Original Article

Impact of Placenta Previa on Neonatal and Maternal Health: An Analysis of Complications and Associated Risk Factors

Raheela Rani Junejo[1], Nazia Memon[2], Geeta Bai[3], Ali Faraz Shaikh[4], Abdul Ghaffar Dars[5], Sajan Sawai[6], Warisha Durrani[7]

[1,3]Registrar, Department obstetrics and gynecology LUMHS Jamshoro, [2] Senior registrar, Department obstetrics and gynecology LUMHS Jamshoro,[4]Registrar, of Cardiology LUMHS Jamshoro, [5]Assistant Professor of Medicine LUMHS Jamshoro, [6]Assistant Professor, Department of Gastroenterology Indus medical College T M Khan, [7]Medical Student LUMHS Jamshoro

Correspondence: Dr. Raheela Rani Junejo
Registrar, Department obstetrics and gynecology LUMHS Jamshoro
raheela_rani@hotmail.com

Abstract

Objective: To investigate the impact of Placenta Previa (PP) on both neonatal and maternal health, while simultaneously identifying and analyzing the associated risk factors.

Methodology: A one-year descriptive cross-sectional study was conducted at the Department of Gynecology and Obstetrics at Liaquat University of Medical and Health Sciences, Jamshoro. Study focused on pregnant women admitted for childbirth with confirmed placenta previa diagnoses. Self-structured forms were used for detailed medical record reviews, collecting clinical data such as placenta previa details, maternal and neonatal outcomes, and risk factors. Data analysis was performed using SPSS version 26.

Results: The study involved 75 participants with PP, with a mean age of 32.81 years and an average gestational age of 34.94 weeks. Most of the mothers 41.3% had type IV PP, 32% cases had type II, and 26.7% had type III PP. 82.7% women had major hemorrhage, 80% requiring blood transfusions, 10.7% undergoing hysterectomy, 8% faced renal failure, 33.3% had PPH, and 8% needed ICU care. Preterm births were 46.7% were born prematurely, 45.3% had low birth weights, and 4% were referred to NICU. Importantly, there were no fetal or maternal mortality during the study. Unbooked mothers, maternal age over 35, high parity (4-6 or more), previous c-sections, smoking, and a history of previous placenta previa were associated with higher chances of high-grade PP, though these associations were not statistically significant ($p > 0.05$.

Conclusion: Placenta previa affects both maternal and neonatal health, with Type IV being the most common. Maternal most common complications include hemorrhage, PPH, hysterectomy, and blood transfusions, while fetal complications mainly involve preterm births and low birth weight. Maternal age over 35, high parity, previous c-sections, smoking, and history of previous PP, appeared to increase the risk of high-grade placenta previa.

Keywords: Placenta previa, mothers, neonates, consequences, risk factors

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Introduction

Placenta previa is a condition that occurs during pregnancy when the placenta is positioned unusually in the lower part of the uterus, sometimes covering the cervix.[1] The global occurrence of placenta previa is currently estimated at 3-5 cases per 1000 pregnancies,[1] and nearly 30% of maternal mortality among the Asian population result from significant obstetric bleeding associated with placenta previa, with a notable increase in occurrence attributed to the rising rates of cesarean section deliveries.[2] In this condition, the placenta partially or completely blocks the internal opening of the cervix. Placenta previa is categorized into four types, which encompass low-lying placenta, marginal placenta previa, partial placenta previa, and complete placenta previa.[3,4]

The literature has firmly established various risk factors linked to the occurrence of placenta previa.[5] Among the maternal risk factors substantiated by research are

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advanced maternal age (AMA), a history of stillbirth, previous cesarean deliveries, prior dilatation and evacuation (D&E) procedures, gravidity, tobacco consumption, and substance misuse.[5,6] The elevated demand for healthcare services is significantly linked to maternal and fetal health complications and fatalities resulting from placenta previa.[6] The likelihood of experiencing placenta previa during a pregnancy following a Cesarean section delivery is reported to be 1.5 to 6 times greater than after a vaginal delivery.[7,8]

