The Association Between Parity and Maternal Age with the Incidence of Placenta Previa at Welas Asih Regional General Hospital, Bandung, in 2023–2024

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Abstract. Placenta previa is a leading cause of third-trimester bleeding and increases maternal and fetal morbidity. Maternal age and parity are considered risk factors, although previous studies have shown inconsistent results. This study aimed to analyze the association between maternal age, parity, and placenta previa at RSUD Welas Asih Bandung. A retrospective case–control study was conducted using medical records from 2023–2024. The case group consisted of 172 women with placenta previa selected by total sampling, while 172 women without placenta previa were included as controls using simple random sampling. Data were analyzed using univariate analysis, chi-square tests, and binary logistic regression. The findings showed a significant association between parity and placenta previa (p=0.000; OR=5.752), with higher incidence among women with parity ≥3 (80.3%) compared to parity <3 (41.4%). Maternal age was also significantly associated (p=0.000; OR=4.920), with a higher prevalence in women aged <20 or >35 years (78.6%) than in those aged 20–35 years (42.7%). Multivariate analysis identified parity as the strongest associated factor (Exp(B)=3.584), followed by maternal age (Exp(B)=2.260). In conclusion, high parity and high-risk maternal age increase the likelihood of placenta previa.

Keywords: *maternal age, parity, placenta previa*.

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A. Introduction

Maternal Mortality Ratio (MMR) is a key indicator of women's health status. The World Health Organization reported that approximately 287,000 women died during pregnancy, childbirth, or the postpartum period in 2020 [1]. In Indonesia, the Ministry of Health recorded an MMR of 189 deaths per 100,000 live births in 2020. Data from the Ministry of Health in 2023 identified preeclampsia, hemorrhage, and infection as the three leading causes of maternal mortality. In 2023, obstetric hemorrhage accounted for 360 maternal deaths, while other obstetric complications contributed to 204 cases per 100,000 live births [2]. One of the Sustainable Development Goals (SDGs) for 2030 is to reduce the maternal mortality ratio to below 70 per 100,000 live births. However, as of 2020, progress toward this target has remained limited [3].

Hemorrhage remains a major contributor to maternal mortality in Indonesia. Obstetric hemorrhage is classified into antepartum and postpartum hemorrhage [4]. Antepartum hemorrhage occurs between 22 and 40 weeks of gestation and is mainly caused by placenta previa and placental abruption. Placenta previa accounts for approximately 35% of antepartum hemorrhage cases [5].

Placenta previa is characterized by placental implantation in the lower uterine segment, partially or completely covering the internal cervical os and obstructing the birth canal. This condition may occur when the endometrium is compromised, such as in cases of endometrial atrophy or inadequate decidual vascularization, leading to abnormal placental implantation. Several factors have been associated with placenta previa, including multiparity, advanced maternal age, previous cesarean section, and uterine anomalies. Among these factors, parity and maternal age are frequently reported and relatively easy to identify during antenatal care. However, the strength and consistency of their association with placenta previa vary across studies, populations, and healthcare settings [7],[8].

Repeated pregnancies may impair endometrial quality due to decidual atrophy and uterine scarring, resulting in disrupted blood and nutrient supply to the placenta. Consequently, placental tissue may extend to the lower uterine segment to meet fetal demands [9],[10]. Advanced maternal age further increases risk due to vascular sclerosis, which compromises uterine blood flow and promotes abnormal placental growth [11]. Previous studies have demonstrated a relationship between parity and maternal age with the incidence of placenta previa. A study conducted at Raden Mattaher Regional Hospital, Jambi Province, showed that placenta previa was more common in women with a history of more than three pregnancies. Another study at Budi Kemuliaan Hospital, Batam, reported that 87.7% of placenta previa cases occurred in women with parity ≥3. Therefore, this study classified parity into ≥3 and <3 [12].

