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Maternal factors associated with placenta previa at Medan Haji Hospital, North Sumatra

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Abstract

Background: Maternal mortality resulting from obstetric complications, including hemorrhage due to placenta previa, remains a significant challenge in achieving the SDGs. Various maternal risk factors are believed to influence the occurrence of this placental implantation malposition.
Purpose: To determine the relationship between maternal age, parity, history of cesarean delivery, history of curettage.
Method: This cross-sectional study used secondary medical record data from 39 pregnant women at Medan Haji Hospital, North Sumatra, during 2021–2025. Total sampling was applied. Maternal age, parity, cesarean section history, and curettage history were analyzed for their association with placenta previa using the Chi-square or Fisher's exact test at α = 0.05.
Results: Four maternal variables demonstrated a statistically significant association with placenta previa incidence: Maternal Age: $p = 0.003$, Parity: $p = 0.001$, Prior Cesarean Section: $p = 0.002$, Prior Curettage: $p = 0.003$.
Conclusion: Advanced maternal age, high parity, and a history of uterine procedures (cesarean section or curettage) are major risk factors for placenta previa, likely due to uterine structural changes affecting normal implantation. Healthcare facilities should implement targeted early screening and enhanced prenatal monitoring for patients presenting with these risk factors.

Keywords: Age; Maternal Factors; Parity; Placenta Previa; Uterine Surgery.

INTRODUCTION

One of the important indicators in assessing the health status of a country and the main focus in achieving the Sustainable Development Goals (SDGs) is maternal health. In Goal 3, Good Health and Well-Being, which emphasizes the healthy and prosperous lives of mothers and children, in target 3.1, the Global target is set for 2030 to reduce the maternal mortality rate to 70 per 100,000 live births and no country should have a maternal mortality rate of more than 140 per 100,000 live births (United Nations, 2024). Based on the World Health Organization (WHO) report, monitoring of indicator 3.1.1 shows that progress in reducing the global maternal mortality ratio has not progressed and is off track to achieve the target of below 70 per 100,000 live births by 2030. This phenomenon indicates the existence of critical obstacles in handling obstetric complications (World Health Organization, 2025).

Placenta previa is one of the most crucial obstetric complications due to its contribution to maternal and neonatal morbidity and mortality. Epidemiologically, placenta previa occurs in approximately 4 to 5 out of every 1,000 full-term pregnancies, or a prevalence of 0.4% to 0.5%. Although statistically small, the clinical impact is significant, particularly related to the risk of severe bleeding, which can threaten the mother's life (Lestari et al., 2021; Mukherjee & Banerjee, 2020).

The maternal mortality rate (MMR) in Indonesia is a significant factor in national health development. Based on 2024 data, obstetric hemorrhage ranked third as the leading cause of maternal death in Indonesia, with a total of 955 cases. One of the main

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causes of obstetric hemorrhage is placental implantation abnormalities, including placenta previa, which is classified as a complication of obstetric hemorrhage. Nationally, obstetric hemorrhage complications contribute significantly to maternal mortality. In North Sumatra province, 36 maternal deaths were recorded due to obstetric hemorrhage in 2024. This condition places North Sumatra as one of the regions with a high burden of hemorrhage cases, requiring serious attention in maternity referral health services (Ministry of Health of the Republic of Indonesia, 2024).

Based on data from the North Sumatra Provincial Health Office, in 2024, the maternal mortality rate failed to meet the established target of 52.33 per 100,000 live births. However, when compared to the national maternal mortality rate of 189 per 100,000 live births in 2024, the maternal mortality rate in North Sumatra Province is much lower than the national rate. The main causes of maternal death are other obstetric complications, including placental problems, with 58 cases (37.66%). Next are bleeding with 40 cases (25.97%), high blood pressure with 38 cases (24.67%), and infection with 8 cases (5.19%). Meanwhile, the least common causes of maternal death are heart or blood vessel disorders and complications after miscarriage or abortion, each with the same number of cases, namely 5 cases (3.24%) (Health Office of North Sumatera Province, 2025).

Based on data from Medan City in 2024, there were 18 maternal deaths recorded out of a total of 34,210 live births, with a reported Maternal Mortality Rate (MMR) of 53 per 100,000 live births. This means that for every 100,000 live births, approximately 53 mothers died during pregnancy, childbirth, or the postpartum period. The MMR in Medan City showed a decline compared to the previous year. In 2023, the number of maternal deaths was recorded at 27 out of 33,497 live births, with a reported MMR of 75 per 100,000 live births. The main causes of maternal deaths included bleeding in 4 cases, hypertension in 8 cases, infection in 2 cases, and other factors in 3 cases (Health Office of Medan City, 2024).