Epidemiological research has additionally revealed that the most significant risk factor for placenta previa is a prior Cesarean section (LSCS), implying that the absence of proper decidualization in the region of a previous uterine scar can affect both the process of implantation and placenta formation.[7] It represents a significant risk factor for postpartum bleeding and can result in health complications and even fatalities for both the mother and the newborn.[9] This circumstance makes a safe vaginal delivery unfeasible and necessitates the delivery of the baby through a cesarean section. Many instances are typically identified in the early stages of pregnancy through ultrasound screenings, while others might present with painless vaginal bleeding in the second or third trimester and seek emergency medical care.[9] Women who experienced a full placenta previa (PP) had an elevated likelihood complications such as placenta accrete spectrum disorders, postpartum hemorrhage (PPH), hemorrhagic shock, hysterectomy, the need for blood transfusions, preterm labor, puerperal infection, admission of the newborn to the neonatal intensive care unit (NICU), and delivering babies with low birth weight.[4] According to a local study negative maternal outcomes included bleeding during pregnancy, anemia, and bleeding after giving birth.[9] In the study by Mahmoud Abdelwhab S et al[11] blood transfusions were recorded in 75% of cases, postpartum hemorrhage and anemia were in 32.5% each, while approximately 28.8% of the patients underwent a hysterectomy.

Placenta previa remains a condition of concern due to its potential impact on maternal and fetal health. However, the existing literature contains controversial findings, and there is a noticeable gap in local research. However current study has been done to evaluate the impact of Placenta Previa on both neonatal and maternal health, while simultaneously identifying and analyzing the associated risk factors. This study has the potential to influence clinical practice and improve the health outcomes of both mothers and newborns in our community.

Methodology

A descriptive cross-sectional study was conducted at the Department of Gynecology and Obstetrics at Liaquat University of Medical and Health Sciences, Jamshoro. The study was conducted over a six months period from July 2022 to December 2022. The study included pregnant women admitted to the obstetrics department for childbirth with a confirmed diagnosis of placenta previa, which included partial or complete placenta previa determined through clinical assessment and ultrasound findings. Eligible participants were aged over 18 years, and parity was not a restriction for inclusion. Participants with incomplete medical records or insufficient information to confirm the diagnosis of placenta previa, as well as those who did not provide consent to participate, were excluded from the study. Data collection involved the use of structured questionnaires administered during face-to-face interviews with pregnant individuals. These questionnaires comprehensively covered key demographic details, medical history, antenatal care, and self-reported experiences related to placenta previa. Additionally, standardized data collection forms were employed for in-depth reviews of participants' medical records. This meticulous process ensured the acquisition of clinical data, including placenta previa diagnosis, type, location, maternal and neonatal outcomes, and relevant risk factors. Prior to conducting interviews or accessing medical records, informed consent was obtained from all participants. Participants were briefed on the study's purpose, the confidentiality of their information, and their right to withdraw from the study at any time. All collected information was entered and analyzed using SPSS version 26

Results

The mean age of the participants was approximately 32.81 years and average gestational age was approximately 34.94 weeks. Regarding the booking status, the majority (82.7%) were booked, and 17.3% of the patients were unbooked. In terms of the mode of delivery, a significant proportion (66.7%) underwent emergency cesarean sections, while only a small fraction (1.3%) had elective cesarean sections and NVD was done in 32% of cases. About 2.7% of patients were nulliparous, 58.7% had a parity between 1 -3, and 38.7% had a parity of 4 or more. 30.7% of patients had smoking

habits. Furthermore 72% of patients had a previous history of PP. Table I

Table I: Descriptive statistics of demographic and clinical characteristics (n=75)

Variables		Statistics	
Age		32.81±5.53 years	
Gestational age		34.94±2.71 weeks	
Booking status	Booked	62	82.7%
	Unbooked	13	17.3%
Educational status	Educated	30	40.0%
	Uneducated	45	60.0%
Mode of delivery	Emergency C-section	50	66.7%
	Elective C-section	01	01.3%
	NVD	24	32.0%
Parity	Nulliparous	02	02.7%
	Parity 1-3	44	58.7%
	Parity 4-6 or >6	29	38.7%
Smoking history	Yes	23	30.7%
	No	52	69.3%
Previous c-section	Yes	60	80.0%
	No	15	20.0%
Previous history of placenta previa	Yes	54	72.0%
	No	21	28.0%

According to the severity of placenta previa, most of the women 41.30% had type IV placenta previa, followed by 32.0% cases had placenta previa type II and 26.7% cases had placenta previa type III. Figure 1

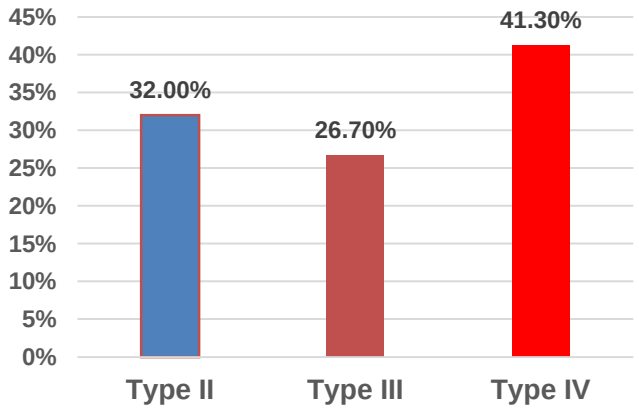

Figure: 1. Types of placenta-previa. (n=75)