At Welas Asih Regional General Hospital, Bandung, an increasing trend in placenta previa cases has been observed in recent years. This condition contributes significantly to maternal morbidity and places a substantial burden on referral healthcare facilities. Therefore, this study aimed to analyze the association between maternal parity and maternal age with the incidence of placenta previa at Welas Asih Regional General Hospital during the 2023–2024 period.

B. Method

This study used an analytical observational design with a case–control approach and quantitative methodology. The study was conducted at Welas Asih Regional General Hospital, Bandung, using secondary data obtained from medical records. The study population included all pregnant and delivering women who received obstetric care at the hospital during the period from January 2023 to December 2024. The case group consisted of women diagnosed with placenta previa based on clinical findings and ultrasonographic confirmation. The control group consisted of women who delivered during the same period but did not have a diagnosis of placenta previa.

Inclusion criteria for both groups were singleton pregnancies and complete medical record data. Exclusion criteria included multiple gestations and incomplete or missing data. The case group was selected using total sampling, resulting in 172 eligible cases. The control group consisted of 172 patients selected using simple random sampling from the same population.

The independent variables analyzed were maternal parity and maternal age. Parity was categorized into two groups: parity ≥3 and parity <3. Maternal age was categorized into high-risk age (<20 years and >35 years) and non–high-risk age (20–35 years). The dependent variable was the occurrence of placenta previa.

Data analysis included univariate analysis to describe the distribution of parity and maternal age, bivariate analysis using the chi-square test to assess associations between independent variables and placenta previa, and binary logistic regression analysis to identify the most dominant associated factor. Statistical significance was defined as $p < 0.05$.

Data analysis included univariate and bivariate analyses. The study was conducted in the medical records unit of the Obstetrics and Gynecology Clinic at RSUD Welas Asih Bandung. The following section describes the research flow used in this study.