RESEARCH METHOD

This study employed an observational analytical design with a cross-sectional approach using secondary data obtained from patient medical records at Medan Haji Hospital, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province. The study analyzed maternal factors, including age, parity, history of cesarean section, and history of curettage, among women diagnosed with placenta previa during the 2021–2025 study period. Ethical clearance for this study was obtained from the Health Research Ethics Committee of the Institute of Health Sciences Mitra Husada Medan (Approval No. 3674/KEP-MHM/III/2026).

The study population comprised pregnant women who received care at Medan Haji Hospital during the 2021–2025 study period and whose medical records contained information relevant to the assessment of placenta previa and the maternal factors under investigation. A total of 39 pregnant women met the predetermined eligibility criteria and were included in the study using total sampling. The study participants were classified into two groups based on the presence or absence of placenta previa: 32 women with placenta previa and 7 women without placenta previa.

The inclusion criteria were pregnant women who received care at Medan Haji Hospital during the study period; medical records containing complete information on maternal age, parity, history of cesarean section, history of curettage, and placenta previa status; and records with a documented clinical diagnosis of placenta previa based on physical examination and/or supporting diagnostic procedures, particularly ultrasonography (USG), when applicable. Records were excluded if they were incomplete, unavailable, or contained illegible information on the variables under investigation.

Data were obtained from patient documentation and medical records. The collected information included maternal age, parity, history of cesarean section, history of curettage, and placenta previa diagnosis. Data processing consisted of several sequential stages: editing, coding, tabulation, data entry, and cleaning. Editing involved reviewing the records for completeness and consistency. The data were subsequently coded according to the predefined categories and tabulated for analysis. Coded data were entered into a computerized statistical program, followed by data cleaning to identify and correct potential entry errors and ensure data accuracy and consistency before statistical analysis.

Data analysis consisted of univariate and bivariate analyses. Univariate analysis was performed to describe the distribution of maternal age, parity,

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history of cesarean section, history of curettage, and placenta previa status using frequency and percentage distributions.

Bivariate analysis was conducted to assess the association between maternal factors and the occurrence of placenta previa. The Chi-square test was used for categorical variables. Fisher's exact test was applied when the assumptions for the Chi-square test were not met, particularly when the expected frequency in any cell was less than 5. Statistical significance was assessed at a 95% confidence level with a significance level of $\alpha = 0.05$. A p-value <0.05 was considered statistically significant.

RESEARCH RESULTS

Table 1. Characteristics of Respondents (n=39)

Variables	Results
Age (Mean±SD)(Year)	(27.00±8.15)
High-risk maternal age <20, >35	20/51.28
Low-risk maternal age 20-35	19/48.72
Parity (n/%)	
Primipara	3/7.69
Multipara	24/61.54
Grandemultipara	12/30.77
Cesarean Section History (n/%)	
Yes	21/53.85
No	18/45.15
Curettage History (n/%)	
Yes	32/82.05
No	7/17.95

Table 1 shows that the respondents had a mean age of 27.00 ± 8.15 years. Of the total respondents, 20 (51.28%) were classified as being in the high-risk age group (<20 or >35 years). Most respondents were multiparous (24; 61.54%), had a history of cesarean section (21; 53.85%), and had a history of curettage (32; 82.05%).

Table 2. Bivariate Analysis of Maternal Factors on the Incidence of Placenta Previa (n=39)

Maternal Factors	Incidence of Placenta Previa		*p*-value
	Yes	No	
Maternal Age (Years) (n/%)			
High-risk maternal age <20, >35	20/51.28	0/0.00	**0.003**
Low-risk maternal age 20-35	12/30.77	7/17.95	
Parity (n/%)			
Primipara	0/0.00	3/7.69	**0.001**
Multipara	21/53.85	3/7.69	
Grandemultipara	11/28.21	1/2.56	
Cesarean Section History (n/%)			
Yes	21/53.85	0/0.00	**0.002**
No	11/28.21	7/17.95	
Curettage History (n/%)			
Yes	29/74.36	3/7.69	**0.003**
No	3/7.69	4/10.26	

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Bivariate analysis (Table 2) evaluated the association between maternal risk factors and placenta previa occurrence. Maternal age demonstrated a statistically significant association with the incidence of placenta previa (p = 0.003), with women aged <20 or >35 years showing a higher risk of placenta previa; 20 (51.3%) cases occurred in this high-risk age group. Parity was also significantly associated with placenta previa (p = 0.001), with most cases occurring among multiparous women (21; 53.8%). Significant statistical associations with placenta previa were demonstrated for both a history of cesarean delivery (*p*=0.002; 53.85%, *n*=21) and a history of curettage (*p*=0.003; 74.36%, *n*=29).