A substantial portion, 82.7% of mothers, experienced major hemorrhage, blood transfusions were necessary for 80% of the mothers, 10.7%, underwent hysterectomy, renal failure was 8% of mothers, PPH was observed in 33.3% of cases, and 8% of mothers required referral to the ICU, emphasizing the seriousness of maternal health issues associated with placenta previa. In terms of neonatal outcomes, nearly half (46.7%) were born preterm, 45.3% of newborns had low birth weights, 4% required referral to the NICU. However, no fetal or maternal mortality found during study. Table II

Table II: Consequences of maternal and fetal health (n=75)

Outcomes			Statistics	
Maternal outcomes	Major haemorrhage of mothers	Yes	62	82.7%
		No	13	17.3%
	Blood transfusion	Yes	60	80.0%
		No	15	20.0%
	Hysterectomy	Yes	8	10.7%
		No	67	89.3%
	Renal failure	Yes	6	8.0%
		No	69	92.0%
	PPH	Yes	25	33.3%
		No	50	66.7%
	Referred to ICU	Yes	6	8.0%
		No	69	92.0%
Neonatal outcomes	Pre-term birth	Yes	35	46.7%
		No	40	53.3%
	Low birth weight	Yes	34	45.3%
		No	41	54.7%
	Referred to NICU	Yes	3	4.0%
		No	72	96.0%

In terms of the association between various risk factors and the severity of placenta previa, the results indicate that among the 13 unbooked cases, 7 had high-grade placenta previa. Among the 46 cases of mothers aged over 35 years, 21 had high-grade placenta previa. Similarly, among the 29 cases with a parity of 4 to 6 or more, 14 had high-grade placenta previa. Additionally, among the 15 cases with a history of previous C-sections, 8 had high-grade placenta previa. Among the 52 women who smoked, 25 had high-grade placenta previa, and among the 54 mothers with a previous history of placenta previa, 25 had high-grade placenta previa. These findings suggest that unbooked status, maternal age over 35, high parity (4-6 or more), previous C-sections, smoking, and a history of previous placenta previa were associated with a higher risk of high-grade (Type IV) placenta previa. However, it's important to note that these findings did not reach statistical significance ($p > 0.05$). Table III

Discussion

Placenta previa is a condition characterized by the abnormal placement of the placenta. This condition is associated with a heightened risk of adverse outcomes for both the mother and the neonate. This study aimed to uncover complications and risk factors related to placenta previa to provide valuable insights for healthcare providers. in terms to the demographic information, mean age of the participants was

approximately 32.81 years and average gestational age was 34.94 weeks, (82.7%) mothers were booked, and 17.3% were unbooked. A significant proportion (66.7%)

Table III: Risk factors association with severity placenta previa. (n=75)

Risk factors		Severity of placenta previa				p-value
		Type II	Type III	Type IV	Total	
Booking	Booked	21	17	24	62	0.588
		28.0%	22.7%	32.0%	82.7 %	
	Unbooked	3	3	7	13	
		4.0%	4.0%	9.3%	17.3 %	
Maternal age	≥35 years	12	13	21	46	0.377
		16.0%	17.3%	28.0%	61.3 %	
	< 35 years	12	7	10	29	
		16.0%	9.3%	13.3%	38.7 %	
Parity	Nulliparous	1	0	1	2	0.697
		1.3%	0.0%	1.3%	2.7%	
	Parity 1-3	16	12	16	44	
		21.3%	16.0%	21.3%	58.7 %	
	Parity 4-6	7	8	14	29	
		9.3%	10.7%	18.7%	38.7 %	
Previous C-section	Yes	22	15	23	60	0.222
		29.3%	20.0%	30.7%	80.0 %	
	No	2	5	8	15	
		2.7%	6.7%	10.7%	20.0 %	
Smoking habits	Yes	11	6	6	23	0.107
		14.7%	8.0%	8.0%	30.7 %	
	No	13	14	25	52	
		17.3%	18.7%	33.3%	69.3 %	
Previous history of placenta previa	Yes	15	14	25	54	0.322
		20.0%	18.7%	33.3%	72.0 %	
	No	9	6	6	21	
		12.0%	8.0%	8.0%	28.0 %	

