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PREMATURE RUPTURE OF MEMBRANES IN PREGNANCIES WITH ABNORMAL FETAL PRESENTATION

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Abstrak: Ketuban pecah dini (KPD) merupakan komplikasi obstetri yang dapat meningkatkan morbiditas ibu dan bayi. Penelitian ini bertujuan untuk mengetahui hubungan antara presentasi janin abnormal dan kejadian KPD. Penelitian menggunakan metode analitik observasional dengan desain potong lintang, berdasarkan data rekam medis 63 ibu bersalin di RSUD Dr. H. Abdul Moeloek pada tahun 2024. Hasil menunjukkan 39,7% mengalami presentasi janin abnormal dan 47,6% mengalami KPD. Ibu dengan malpresentasi janin, 64,0% mengalami KPD. Uji statistik Chi-square menunjukkan hubungan signifikan antara malpresentasi janin dan KPD ($p = 0,035$). Hasil ini menunjukkan bahwa malpresentasi janin meningkatkan risiko KPD. Studi ini menegaskan pentingnya deteksi dini dan penanganan malpresentasi janin guna mengurangi komplikasi yang berkaitan dengan KPD.

Kata Kunci: Malpresentasi Janin; Ketuban Pecah Dini; Obstetri; Risiko Kehamilan.

Abstract: Premature rupture of membranes (PROM) is a significant obstetric complication that can lead to increased maternal and neonatal morbidity. This study aimed to determine the relationship between fetal malpresentation and PROM. Using an observational analytic method with a cross-sectional design, data were collected from medical records of 63 mothers who delivered at RSUD Dr. H. Abdul Moeloek in 2024. The results showed that 39.7% of respondents experienced fetal malpresentation and 47.6% had PROM. Among those with malpresentation, 64.0% experienced PROM. Statistical analysis using the Chi-square test revealed a significant association ($p = 0.035$) between fetal malpresentation and PROM. These findings suggest that malpresentation increases the risk of PROM. The study highlights the importance of early detection and management of fetal malpresentation to reduce PROM-related complications.

Keywords: Put Fetal Malpresentation; Premature Rupture of Membranes; Obstetrics; Pregnancy Risk.

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INTRODUCTION

Premature Rupture of Membranes (PROM) is a condition in which the amniotic sac ruptures before the onset of labor. PROM can occur in term pregnancies (gestational age ≥ 37 weeks), known as term PROM, or in preterm pregnancies (< 37 weeks), referred to as preterm PROM. It is considered a serious obstetric complication due to its potential to increase maternal and neonatal morbidity and mortality (D. S. M. Sari, 2020). Globally, PROM occurs in approximately 2–10% of all births, with about 1% of cases classified as preterm PROM. Most PROM cases (approximately 70%) occur at term, while the remaining 30% can lead to preterm delivery. In Indonesia, data from the World Health Organization (WHO) in 2020 reported 17,665 cases of PROM, accounting for about 65% of all pregnancies (Muna et al., 2024).

The objective of this study is to determine the association between fetal malpresentation and premature rupture of membranes. The benefit of this research is to provide scientific information to healthcare professionals for the prevention and management of PROM, particularly in pregnancies complicated by fetal malpresentation, as well as to serve as a reference for future studies in the field of obstetrics and gynecology.

Several known risk factors for PROM include intrauterine infection during pregnancy, multiple gestations, polyhydramnios, chorioamnionitis, cervical incompetence, history of preterm delivery, and fetal malpresentation. Malpresentation refers to an abnormal fetal position in the uterus, such as breech, shoulder, brow, or face presentation, which may interfere with the labor process (Sari, 2020). A study by Duffy et al. (2019) reported a global prevalence of malpresentation in cesarean deliveries of 63.6%. In Indonesia, the prevalence of fetal malpresentation reached 52.3% in 2022 (Duffy et al., 2019). In malpresentation cases, the presenting fetal part does not press evenly against the pelvic inlet. For instance, the breech, which should be located in the uterine fundus, may instead be situated in the lower uterine segment, resulting in suboptimal engagement with the pelvic inlet. This imbalance can increase intrauterine pressure, potentially triggering premature rupture of membranes (Salat, 2017).

