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Determinant Premature Rupture of Membrane

Ekayanti[1], Dwi Ghita[2], Marina[3]
[1,2,3]STIKES Graha Edukasi Makassar, Jl. Perintis Kemerdekaan, Kapasa, Kec. Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia.
Email: ekayanti826@gmail.com, dwighita924@gmail.com, rhinaglobal@yahoo.com

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ABSTRACT

Premature rupture of the membrane is a complication that threatens the soul of both the mother and the baby born. This article aims to determine the factors that can increase premature rupture of amniotic fluid so that prevention can be done. The study was conducted at the health centre for ten months. Research design with a case control study approach using the purposive sampling technique, collecting data using observation sheets. History of premature rupture of membrane, age, parity and employment status. This study used a research design with a case control study approach using a purposive sampling technique with a sample of 15 respondents who experienced prom and 15 respondents who did not experience prom collecting data using observation sheets. Results showed that of the 30 people who were used as samples, 16 mothers had a history, there were 13 (81.2%) cases of premature rupture of membranes. Based on the results of chi square analysis, the value of = 0.000 < from 0.05. Conclusion There is a relationship between the history of prom, age, and parity with prom's incidence advice for pregnant women to avoid risk factors that increase the incidence of amniotic rupture early.

Keywords: Age, Membrane, Parity

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* Ekayanti Robin Dompas, STIKES Graha Edukasi Makassar, Jl. Perintis Kemerdekaan, Kapasa, Kec. Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia.
Email: ekayanti826@gmail.com

INTRODUCTION

The impact of Covid19 on pregnant women causes an increase in cases of premature rupture of amniotic fluid. If pregnant women experience amniotic rupture early, pregnant women will give birth to premature babies. If the baby is born prematurely will increase the risk of death in the neonatal and the cost of care of premature babies, which also require long-time care and expensive costs (Abdelazim, 2018).

The amniotic membrane that limits the amniotic cavity consists of amniotic and chorion tightly bonded. This layer consists of several cells, such as epithelial cells, mesenchymal cells, trophoblast dam cells bound in the collagen matrix (Bartal, 2021). The amniotic membrane produces amniotic water and protects the fetus against infection. Under normal circumstances, the amniotic membrane ruptures in the labour process. Early amniotic rupture is the amniotic membrane rupture before delivery (Bacheller et al., 2021).

Premature rupture of the membrane is hazardous for pregnant women and their babies. The danger of amniotic rupture is that infection occurs in both mother and baby. Break of amniotic fluid leaves the baby unprotected by the amniotic membrane and exposed to contact with the outside world, which causes bacteria to enter the mother's womb and infect the mother and mother. This can threaten the life of both mother and baby. In addition, the birth of a baby that is less than typical causes premature babies and the risk of fetal defects becomes high (Rizka Ameliah, 2022).

Premature rupture of membrane events ranges from 5-25% in developed countries, contributing 60-80% to neonatal morbidity mortality worldwide. Premature rupture of membrane incidence in Indonesia is around 39.1% (Mayuputri, 2020). Premature rupture of membrane incidence is 6-20% in all pregnancies, and 94% occur in pregnancy. Premature rupture of the membrane in preterm pregnancies can cause more problems than a term pregnancy. Pregnant women aterm 8-10% will experience premature rupture of membrane before and 1% early pregnancy (Muayah, 2022).

The mother's cause of death is due to bleeding, infection, and pregnancy poisoning(Astuti, 2021). The onset of the disease is caused by labour assistance that does not heed the requirements of asepsis antiseptic and the accompanying obstetric complications such as old partus, premature rupture of amniotic fluid, amniotic membrane abnormalities, central prolapsus umbilical cord and nutritional deficiencies (Bacheller et al., 2021). The infection that occurs results from complications/ circumcision of pregnancy such as

chorioamnionitis urinary tract infections and 65% are caused by premature rupture of the membrane so that it is the risk to the mother and fetus (Agustina, 2021).