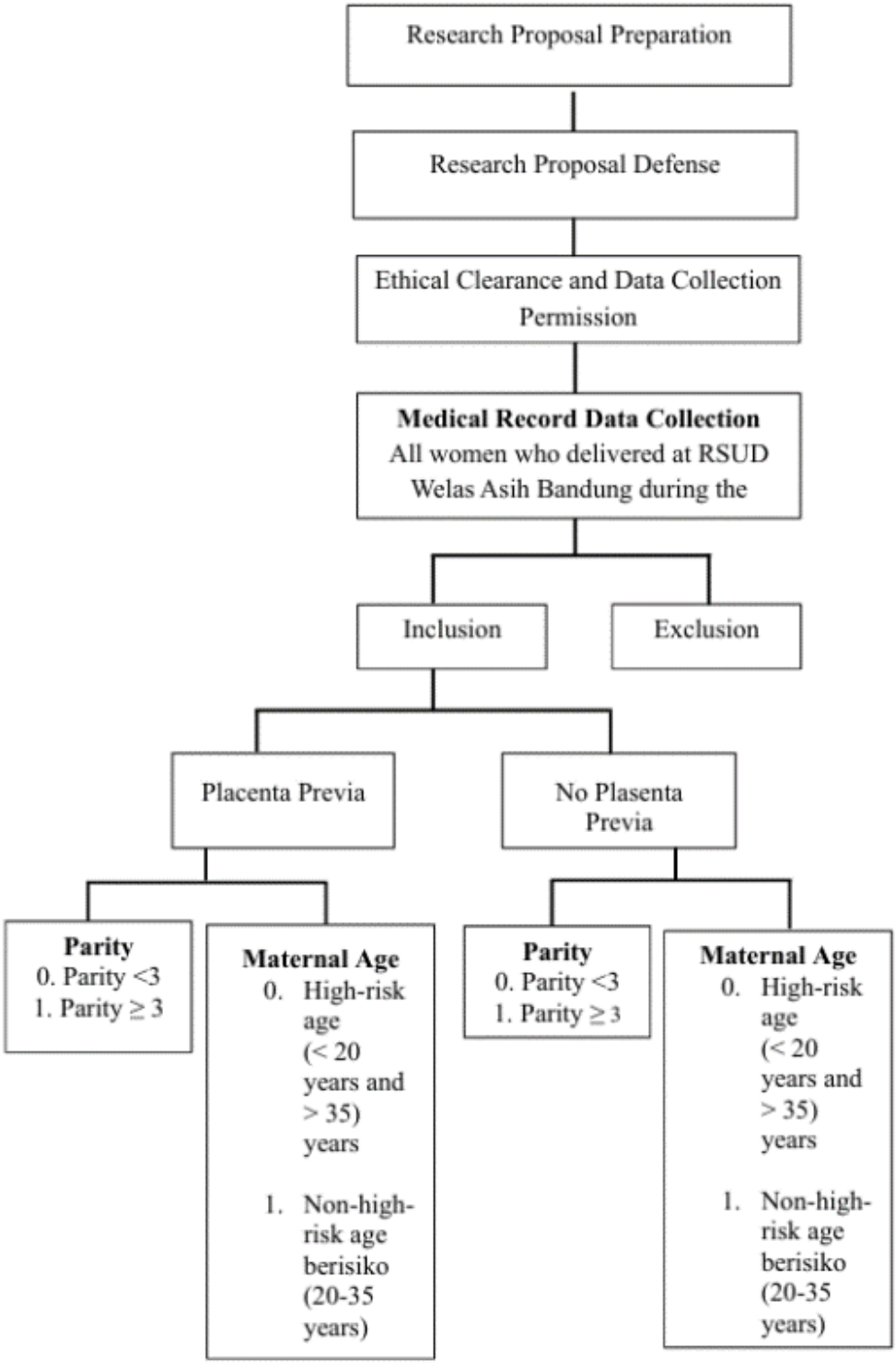

Figure 1. Research Flow

C. Result and Discussion

Univariate Analysis

Parity

The following presents the frequency distribution of patient characteristics based on maternal parity among women who delivered at RSUD Welas Asih during the 2023–2024 period.

Table 1. Frequency Distribution of Parity Categories

Parity Category	Placenta Previa				P-value (Chi-square test)
	Yes		No		
	n	%	n	%	
Paritas ≥ 3	61	35,5%	15	8,7%	0,000
Paritas < 3	111	44,5%	157	91,3%	
Total	**172**	**100%**	**172**	**100%**	

The table above illustrates the frequency distribution of maternal parity based on the occurrence of placenta previa. Among women with placenta previa, the largest proportion was observed in the parity <3 category, comprising 111 individuals (44.5%), while those with parity ≥3 accounted for 61 individuals (35.5%). This distribution indicates that, within the placenta previa group, women with lower parity were more numerous than those with higher parity.

In the group of women without placenta previa, the majority also fell into the parity <3 category, with 157 individuals (91.3%), whereas only 15 individuals (8.7%) had parity ≥3. Therefore, the non–placenta previa group was predominantly composed of women with lower parity.

Age

The following presents the frequency distribution of patient characteristics based on maternal age among women who delivered at RSUD Welas Asih Bandung during the 2023–2024 period.

Table 2. Frequency Distribution of Age Categories

Maternal Age Category	Placenta Previa				P-value (Chi-square test)
	Yes		No		
	n	%	n	%	
High-risk (<20 years and >35 years)	55	32%	15	8,7%	0,000
Non–high-risk (20–35 years)	117	68%	157	91,3%	
Total	**172**	**100%**	**172**	**100%**	

The table above presents the distribution of maternal age based on the occurrence of placenta previa. Among women with placenta previa, the majority were in the non-risk age category (20–35 years), totaling 117 individuals (68%). Meanwhile, women classified as being in the high-risk age group (<20 years and >35 years) accounted for 55 individuals (32%). These findings indicate that, within the placenta previa group, women of non-risk age constituted a larger proportion than those of high-risk age.

