Correlation of Cesarean Section and Curettage History with Placenta Previa at Limboto Regional Hospital

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Abstract
Objective: To investigate the correlation of cesarean section and curettage history with placenta previa at Dr. M.M. Dunda Limboto Hospital.
Methods: A cross-sectional analytical study was conducted from January to February 2025, involving 180 pregnant women with gestational age ≥28 weeks from records from 2022-2024. Data were collected through consecutive sampling from medical records. Chi-square analysis was performed using SPSS version 24.
Result: Among women with a history of cesarean section, 8.3% (12/145) had placenta previa compared to 54.3% (19/35) without such a history (p<0.001; PR=0.152, 95% CI: 0.082-0.284). Similarly, only 2.9% (1/35) with a history of curettage had placenta previa compared to 20.7% (30/145) without a curettage history (p=0.012; PR=0.138, 95% CI: 0.019-0.978). These findings suggest apparent protective effects that contradict established literature.
Conclusion: Although statistically significant associations were observed between surgical histories and placenta previa in unexpected directions, these probably reflect study artifacts rather than actual protective effects. Multivariate analysis will be crucial in future research to account for confounding variables.

Keywords: cesarean section, curettage, placenta previa

Hubungan Riwayat Sectio Caesarea dan Kuretase dengan Plasenta Previa di RSUD Limboto

Abstrak
Tujuan: Penelitian ini bertujuan menganalisis hubungan antara riwayat kuretase dan sectio caesarea dengan kejadian plasenta previa di RSUD Dr. M.M. Dunda Limboto.
Metode: Penelitian analitik potong lintang dilakukan pada Januari – Februari 2025, melibatkan 180 ibu hamil dengan usia kehamilan ≥28 minggu dari rekam medis 2022 – 2024. Data dikumpulkan melalui consecutive sampling. Analisis Chi-square dilakukan menggunakan SPSS ver 24.
Hasil: Pada kelompok dengan riwayat sectio caesarea, 8,3% (12/145) mengalami plasenta previa dibandingkan 54,3% (19/35) tanpa riwayat tersebut (p<0,001; PR=0,152, 95% CI: 0,082-0,284). Demikian pula, hanya 2,9% (1/35) dengan riwayat kuretase mengalami plasenta previa dibandingkan 20,7% (30/145) tanpa riwayat kuretase (p=0,012; PR=0,138, 95% CI: 0,019-0,978). Temuan ini menunjukkan efek protektif yang bertentangan dengan literatur medis.
Kesimpulan: Meskipun ditemukan asosiasi signifikan antara riwayat bedah dan plasenta previa dalam arah yang tidak terduga, temuan ini kemungkinan merupakan artefak penelitian daripada efek protektif sejati. Analisis multivariat sangat penting untuk penelitian masa depan guna mengontrol faktor perancu.

Kata kunci: kuretase; plasenta previa; sectio caesarea.

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Introduction

Obstetric complications remain a leading cause of maternal mortality worldwide, with approximately 810 women dying each day from pregnancy-related causes.[1] In Indonesia, maternal deaths reached 4,627 in 2020, with antepartum hemorrhage making up 28.39% of cases and placenta previa contributing approximately 3%.[2,3] Placenta previa occurs in 0.3% to 0.6% of all deliveries.[4]

Placenta previa is characterized by abnormal placental attachment in the lower uterine segment, covering the internal cervical opening.[5] Risk factors include maternal age under 20 or over 35 years, high parity, and previous uterine procedures such as cesarean delivery or curettage.[6] Cesarean section rates in Indonesia increased from 12% in 2012 to 17% in 2017, surpassing the WHO's recommended range of 10-15%.[7]

The biological mechanism connecting uterine surgery to placenta previa involves scar tissue formation that damages the endometrium and decreases vascularization. This causes the placenta to move toward better-vascularized areas, often in the lower uterine segment, raising the risk of placenta previa.[8,9] Most studies show positive links between these surgical histories and placenta previa, although some results are conflicting.[10,11]

This research was conducted at Dr. M.M. Dunda Limboto Regional Hospital, the primary referral center in Gorontalo Regency, to assess the relationship between a history of cesarean section and curettage and the occurrence of placenta previa in the local population, which has not been extensively studied before. The findings from this study are expected to provide local epidemiological data that can help inform preventive strategies and reduce maternal morbidity and mortality related to placenta previa in this region.