Premature rupture of the membrane increases the risk of infection because the amniotic membrane that becomes a barrier to entering germs is no longer there, so it can be dangerous for the mother and fetus (Brough et al., 2021). Factors that cause premature rupture of the membrane include primipara, multipara, grand multipara, over distance (hydroamination, double pregnancy), disproportion cephalo pelvis, abnormality of location (latitude and breech) (Bartal, 2021). Premature rupture of the membrane requires close supervision and cooperation between families and nurses because it can cause intrauterine infections that can threaten the safety of the mother and fetus (Magdalena Tri Princess Apriyani, 2022).

The healthy reproductive age in carrying out the function of producing pregnant and giving birth between the ages of 20-35 years. The risk of pregnancy and complications increases if the pregnancy occurs under 20 years and over 35 years (Brough et al., 2021). For mothers who give birth at the age of fewer than 20 years, the development of the reproductive organs has not been optimal. Her soul is still unstable, so pregnancy often arises complications. (Magdalena Tri Putri Apriyani, 2022).

Previously (Chandra & Sun, 2019) had researched the differences in mothers who give birth prematurely in the third trimester with the characteristics of mothers who experience amniotic rupture early in the second trimester. His research found that the gestational age of 28-31 weeks is at risk for premature birth and premature rupture of amniotic fluid.

Labour is a stressful event for most women. A mother in labour tends to feel afraid, especially in primipara mothers. But when a mother feels terrified, the brain automatically regulates and prepares the body to feel pain so that the pain during labour will be more pronounced (Idha Budiarti, 2022).

Sri Lanka researchers (Brough et al., 2021) researched complementary efforts to reduce the use of pharmacology to deal with the incidence of premature rupture of amniotic fluid. However, from the results of his research, there has been no effective complementary effort to deal with the incidence of premature rupture of amniotic fluid, so research is needed on risk factors that can increase the incidence of premature rupture.

Data from the World Health Organization (WHO) showed that 532,000 women died

from childbirth. In 2017, 542,000 women died, lower than the number of maternal deaths in 2018, with 579,000 women dying. Countries such as Thailand and Brunei Darussalam reached 67,268 people (Bryant et al., 2022).

This research is a development of previous research because there has not been found the right effort to prevent amniotic rupture early, so this study wants to find risk factors that can increase the incidence of amniotic fracture early.

According to the Indonesian health demographic survey, the maternal mortality rate in Indonesia is 102 per 100,000 live births. This figure is by the achievement of the target. Based on a study conducted at a research place, there were many cases of premature rupture of membrane, which in 2018 amounted to 17 points. In 2019 there were 20 cases to October 2020 amounted to 15 patients (Canu et al., 2019).

This study aims to determine the factors that can increase the incidence of premature rupture of amniotic fluid so that proper reassurance and handling can be done. In addition, if prevention and adequate handling efforts can be made, the death rate of infants due to premature rupture of amniotic fluid can also be avoided.

METHOD

This research is conducted using a research design with the case control study approach. Sampling in this study was conducted by purposive sampling. This research was conducted at a health centre. The study was conducted from January to February 2022. The sample in this study was a maternity mother who experienced premature rupture of the membrane as many as 30 people in the health centre. In research using purposive sampling techniques is a sampling technique by limiting the number of populations based on variables that researchers with inclusion and exclusion criteria have determined.

The data collected in the study is processed analytically with the chi-square test, and the results will be processed to determine the effectiveness of independent and dependent variables. Statistical tests were used to assess the history of premature rupture of membrane, parity, age and work of mothers with premature rupture of membrane events. Using chi square analysis obtained a value of $\rho = 0.000 <$ from $\alpha = 0.05$, which means H0 was rejected, and Ha was accepted.

RESULT AND DISCUSSION

Result

Table 1 Distribution Frequency Characteristics of Respondents

Characteristics of respondents	Case	Control
History of premature rupture of membrane		
Yes	13 (43%)	3 (10%)
No	2 (7%)	12 (40%)
Parity		
High Risk	14 (47%)	3 (10%)
Low Risk	1 (3%)	12 (40%)
Age		
High Risk	13 (43%)	3 (10%)
Low Risk	2 (7%)	12 (40%)
Work		
Work	9 (30%)	4 (13%)
Not Working	6 (20%)	11 (37%)

Source: Primary Data

Based on table 1, it can be known that the characteristics of the sample can be concluded that 43% of samples who experience premature rupture amniotic fluid have had a high risk of amniotic fluid, 43% of samples who experienced premature rupture of Membrane had an increased risk age. However, 37% of mothers who do not work do not experience prematurely ruptured membranes.