In the group without placenta previa, most women were also within the 20–35-year age range, with 157 individuals (91.3%). Only 15 women (8.7%) fell into the high-risk age category. This distribution demonstrates that the non–placenta previa group was predominantly composed of women of non-risk age.

Bivariate Analysis Using the Chi-Square Test

Bivariate analysis was conducted using the chi-square test to assess the significance of the association between independent variables and the occurrence of placenta previa. This study examined the relationship between two factors, parity and maternal age, and the incidence of placenta previa among pregnant and delivering women. Through this analysis, the frequencies of placenta previa across different categories of each variable were compared to determine whether these maternal characteristics had a statistically significant influence on the occurrence of placenta previa.

Parity

The following table presents the association between maternal parity and the occurrence of placenta previa at RSUD Welas Asih Bandung during the 2023–2024 period.

Table 3. Association Between Maternal Parity and Placenta Previa

Parity Category	Placenta Previa				P-value (Chi-square test)	OR (95% CI)
	Yes		No			
	n	%	n	%		
Parity ≥ 3	61	35,5%	15	8,7%	0,000	5,752 (3,110 – 10,638)
Parity < 3	111	64,5%	157	91,3%		
Total	**172**	**100%**	**172**	**100%**		

Based on the table above, bivariate analysis was performed to assess the association between maternal parity and the occurrence of placenta previa. Among women with parity ≥3, 61 individuals (35.5%) experienced placenta previa, while 15 individuals (8.7%) did not. In contrast, among women with parity <3, 111 individuals (64.5%) had placenta previa and 157 individuals (91.3%) did not. This distribution indicates that high parity was more prevalent in the placenta previa group than in the non–placenta previa group.

Statistical analysis showed a p-value of 0.000 ($p<0.05$), indicating a significant association between maternal parity and placenta previa. The odds ratio (OR=5.752; 95% CI: 3.110–10.638) suggests that women with high parity had nearly six times higher risk of developing placenta previa compared to those with lower parity. These findings confirm a strong and statistically significant relationship between parity and the occurrence of placenta previa.

Age

The following table presents the association between maternal age and the occurrence of placenta previa at RSUD Welas Asih Bandung during the 2023–2024 period.

Table 4. Association Between Maternal Age and Placenta Previa

Maternal Age Category	Placenta Previa				P-value (Chi-square test)	OR (95% CI)
	Yes		No			
	n	%	n	%		
High-risk (<20 years and >35 years)	55	32%	15	8,7%	0,000	4,920 (2,649 – 9,138)

Maternal Age Category	Placenta Previa				P-value (Chi-square test)	OR (95% CI)
	Yes		No			
	n	%	n	%		
Non–high-risk (20–35 years)	117	68%	157	91,3%		
Total	**172**	**100%**	**172**	**100%**		

Table 4.4 demonstrates differences in the distribution of placenta previa across maternal age groups. Among women in the high-risk age category, 55 individuals (32%) experienced placenta previa, while 15 (8.7%) did not. In contrast, among women in the non-risk age group, 117 individuals (68%) had placenta previa and 157 (91.3%) did not. This distribution indicates a higher proportion of placenta previa among women of high-risk age.

The chi-square test yielded a p-value of 0.000, confirming a statistically significant association between maternal age and the occurrence of placenta previa. The odds ratio (OR=4.920; 95% CI: 2.649–9.138) indicates that women in the high-risk age group had nearly five times higher odds of developing placenta previa compared to women aged 20–35 years, demonstrating a strong and significant relationship.

Further bivariate analysis using binary logistic regression was conducted to evaluate the combined effects of parity and maternal age on the incidence of placenta previa and to identify the most influential contributing factor.