Method

This cross-sectional analytical observational study was conducted at Dr. M.M. Dunda Limboto Hospital during January and February 2025 to examine the association between a history of curettage and cesarean section with the incidence of placenta previa. The target population included all pregnant women, with samples drawn from patients managed between 2022 and 2024. Given the retrospective nature of the medical record review, consecutive sampling was employed. Medical records that met the inclusion criteria were systematically reviewed until the required sample size was obtained.

The inclusion criteria included gestational age ≥28 weeks and the availability of complete medical records. Meanwhile, the exclusion criteria included a history of uterine surgery other than cesarean section, the presence of uterine abnormalities, and incomplete medical records. Assuming a 20% risk difference, the required sample size of 180 subjects was calculated using the two-proportion formula. This calculation was based on an expected prevalence of 74.19% in the exposed group and 54.19% in the unexposed group, with a two-tailed alpha level of 0.05 and 80% power.

Data were obtained from medical records and included variables such as history of cesarean section, history of curettage, and diagnosis of placenta previa, all measured on a nominal scale. Placenta previa was defined as abnormal placental implantation in the lower uterine segment covering the internal cervical opening, confirmed via ultrasound examination. A history of cesarean section was defined as any previous delivery by cesarean section, while a history of curettage referred to any prior uterine curettage procedure performed for any indication.

Univariate analysis (frequency distribution) and bivariate analysis (Chi-square test) were performed using IBM

SPSS Statistics version 24. Fisher's Exact test was used when Chi-square assumptions were not met. Statistical significance was established at p-value <0.05. Prevalence ratio (PR) and 95% confidence intervals (CI) were calculated to assess association strength.

This study received ethical approval from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Tarumanagara (No: 551/KEPK/FK UNTAR/XII/2024), and from the Ethics Committee of Dr. M.M. Dunda Limboto Regional Hospital (No: 070/1456/RSUD-DUNDA). As this was a retrospective study utilizing de-identified medical records, informed consent was waived by ethics committees.

Result

A total of 180 pregnant women, each delivering between 2022 and 2024 at gestational ages of 28 weeks or more (third trimester), were enrolled in the study. Table 1 displays how participants were distributed by placenta previa incidence and their exposure histories.

Of the 180 participants, 31 (17.2%) experienced placenta previa and 149 (82.8%) did not. A majority (145 participants, 80.6%) had a history of cesarean section, and the same number (145 participants, 80.6%) had no history of curettage.

Table 1 Distribution of Participants Based on Placenta Previa, History of Cesarean Section, and Curettage

Variables	Frequency (n)	Percentage (%)
Placenta Previa		
Yes	31	17.2
No	149	82.8
History of Cesarean Section		
Yes	145	80.6
No	35	19.4
History of Curettage		
Yes	35	19.4
No	145	80.6

Unexpectedly, among 145 women with a history of cesarean section, only 12 (8.3%) had placenta previa, while among 35 women without such a history, 19 (54.3%) had placenta previa. A statistically significant association (p<0.001) was found, with a prevalence ratio of 0.152 (95% CI: 0.082–0.284). Interestingly, this indicates a seemingly protective effect of prior cesarean section against placenta previa, which is inconsistent with established medical literature.

Table 2 Analysis of Cesarean Section History with Placenta Previa

Cesarean Section	Placenta Previa			P-value	PR (95% CI)
	Yes	No	Total		
	n (%)	n (%)	N (%)		
Yes	12 (8.3)	133 (91.7)	145 (80.6)		
No	19 (54.3)	16 (45.7)	35 (19.4)	<0.001	0.152 (0.082-0.284)
Total	31 (17.2)	149 (82.8)	180 (100.0)		

Note: Chi-square test; PR = Prevalence Ratio; CI = Confidence Interval

Table 3 Analysis of Curettage History with Placenta Previa

Curettage History	Placenta Previa			P-value	PR (95% CI)
	Yes	No	Total		
	n (%)	n (%)	N (%)		
Yes	1 (2.9)	34 (97.1)	35 (19.4)		
No	30 (20.7)	115 (79.3)	145 (80.6)	0.012	0.138 (0.019-0.978)
Total	**31 (17.2)**	**149 (82.8)**	**180 (100.0)**		

Note: Chi-square test; PR = Prevalence Ratio; CI = Confidence Interval

Only 1 of 35 women (2.9%) with a history of curettage developed placenta previa, whereas 30 of 145 women (20.7%) without a history of curettage did. This difference was statistically significant (p = 0.012), and the prevalence ratio was 0.138 (95% CI: 0.019–0.978). However, this apparent protective effect runs counter to both biological plausibility and the established medical literature.