Table 2 Relationship of History With Premature Rupture of Membrane

History Premature Rupture of Membrane	Premature Rupture of Membrane				Total		P-Value
	Case		Control				
	n	%	n	%	n	%	
Yes	13	43	3	10	16	53	0.0001
No	2	7	12	40	14	47	
Total	15	50,0	15	50,0	30	100	

Source: Secondary Data

Table 2 statistical test results using Chi-Square p-value 0.0001 < α 0.05 show a relationship history of premature rupture with the occurrence of the premature ruptured membrane. So it can be concluded that if a pregnant woman has experienced premature rupture of membrane, then most likely will experience premature rupture of membrane again.

Table 3. Relationship of Parity With Premature Rupture of Membrane

Parity	Premature Rupture of Membrane				Total		P-Value
	Case		Control				
	n	%	n	%	n	%	
High Risk	14	47	3	10	17	57	0.005
Low Risk	1	3	12	40	13	43	
Total	15	50,0	15	50,0	30	100,0	

Source: Secondary Data

Table 3 statistical test results using Chi-Square p-value 0.005 < α 0.05 show a relationship parity with premature ruptured of Membrane. So it can be concluded that pregnant women who belong to the parity of high risk (grande multipara) are more at risk of developing premature ruptured amniotic fluid than pregnant women who have low-risk equality (primipara or multipara).

Table 4 Relationships Age With Premature Rupture of Membrane

Age	Premature Rupture of Membranee				Total		P-Value
	Case		Control				
	n	%	n	%	n	%	
High Risk	13	43	3	10	16	53	0.001
Low Risk	2	7	12	40	14	47	
Total	15	50,0	15	50,0	30	100,0	

Source: Secondary Data

Table 4 statistical test results using Chi-Square P-value 0.005<α 0.05 show a relationship parity with premature ruptured of Membrane. So it can be concluded that pregnant women at a high risk of>35 years are more at risk of developing premature ruptured amniotic fluid than pregnant women with a low-risk age or in a healthy reproductive period of 20-35 years.

Table 5 Relationship Employment Status With Premature Rupture of Membranee

Employment Status	Premature Rupture of Membrane				Total		Value *p*
	Case		Control				
	n	%	n	%	n	%	
Work	9	30	4	13	13	43	0.030
Not Working	6	20	11	37	17	57	
Total	15	50,0	15	50,0	30	100,0	

Source: Primary Data

Table 5 statistical test results using Chi-Square P-value 0.030>α 0.05 show no relationship between employment status and premature ruptured membrane. Working mothers are more at risk of developing prematurely ruptured Membrane than mothers who do not work. So it can be concluded that mothers who mobilize more are more at risk of developing prematurely ruptured membrane

Discussion

The results showed that of the 30 people used as a sample, mothers with a history of as many as 16 people, 13 people in the case group premature rupture of membrane and three people in the control group. While those who do not have a history of premature rupture of the membrane as many as 14 people, there are two people group of amniotic cases premature rupture of membrane and 12 people amniotic control group.

Based on the results of chi square analysis obtained, the p-value 0.0001 < α 0.05, this means H0 was rejected, and Ha was accepted. Thus there is a relationship of premature rupture of membrane history with the occurrence of premature rupture of membrane history. (Dhinda Fitri Puspita, 2021) Pregnant women who have experienced premature ruptured amniotic fluid before experience the risk of amniotic rupture early 2-4 times. The collagen content decreases combine this, triggering the break of amniotic fluid in pregnant women. Then, the membrane's composition becomes easily brittle, and the collagen content decreases in subsequent pregnancies. (Brough et al., 2021)

Pregnant women who have experienced premature ruptured amniotic fluid before will be at risk of experiencing premature ruptured amniotic fluid. If the amniotic fluid ruptures before 23 weeks of pregnancy, the fetal lungs are unlikely to develop correctly and cause the fetus not to survive (Bryant et al., 2022). Even if the fetus survives, it will likely experience physical and mental disabilities when born. Babies are also at risk for several problems, such as chronic lung disease, hydrocephalus, cerebral palsy, and developmental disorders (Canu et al., 2019).