Table 5. Association of Maternal Parity and Age with the Occurrence of Placenta Previa Analyzed Using Binary Logistic Regression

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Parity	1,276	0,378	11,389	1	**0,000**	**3,584**
Maternal Age	0.815	0,388	4,416	1	**0,036**	**2,260**
Constant	-0,400	0,127	9,893	1	0,002	0,671

The detailed analysis presented in Table 6 reveals a significant association between the two studied variables maternal age and parity and the occurrence of placenta previa. Both variables demonstrated p-values below 0.05, indicating that they function as significant risk factors within the analytical model.

Parity showed an Exp(B) value of 3.584, indicating that women with parity ≥3 had approximately 3.5 times higher odds of developing placenta previa compared to those with parity <3. Maternal age yielded an Exp(B) value of 2.260, suggesting that women in the high-risk age group (<20 years or >35 years) had about 2.26 times higher odds of placenta previa compared to women aged 20–35 years. Notably, the Exp(B) value for parity exceeded that of maternal age, indicating that parity emerged as the most influential factor associated with placenta previa in this binary logistic regression analysis.

Discussion

Association Between Maternal Parity and Placenta Previa

This study found that placenta previa occurred more frequently among women with parity ≥3 than those with parity <3. In the high-parity group, 61 women (35.5%) experienced placenta previa, compared to 15 women (8.7%) who did not. Conversely, among women with parity <3, 111 (64.5%) had placenta previa and 157 (91.3%) did not. These findings indicate a higher proportion of placenta previa among women with high parity. Statistical analysis demonstrated a significant association

(p=0.000), with an odds ratio of 5.752, indicating that women with parity ≥3 had nearly six times greater risk of placenta previa than those with lower parity.

These results are consistent with previous studies reporting a higher incidence of placenta previa among multiparous women, particularly those with parity ≥3 [13]. Repeated pregnancies may lead to structural and functional changes in the uterus, including endometrial remodeling, scarring, and impaired vascularization, which can influence placental implantation in the lower uterine segment [14],[15].

In contrast, a study conducted by Lismiati found no significant association between parity and placenta previa, possibly due to differences in sample characteristics and risk factor distribution. Despite these discrepancies, the present study provides strong evidence that high parity (≥3) is a significant contributing factor to placenta previa.

These findings are consistent with previous studies conducted in Indonesia and other countries, which reported that multiparity is a significant risk factor for placenta previa. However, some studies have failed to demonstrate this association, possibly due to differences in study design, sample size, or population characteristics.

Maternal age also plays an important role in placental implantation. In women younger than 20 years, reproductive organs may not yet be fully mature, leading to suboptimal implantation conditions. In women older than 35 years, degenerative changes in uterine blood vessels, such as sclerosis and reduced elasticity, may impair uterine perfusion. These vascular changes may encourage compensatory placental expansion toward the lower uterine segment.

The interaction between advanced maternal age and multiparity further increases the risk of placenta previa. Women who are both multiparous and of advanced age may experience combined structural and vascular changes in the uterus, significantly increasing the likelihood of abnormal placental implantation.

Association Between Maternal Age and Placenta Previa

The results of this study demonstrate a statistically significant association between maternal age and the incidence of placenta previa (p=0.000). Differences in the distribution of placenta previa were observed across age groups. Among women in the high-risk age category (<20 years and >35 years), 55 women (32%) experienced placenta previa, while 15 (8.7%) did not. In contrast, among women aged 20–35 years, 117 (68%) had placenta previa and 157 (91.3%) did not, indicating a higher proportion of placenta previa in the high-risk age group.

These findings are consistent with previous studies reporting increased risk of placenta previa among women younger than 20 years and older than 35 years compared to those of optimal reproductive age [16]. The higher statistical significance observed in this study further strengthens evidence that maternal age is an important contributing factor.

In women younger than 20 years, the increased risk may be related to incomplete development of the reproductive organs, resulting in suboptimal endometrial conditions that predispose to abnormal trophoblastic implantation [5]. In women older than 35 years, age-related vascular sclerosis and reduced arterial elasticity may impair uterine blood flow, encouraging placental implantation in the lower uterine segment and increasing the likelihood of placenta previa.

