, compared to mothers who gave birth in an abnormal position. Apart from that, there were more mothers giving birth who did not experience premature rupture of membranes in normal locations, 74.7%, compared to mothers giving birth in abnormal locations. The Chi-Square test results obtained p value = 0.001. This means that there is a significant relationship between the location of the fetus and the incidence of premature rupture of membranes in women giving birth at Salak Bogor Hospital in 2016. The OR value = 3.054 means that mothers giving birth with abnormal fetal position have a 3.054 times greater chance of experiencing premature rupture of membranes, if compared with women giving birth with normal fetal position.

DISCUSSION

One of the predisposing factors for premature rupture of membranes is multigravida because the uterus has been enlarged before so that when the mother becomes pregnant again, the uterus will stretch further. The strength of the connective tissue and vascularization will decrease, causing brittleness in certain parts (Surayapalem et al., 2017). Researchers believe that health services for multigravida parity mothers still require special attention because most of the premature rupture of membranes occurs in mothers with parity 1-4.

Multiple pregnancies can cause the amount of amniotic fluid in the uterus to increase. The more amniotic fluid in the uterus causes contractions in the uterus until the cervix opens and premature rupture of the membranes occurs (Manuaba, 2012). Researchers believe that the incidence of multiple pregnancies at Salak Bogor Hospital is still low, so it does not significantly impact the incidence of premature rupture of membranes.

Disproportion of the fetal head can cause abnormalities in the position of the fetus so that the lowest part immediately receives dominant intrauterine pressure, which causes premature rupture of the membranes (Barma, 2017; Maharaj, 2010). Researchers believe that this percentage influences the results of the bivariate analysis, which states that there is no relationship between

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cephalopelvic disproportion and the incidence of premature rupture of membranes. Even in cases of cephalopelvic disproportion, labor will take longer because there is no progress in labor. During long labor, the mother will be easily exposed to infection. In cephalopelvic disproportion, the lowest part of the fetus does not enter PAP. At the same time, the upper segment of the uterus continues to contract so that the amniotic membrane experiences pressure and then ruptures before labor progresses.

Based on the theory, the factors causing premature rupture of membranes could be determined by the location of the fetus in the uterus. Location abnormalities are an indication of termination of pregnancy. Disproportion of the fetal head can cause abnormalities in the position of the fetus so that the lowest part of the amniotic fluid directly receives dominant intrauterine pressure. Location abnormalities such as breech so that there is no lowest part covering the upper pelvic inlet, which can block pressure against the lower membrane. resulting in premature rupture of membranes. Researchers believe that pregnancies with a normal location will have the potential to experience premature rupture of membranes due to the increase in the incidence of premature rupture of membranes during pregnancy at Salak Bogor Hospital.

The study's results showed a significant relationship between parity and the incidence of premature rupture of membranes in women giving birth at Salak Bogor Hospital in 2016. Based on the theory of (Husuni et al., 2022), multiparous parities experience premature rupture of membranes because the uterus has been enlarged before, so when the mother becomes pregnant again, the uterus will stretch further. The strength of the connective tissue and vascularization will decrease, causing brittleness in certain parts. Parity with multigravida had a lack of blood circulation in the uterus, and the tissue around the uterus makes the amniotic membrane fragile, causing premature rupture of the membranes.

The results showed no significant relationship between twin pregnancies and the incidence of premature rupture of membranes in maternity women at Salak Bogor Hospital in 2016. Based on Parry's theory (2014), in multiple pregnancies, this depends on the strength and weakness of the amniotic membranes in stretching as the pregnancy grows larger and holds the fetus in the mother's womb. Researchers believe that in this study, there was no relationship between multiple pregnancies and the incidence of premature rupture of membranes. Premature rupture of membranes occurs depending on the strength and weakness of the amniotic membranes in stretching as the pregnancy gets bigger and holds the two fetuses in the mother's womb. The strength and weakness of the amniotic membranes are also influenced by the mother's nutrition and nutritional intake. If a mother with a twin pregnancy is, of course, aware that the nutrition she needs is twice as much as a mother with a single pregnancy. Consuming lots of nutritious food will certainly be very good for the condition of the mother's fetus so that premature rupture of membranes can be avoided from the start of pregnancy by providing adequate nutrition.

The results of the study showed that there was no significant relationship between CPD and the incidence of premature rupture of membranes in maternity women at Salak Bogor Hospital in 2016. Cephalopelvic Disproportion is a condition that describes an imbalance between the fetal head and the mother's pelvis. Disproportion of the fetal head can cause abnormalities in the position of the fetus so that the lowest part immediately receives dominant intrauterine pressure, which causes premature rupture of the membranes (Turlina & Ummah, 2020). Researchers believe that in this study, there is no relationship between CPD and the incidence of premature rupture of membranes because the number of mothers giving birth with CPD is very small, 1.7%, when compared to the number of mothers giving birth without CPD, namely 98.3%.

The results of the research show that there is a significant relationship between the position of the fetus and the incidence of premature rupture of membranes in maternity women at Salak

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Bogor Hospital in 2016. Based on Varney's theory (2007), in the breech position, fetal movement is more pronounced in the lower segment of the uterus, so there is a possibility of infiltration of the extremities of the fetus. pressing on the amniotic membranes and due to intrauterine pressures, which causes the amniotic membranes to rupture. Researchers believe that there is a relationship between the location of the fetus and the incidence of premature rupture of membranes because pregnancies with abnormal locations have the potential to experience premature rupture of membranes because the shoulders or extremities of the fetus cannot cover the upper pelvic inlet which can reduce the pressure on the lower membrane so that contractions directly lead to fluid in front of the lower membrane.

CONCLUSION

Based on the results, it can be concluded that out of 300 mothers who experienced premature rupture of membranes, the results were multigravida was 53.7%, 93.3% was non-twin pregnancies, 98.3% was non-CPD, and 82.3% was normal fetal position. In addition, there is a significant relationship between maternal parity (p-value = 0.005) and fetal abnormalities (p-value = 0.001) with the incidence of premature rupture of membranes, and there is no significant relationship between twin pregnancies (p-value = 0.24) and CPD (p-value = 1) with the incidence of premature rupture of membranes. The results of this research can be used to increase mothers' knowledge about the factors associated with the incidence of premature rupture of membranes.

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CONFLICT OF INTEREST

There is no conflict of interest in conducting this study.

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