Discussion

This study investigated the relationship between the history of cesarean section and curettage and the occurrence of placenta previa at Dr. M.M. Dunda Limboto Hospital. Among 180 pregnant women, 31 (17.2%) were found to have placenta previa. Both exposures demonstrated statistically significant associations—cesarean section ($p<0.001$) and curettage ($p=0.012$)—but, unexpectedly, both presented as protective factors, with prevalence ratios of 0.152 and 0.138, respectively. These results contradict established medical literature and biological plausibility, warranting careful interpretation.

Our results contrast sharply with published literature. Multiple Indonesian studies demonstrate that cesarean section increases the risk of placenta previa: Damanik and Zuiatna found a significant positive association ($p=0.032$),[3] Puswati and Oktavia reported a 20-fold increased risk (OR=20.364),[12] and Anggriani showed similar findings ($p=0.000$).[8] For curettage, Sari et al. found a 4-fold increased risk (OR=4.23),[9] while Asih and Idawati reported a 17.9-fold elevation (OR=17.9).[10] This consistent evidence across multiple settings supports these procedures as major risk factors.

The established biological mechanism involves the formation of scar tissue after uterine surgery, which damages the endometrium and reduces blood supply. This prompts the placenta to grow toward better-vascularized areas in the lower uterine segment, increasing the risk of placenta previa.[8,9] Our conflicting findings are more likely due to methodological limitations than to genuine protective effects.

Physiologically, curettage procedures can damage the endometrial lining, disrupt normal adhesion, and increase the risk of placenta previa in subsequent pregnancies.[13] Additionally, as an invasive procedure, curettage may lead to uterine perforation or scar tissue formation, both of which can interfere with normal placental implantation.[14]

A history of cesarean delivery is a well-established risk factor. Women who have undergone multiple cesarean sections are more likely to develop placenta previa, but even a single cesarean section can increase this risk.[15–17] Endometrial damage from previous deliveries and impaired decidual vascularization are believed to play significant roles, although the exact mechanisms are not yet fully understood.[18] Additionally, a history of cesarean delivery is associated with serious complications such as hemorrhage, need for blood transfusion, and even hysterectomy,

especially in cases of nonadherent placenta previa.[19]

Several factors contribute to these unexpected results. As a referral center, women with surgical histories receive enhanced surveillance, allowing for better management of a low-lying placenta that tends to "migrate" upward. Additionally, referral patterns may introduce bias: complicated cases without prior surgery are often over-represented from peripheral facilities.

A significant limitation of this study is the inability to perform multivariate analyses, preventing control for confounders like maternal age, parity, and smoking status. As a result, it is unclear whether the observed associations are authentic or the result of uncontrolled variables. Furthermore, the small number of participants in specific subgroups, such as the 35 individuals without prior cesarean history, leads to unstable statistical estimates.

Retrospective data quality issues may lead to misclassification. Diagnosis of placenta previa can vary depending on operator experience, and surgical histories from other facilities may be under-documented. While the sample size was adequate and data were systematically collected, clinical implications should be interpreted with caution. This study does not guide clinical practice. Clinicians should continue to regard cesarean section and curettage as risk factors that require enhanced surveillance. Future studies should use prospective designs with multivariate analysis and multi-center approaches to minimize bias.

Our findings underscore the importance of critical appraisal. When outcomes conflict with established mechanisms or evidence, methodological limitations are more likely than paradigm shifts. Scientific integrity demands honest reporting and acknowledgment of limitations. Clinical practice should adhere to established, evidence-based guidelines until more robust research becomes available.

Conclusion

This study identified a significant correlation of cesarean section and curettage history with placenta previa, but in unexpected protective directions, contrary to established literature. These atypical findings likely reflect methodological limitations, particularly the inability to perform multivariate analysis to control for confounding variables.

Therefore, these associations should not be regarded as actual protective effects, but rather as artifacts of the study's limitations. Clinical practice should continue to follow established guidelines, treating previous uterine surgery as a risk factor requiring heightened surveillance. Prospective research with appropriate multivariate analysis is necessary to clarify these relationships within our population.

Conflict of Interest

The authors declare that no conflict of interest may affect the results of the research.

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