Association of Maternal Parity and Age with the Occurrence of Placenta Previa

The results of this study indicate that maternal age and parity have a significant and statistically meaningful influence on the occurrence of placenta previa, with both variables showing p-values below 0.05. Parity was identified as the most dominant factor, as it had a higher odds ratio (OR=3.584) compared to maternal age (OR=2.260). These findings support the conclusion that both factors contribute to the occurrence of placenta previa, with parity exerting the strongest effect.

This study demonstrates that maternal age and the number of previous deliveries significantly affect the incidence of placenta previa. The number of prior deliveries showed the highest odds ratio (OR=3.584), indicating that women who had delivered three or more times had approximately 3.5 times greater risk of developing placenta previa compared to women with fewer than three deliveries. Maternal age showed an odds ratio of 2.260, indicating that women in the high-risk age category had about 2.26 times higher odds of placenta previa compared to women aged 20–35 years.

These findings are consistent with previous studies reporting that parity is a significant risk factor for placenta previa [13]. Several studies have also suggested that the dominance of maternal age or parity as risk factors is not constant and may vary depending on population characteristics. The interaction between advanced maternal age and multiparity has been shown to further increase the risk of placenta previa, and meta-analyses have demonstrated that heterogeneity in study populations, sample sizes, and variable control contributes to variation in risk distribution [17].

D. Conlusion

Parity shows a highly significant association with the occurrence of placenta previa, as indicated by a p-value of 0.000. Women with parity ≥3 have a higher likelihood of developing placenta previa compared to those with parity <3. Maternal age is also significantly associated with placenta previa (p=0.000), with higher proportions observed among women aged <20 years and >35 years compared to those aged 20–35 years. Bivariate analysis using binary logistic regression demonstrated that both parity and maternal age are significantly associated with placenta previa. However, parity emerged as the most dominant factor, as reflected by a higher Exp(B) value (3.584) compared to maternal age (Exp(B)=2.260)[1]

Parity demonstrates a highly significant association with the occurrence of placenta previa, as evidenced by a p-value of 0.000, indicating a very strong statistical relationship between the two variables. The findings show that women with a parity of three or more (≥3) have a substantially higher likelihood of developing placenta previa compared to women with a parity of less than three (<3). This increased risk may be attributed to repeated structural and vascular changes in the uterine wall resulting from multiple pregnancies, which can affect normal placental implantation in subsequent pregnancies[2]

Maternal age is also found to be significantly associated with the occurrence of placenta previa, with a p-value of 0.000. The results reveal that the proportion of placenta previa cases is higher among women at the extremes of reproductive age, specifically those younger than 20 years and older than 35 years, when compared to women within the optimal reproductive age range of 20–35 years. These age-related risks may be related to uterine immaturity in younger mothers and age-related degenerative or functional changes in the uterine endometrium among older mothers, both of which can influence abnormal placental attachment.

Furthermore, bivariate analysis using binary logistic regression confirms that both parity and maternal age are statistically significant predictors of placenta previa. The regression analysis indicates that each variable independently contributes to the increased risk of placenta previa. However, parity emerges as the most dominant risk factor, as demonstrated by a higher Exp(B) value of 3.584, compared to an Exp(B) value of 2.260 for maternal age. This suggests that women with higher parity are more than three times as likely to develop placenta previa compared to those with lower parity, after controlling for maternal age. In contrast, women in high-risk age groups are approximately twice as likely to experience placenta previa compared to those in the 20–35-year age group.

Overall, these findings highlight the important role of both parity and maternal age in the development of placenta previa, with parity being the strongest contributing factor. The results emphasize the need for increased antenatal surveillance and early risk assessment among multiparous women and those at high-risk ages to enable timely diagnosis and appropriate management, thereby reducing maternal and perinatal complications associated with placenta previa.

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