If a pregnant woman has amniotic water rupture early, immediately go to the hospital to get treatment from a doctor. Amniotic water can be recognized by its features that are clear in colour, or there are white spots, accompanied by blood or mucus, and odourless (Chandra & Sun, 2017)

The results showed that of the 30 sampled mothers who had high-risk parity as many as 14 people, 11 people of the amniotic fluid case group premature rupture of membrane

and 3 people amniotic control group. While low-risk parity was 16 people, there were 4 people of amniotic fluid cases group premature rupture of membrane and 12 people amniotic control group.

Based on the results of chi square analysis obtained, the value $\rho = 0.005 <$ from $\alpha = 0.05$ means Ho was rejected, and Ha was accepted. Thus there is a relationship of parity with premature rupture of membrane. Parity is the number of births that have been experienced by mothers both born alive and stillborn with gestational age complications that can trigger the occurrence of premature rupture of membrane. (Rudilla et al., 2021) Women who have never given birth or are the first time to give birth usually experience physiological conditions such as pain during pregnancy, in addition to psychological disorders such as emotions and anxiety about pregnancy, so younger experience premature rupture of the membrane because in sick women, the condition of the body is not prime so it is not able to care for her pregnancy, which allows the risk of infection in the amniotic state. (Endang Susilowati, 2021)

The results of this study are in line with those conducted by showing that mothers with high-risk parity as many as 82 people out of 56 mothers experience premature rupture of the membrane. Thus, we concluded a relationship between parity and the incidence of premature rupture of Membrane obtained a $p = 0.028$.

Based on research conducted, women classified as multipara and grande multipara will have many risks to pregnancy. Women who have given birth several times and the birth distance is too close are believed to be more at risk of experiencing premature rupture of membrane (Dani et al., 2022)

Premature rupture of the membrane because of the decreased blood circulation capacity to the uterus and decreased myometrium so that vascularization to the uterus is not adequate, especially at the bottom of the uterus, which causes the connective tissue of the amniotic membrane easily brittle and eventually ruptures spontaneously. (DiNapoli & DeFranco, 2021)

Similarly, the occurrence of an incomplete cervix due to repeated labour so that there is excessive cervical dilation at the termination of pregnancy or cervical lacerations. (Han et al., 2020) The influential factor and threat are related to the function of the reproductive organs that have decreased so that it can cause abnormalities in the labour process such as premature amniotic fluid, bleeding and eclampsia. Therefore, the risk is more in multipara and grandemultipara caused by excess uterine mortality, reduced cervical flexion so that there can be an early opening in the cervix, the possibility of narrow pelvis (CPD), hanging abdomen, and

the lowest part has not entered the upper entrance of the pelvis can also have an effect. (Han et al., 2020) So the safe parity to run a pregnancy is 2-3 times. Therefore, amniotic rupture early many experienced by multiparity mothers. According to researchers, parity 2-3 is the safest parity when viewed from the point of maternal death. First birth and high amount of parity (more than 3)

Maternal mortality rates are higher. Higher parity, higher maternal mortality. In multipara and grandemultipara mothers, there are often complications related to the function of the reproductive organs that have decreased, resulting in abnormalities in the delivery process, but not all mothers with high-fertility pregnancies are at risk of complications.

The results showed that of the 30 people used as a sample, mothers who had a high-risk age of 15 people, 12 people (80.0%) premature rupture of membrane case group and three people (20.0%). While the low-risk age of 15 people, three people (20.0%) group of amniotic cases broke early and 12 people (80.0%) amniotic control group.