A study conducted by Sari (2019) found a significant association between malpresentation and PROM, with a p-value of 0.000, suggesting that uneven pressure on the pelvic inlet may contribute to the occurrence of PROM (Sari, 2020). However, a contrasting result was reported by Ali RN et al., who found no significant association between malpresentation and PROM ($p = 0.746$). These inconsistent findings indicate a scientific gap that requires further investigation to enhance the understanding of PROM etiology (Ali et al., 2021). Based on the aforementioned background and the discrepancies in previous research findings, this study is deemed necessary. The research hypothesis is that there is an association between fetal malpresentation and the occurrence of premature rupture of membranes.

METHOD

Participant Characteristics and Research Design

This study employed an observational analytic method with a cross-sectional design to assess the relationship between fetal malpresentation and premature rupture of membranes (PROM). The research was conducted at RSUD Dr. H. Abdul Moeloek, Bandar Lampung, over the course of one month in April 2025. The data used were secondary data from medical records of deliveries occurring in 2024. The target population consisted of delivering mothers. The accessible population was delivering mothers at RSUD Dr. H. Abdul Moeloek in 2024. The study subjects were delivering mothers who met specific inclusion and exclusion criteria.

Eligibility and Exclusion Criteria

Inclusion criteria were: mothers who delivered at RSUD Dr. H. Abdul Moeloek and had complete medical record data. Exclusion criteria were: mothers with multiple pregnancies as documented in medical records, mothers with a history of polyhydramnios (AFI > 25 cm), and mothers aged <20 or >35 years at the time of delivery.

Sampling Procedures

Samples were selected using a consecutive non-random sampling technique. The process began by identifying all postpartum mothers who delivered at RSUD Dr. H. Abdul Moeloek in 2024. Researchers then included participants who met the inclusion criteria and excluded those who met any exclusion criteria, continuing until the required number of samples was obtained. A total of 63 respondents were included in the study. Ethical approval and permission to conduct the study was granted by RSUD Dr. H. Abdul Moeloek.

Sample Size, Power, and Precision

The intended sample size was 63 participants, determined through statistical calculations based on a 95% confidence level and a 5% margin of error, using a prevalence of PROM in the region (4.2%). This sample size included an additional 15% to account for potential dropouts. The final sample size was achieved as planned. Power analysis or interim analyses were not conducted, as the study used complete secondary data and employed a cross-sectional design.

Measures and Covariates

The primary independent variable was fetal malpresentation, and the dependent variable was PROM. Malpresentation types included breech, shoulder, brow, and face presentations. PROM was defined as rupture of the amniotic sac prior to the onset of labor, based on clinical documentation in medical records. Secondary variables included maternal age and pregnancy characteristics such as the presence of polyhydramnios or multiple gestations. Data were collected using hospital medical records from January to December 2024. Trained research assistants extracted the data to ensure consistency and reliability. All variables were obtained from clinical documentation recorded by medical professionals. No psychometric instruments were used.

Data Analysis

Data were analyzed using SPSS version 30. Descriptive statistics (univariate analysis) were used to describe the distribution and frequency of the study variables. Chi-square tests

(bivariate analysis) were used to examine the relationship between fetal malpresentation and PROM.

The significance level was set at $p < 0.05$. A p-value less than 0.05 was interpreted as a statistically significant relationship between fetal malpresentation and PROM. Conversely, a p-value greater than 0.05 indicated no significant relationship. No adjusted or multivariate analyses were conducted; all analyses were prespecified before data collection.

RESULT AND DISCUSSION

In this study, the subjects were mothers who gave birth, aged between 20 and 35 years. Data showed that 25 respondents (39.7%) experienced fetal malpresentation, with 14 cases (56%) categorized as breech presentation and 11 cases (44%) as transverse presentation. Additionally, 38 mothers (60.3%) had an occiput presentation. There were 30 mothers (47.6%) who experienced premature rupture of membranes (PROM), while 33 mothers (52.4%) did not.

Table 1. Characteristics of research subjects

Characteristics	Frequency	
	n	%
Fetal malpresentation		
Yes	25	39,7
No	38	60,3
Premature rupture of membranes		
Yes	30	47,6
No	33	52,4

Based on the analysis of the relationship between fetal malpresentation and the incidence of premature rupture of membranes (PROM), it was found that among mothers with fetal malpresentation, more experienced PROM which is 16 respondents (64,0%). In contrast, among mothers with normal fetal presentation, more did not experience PROM with 24 respondents (%).