DISCUSSION

Relationship Between Maternal Age and the Incidence of Placenta Previa

The statistical analysis demonstrated a significant association between maternal age and the incidence of placenta previa. This finding is consistent with previous evidence identifying maternal age as an important determinant of adverse pregnancy outcomes, including abnormalities in placental implantation. The increased vulnerability observed at the extremes of reproductive age may be attributed to differences in uterine and endometrial conditions. In adolescents younger than 20 years, incomplete maturation of the reproductive system and endometrial vascularization may affect implantation, whereas women older than 35 years may experience age-related changes in uterine tissue and vascular function that increase the risk of abnormal placental implantation (Lestari et al., 2021). In addition, pregnancy at a young age may occur before full physical and psychological maturity, while advanced maternal age is associated with a greater risk of obstetric complications (Komariyah et al., 2025).

Relationship Between Parity and the Incidence of Placenta Previa

Parity was also significantly associated with the incidence of placenta previa (*p* = 0.001). Placenta previa occurred predominantly among multiparous and grand multiparous women, whereas no cases were identified among primiparous women. This pattern is consistent with previous evidence indicating that higher parity may increase the risk of abnormal placental implantation. Repeated pregnancies and deliveries may produce structural and vascular changes in the endometrium, including tissue thinning, microscopic injury, and reduced vascularization. These alterations may compromise the suitability of the upper uterine segment for placental implantation, potentially increasing the likelihood of implantation in the lower uterine segment. Anatomical and physiological changes following repeated childbirth may therefore contribute to an increased risk of placenta previa (Agustin, 2021; Amin et al., 2024).

Relationship Between History of Cesarean Section and the Incidence of Placenta Previa

A history of cesarean section was significantly associated with placenta previa (*p* = 0.002). This finding is consistent with previous research demonstrating an association between previous cesarean delivery and placenta previa in subsequent pregnancies (Maqsood et al., 2024). A possible mechanism is the formation of scar tissue following cesarean delivery, which may alter the integrity and vascularization of the endometrium at the surgical site. Such changes may affect the normal process of placental implantation and increase the likelihood of implantation in the lower uterine segment (Sinaga & Silaban, 2025; Zhang, 2020).

Relationship Between History of Curettage and the Incidence of Placenta Previa

A significant association was also observed between a history of curettage and placenta previa (p = 0.003). Most women with a previous history of curettage in this study were diagnosed with placenta previa. This finding is consistent with previous research identifying prior curettage as a potential risk factor for abnormal placental implantation (Lestari et al., 2021). Curettage may cause trauma to the endometrial lining, potentially resulting in structural changes and impaired tissue integrity that interfere with normal implantation. These alterations may subsequently increase the likelihood of abnormal placental implantation, including placenta previa (Tambunan et al., 2025).

Clinical Implications and Prevention

These findings highlight the importance of early identification and continuous monitoring of pregnant women with established risk factors for placenta

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previa. Maternal health awareness and access to appropriate antenatal care are important components of preventive maternal healthcare, particularly in identifying pregnancies at increased risk of obstetric complications (Sinaga, 2024). Health education can improve maternal knowledge and attitudes toward pregnancy care and encourage appropriate preventive behaviors (Manurung et al., 2022). Regular antenatal care (ANC) visits are particularly important for identifying high-risk pregnancies and facilitating timely assessment and management when placenta previa is suspected (Siregar et al., 2023).

Conversely, inadequate ANC attendance may delay the detection of pregnancy complications and increase maternal vulnerability (Hondro et al., 2022). Maternal knowledge of obstetric risk factors is also associated with ANC utilization and adherence (Putri et al., 2025). Therefore, healthcare professionals should strengthen risk-based ANC, provide targeted education to women with relevant obstetric histories, and promote timely referral and emergency preparedness. Strengthening the capacity of healthcare workers and improving maternal knowledge regarding the early recognition and initial management of maternal and neonatal emergencies may help reduce adverse outcomes associated with severe obstetric hemorrhage due to placenta previa (Situmorang et al., 2024)..

CONCLUSION

This study demonstrates significant associations between maternal factors and the incidence of placenta previa at Haji Hospital Medan in 2026. Higher risk was observed among women aged <20 or >35 years, those with multiparous to grand multiparous status, and those with a history of cesarean section or curettage. Statistically significant associations were identified for maternal age (p = 0.003), parity (p = 0.001), previous cesarean section (p = 0.002), and history of curettage (p = 0.003). These findings highlight the importance of risk-based antenatal monitoring and early identification of women at increased risk of placenta previa.

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