Based on the results of *chi square* analysis obtained, the value $\rho = 0.001 <$ from $\alpha = 0.05$ means H0 was rejected and Ha accepted. Thus there is an age relationship with the occurrence of amniotic rupture; early age is the length of a person's life calculated based on the last birthday. Age is one of the characteristic traits of people in epidemiological studies to be quite an essential variable because of several diseases or refiners found with varying frequency variations caused by age (Samejima et al., 2021). Pregnancy at fewer than 20 years can cause problems because the physical condition is not 100% ready. The reproductive age is not mature, the age of women who are less than 20 years, including the age too young to get pregnant and give birth, because the state of the uterus is less mature and not ready to receive the fruit of pregnancy so that the membrane of the amniotic membrane is also not too strong defence to protect the fetus is susceptible to spontaneous rupture that can be identified as premature rupture of membrane (Murni Lestari, 2021).

The results of this study are in line with those conducted by showing that the age of mothers is at high risk; as many as 87 people out of 43 mothers experience premature rupture of the membrane. Thus, we concluded a relationship between the mother's age and the incidence of premature rupture obtained the value p = 0.009 (Muayah, 2022).

Based on research conducted, the age of mothers over 35 years of maternal health has decreased so that higher complications experiencing obstetric skin such as

experiencing premature rupture of membrane. (Sorano et al., 2020) Uterine function declines due to the presence of adequate vascularization to the uterus. The uterine muscle tone begins to decrease its elasticity, thus can risk weakening of the amniotic Membrane to protect the fetus so that it is easily ruptured spontaneously (Sung et al., 2017). Unlike women aged 20-35 years who are considered ideal for pregnancy and childbirth. At this age, the condition is too close to the woman's physical in prime shape. The uterus has been able to provide maximum protection or needs for pregnancy. Generally mentally prepared, which impacts the behaviour of carefully caring for and maintaining the pregnancy (W. L. Lee et al., 2021).

The results showed that of the 30 sampled working mothers, as many as 12 people, there were 9 people in the amniotic case group and 3 people (25.0%) in the amniotic control group. While those who did not work as many as 18 people, there were six people group of cases and 12 people amniotic control group. Based on the results of *chi square* analysis obtained, the value *of* ρ = 0.030 < from α = 0.05 means ho rejected and Ha accepted. Thus there is a working relationship with the occurrence of amniotic rupture early

Work is an essential thing in life, but during pregnancy heavy work and can endanger the pregnancy should be avoided to maintain the safety of the mother and fetus; the pattern of working pregnant women affects energy needs (Y. J. Lee et al., 2018). Physical work during pregnancy that is too heavy and with a length of work exceeding three hours per day can result in fatigue. Fatigue at work causes weak amniotic cordon so that amniotic rupture early. (Rizky Nikmathul Ali, 2021)

The results of this study are in line with those conducted by showing that the distance of pregnancy is high risk as many as 84 people from 38 mothers. (Meilinda Dhea Ayuningtias, 2021) As anaemic, we thus concluded that Ho was accepted and Ha was rejected. Therefore there is no influence between nutritional status and the occurrence of amniotic rupture early with a value of p = 0.127.(Rodríguez-Balderrama et al., 2016)

Based on research conducted, the impact that occurs to pregnant women who have a solid job will impact their pregnancy, for that mother who has a risk of excessive work is most likely to experience premature ruptured amniotic fluid (Nurdin et al., 2021).

The limitations of this study are only conducting research related to external factors that can cause the occurrence of amniotic rupture early. Internal aspects of the mother and baby such as blood type, infection, cervical form, fetal presentation

have not been studied because of the limited time of the study and the number of respondents, so it is expected that the next researcher to conduct research with internal factors that can affect the incidence of amniotic rupture early.

CONCLUSION

The results showed a relationship between the history of having experienced premature rupture of amniotic fluid, parity, age during pregnancy with the incidence of premature amniotic rupture. However, there was no link between work and early rupture events. It is recommended that the public, especially pregnant women, anticipate the occurrence of amniotic fluid early on by routinely checking themselves into health services. Every pregnant woman can do a routine pregnancy checkup to detect early risk factors for premature rupture of amniotic fluid early, especially for pregnant women who are <20 and >35 years old. Health workers can increase knowledge related to the risk factors of amniotic rupture early so that it can provide education to patients who are found risk factors for premature rupture.

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