The analysis showed a p-value of 0.035 ($p < 0.05$) from the Chi-square test, indicating a significant relationship between fetal malpresentation and the occurrence of PROM. This suggests that 64,0% of mothers with fetal malpresentation experienced PROM, indicating that mothers with malpresentation are at a higher risk of experiencing PROM compared to those without malpresentation. (Table 2)

Table 2. Relationship between fetal malpresentation and premature rupture of membranes (PROM)

Variable	PROM				p*
	Yes	%	No	%	
Fetal Malpresentation	n		n		
Yes	16	64,0	9	36,0	
No	14	36,8	24	63,2	0,035*

This study involved subjects aged 20–35 years, a reproductive age group generally considered to have a lower risk of pregnancy complications, including premature rupture of membranes (PROM). Subjects outside this age range were excluded to reduce potential bias related to high-risk reproductive age. This approach aligns with Yasinta et al. (2024), who reported that mothers in high-risk age groups had a greater incidence of PROM (60.5%) compared to low-risk age groups (39.5%) (Yasinta et al., 2024).

In terms of fetal presentation, 25 mothers (39.7%) experienced malpresentation, dominated by breech (56%) and transverse positions (44%). This prevalence is lower than the global rate reported by Duffy et al. (2019), which found fetal malpresentation in 63.6% of cases. (Duffy et al., 2019) Similarly, Sari RA et al. (2023) observed a lower prevalence in Indonesia—34% at PONED Puskesmas Sitanggal, Brebes (Sari et al., 2024). These findings suggest that the prevalence of malpresentation in Indonesia is notably lower than the global average, possibly due to differences in antenatal care quality, maternal awareness, or referral patterns.

Regarding PROM, 30 respondents (47.6%) experienced it, substantially higher than the 4.2% reported in the 2018 RISKESDAS for Lampung. (Kementerian Kesehatan RI, 2019) This discrepancy is likely due to the setting of the current study, which was conducted at RSUD Dr. H. Abdul Moeloek, a tertiary referral hospital where high-risk pregnancies are concentrated. Similar trends were reported by Ningtyas D et al. (2024), where PROM occurred in 35.2% of cases at a referral hospital in Kab. Lampung Tengah. (Ningtyas et al., 2024) These findings highlight the potential selection bias inherent in referral hospital-based studies, which typically manage more complex and high-risk obstetric cases.

The analysis revealed a statistically significant association between fetal malpresentation and PROM. Among 63 respondents, 64.0% of mothers with malpresentation experienced PROM, compared to only 36.0% who did not. In contrast, mothers without malpresentation predominantly did not experience PROM (63.2%). The Chi-square test yielded a p-value of 0.035 ($p < 0.05$), confirming a significant relationship between fetal malpresentation and PROM risk.

These findings are consistent with prior research. Ningtyas DT et al. (2024) found a significant association ($p = 0.006$) between malpresentation and PROM in a study involving 102 subjects, where other variables such as maternal age, parity, anemia, and infection were also analyzed. (Ningtyas et al., 2024) Likewise, Husna DA et al. (2017) conducted a case-control study at Dr. H. Moch. Ansari Saleh Hospital, showing a significant relationship with a p-value of 0.004. (Husna et al., 2017) However, contrary findings were reported by Wulansari I (2022) at Prof. Dr. Aloe Saboe Hospital, Gorontalo. Using a retrospective case-control design, she reported no significant association between fetal malpresentation and PROM ($p = 0.225$). This discrepancy may be due to differences in study design, sample size, or population characteristics (Wulansari et al., 2023).

From a pathophysiological perspective, malpresentation are where the fetal head does not occupy the pelvic inlet that can increase pressure on the lower membranes, making them more susceptible to rupture. This anatomical misalignment may compromise membrane integrity, especially in the absence of a protective presenting part. When PROM and malpresentation occur simultaneously, the risk of obstetric complications significantly increases. PROM can lead to intrauterine infection, preterm birth, cord compression, and oligohydramnios, while malpresentation increases the likelihood of obstructed labor.

Together, these conditions pose a greater threat to maternal and neonatal outcomes and underscore the importance of early detection and management (Puteri et al., 2024; Sridhar et al., 2025).

CONCLUSION

Based on the results of the study on the relationship between fetal malpresentation and premature rupture of membranes (PROM), it can be concluded that 39.7% of mothers experienced fetal malpresentation, and 47.6% of mothers experienced PROM. A statistically significant relationship was found between fetal malpresentation and PROM, with a p-value of 0.035 ($p < 0.05$). This indicates that mothers with fetal malpresentation are at a higher risk of experiencing PROM compared to those without fetal malpresentation.

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