underwent emergency cesarean sections, while (1.3%) had elective cesarean sections and NVD was done in 32% of cases. About 58.7% had a parity between 1 -3, and 38.7% had a parity of 4 or more, 30.7% of patients had smoking habits and 72% of patients had a previous history of PP. These findings were supported by the ISRAR A et al[12] as their study sample comprised 147 patients diagnosed with placenta previa, the patients were approximately 28.69 years old, had an average parity of 3.18, and were at a mean gestational age of about 39.029 weeks. Our findings were supported by the Afzal S et al[13] as in their study out of the 62 patients, 19.4% were under 26 years old, 41.9% were under 31 years old, and 38.7% were 31 years old or above. Among these, 48 patients had prior appointments, while 14 were new or unbooked patients.

In this study most of the women 41.30% had type IV placenta previa, followed by 32.0% cases had placenta previa type II and 26.7% cases had placenta previa type III. In the comparison of this study Afzal S et al[13] reported that the placenta previa type I accounted for 16.1% of the cases, type II constituted 22.6% of the cases, type III represented 12.9% of the cases, and type IV comprised 16.1% of the cases. Additionally, 12.9% of the total 62 patients were diagnosed with placenta increta through ultrasound.[13] On the other hand Patokar G et al[14] reported that the type IV is the most prevalent form of placenta previa, followed by 5.3% of cases with a low-lying placenta (type I), while the remaining 94.6% were classified as placenta previa (types II, III, and IV).

This study examined the consequences of maternal and fetal health in a cohort of 75 patients with placenta previa and the analysis of maternal outcomes revealed several significant findings, like a substantial portion, 82.7% of mothers had major hemorrhage, highlighting the severity of bleeding complications in these cases, blood transfusions were necessary for 80% of the mothers, emphasizing the critical need for transfusion support in managing placenta previa-related bleeding, 10.7% mothers underwent hysterectomy, renal failure was 8% of mothers, PPH was observed in 33.3% of cases and 8% of mothers required referral to the intensive care unit (ICU), emphasizing the seriousness of maternal health issues associated with placenta previa. In the line of this series Patokar G et al[14] reported that PPH occurred in 14.89% of cases. Severe anemia was identified in 36.16% of women, and 60.56% of cases necessitated blood transfusions and intraoperative bleeding was observed in 6.1% of women. In the study by Salim NA et al[15] demonstrated that the among maternal complications, 40.4% required blood transfusion due to hemorrhage, 21.2% underwent cesarean hysterectomy, and 3.8% experienced bladder injury and like this study they also did not find maternal mortality. According to the study by Maqsud M et al[16] hysterectomy was performed in 19.2% of cases, while 8.3% experienced hypovolemic shock, 8.3% had an extended hospital stay, and 5.8% required admission to the ICU. Tragically, 1.7% of patients did not survive.

In this study according to neonatal outcomes, the analysis revealed that nearly half (46.7%) were born preterm, and 45.3% of newborns had low birth weights, while 4%, required referral to the neonatal intensive care unit (NICU). In the comparison of our findings Salim NA et al[15] reported that the neonatal complications included NICU admission for respiratory distress syndrome (25%), prematurity (25%), and a 5.8% mortality rate. In 44.2% of cases, the fetal outcome was positive. However, Afzal S et al[13] found lower rate of low birth weight 16%. Maqsud M et al[16] found that 25.0% of infants were admitted to the NICU, 7.5% were intrauterine deaths (IUD), and 3.5% were stillborn. The Apgar score ranged from 4 to 6 in the majority of cases, accounting for 85.0%. All above findings collectively underscore the substantial impact of placenta previa on both maternal and neonatal health, emphasizing the need for comprehensive and specialized care in such cases.

In this study unbooked mothers, maternal age over 35, high parity (4-6 or more), previous c-sections, smoking, and a history of previous placenta previa were associated with higher chances of high-grade PP, while the observed relationships were not strong enough to be considered statistically significant in this study. Consistently Nazneen S et al[10] reported that the history of prior cesarean section, advancing maternal age, and having more than four previous pregnancies were identified as significant risk factors. Tabassum R et al[17] also found elevated maternal age, a history of smoking, and prior cesarean sections, are widely recognized as established risk factors for placenta previa. Amir A et al[18] reported that the patients with multiple previous pregnancies and previous c-sections faced an increased risk of developing placenta previa. Some other studies also found almost similar risk factors.[19,20] Aging can lead to changes in the reproductive system, affecting placental implantation and function, while multiple pregnancies may alter the uterine environment, increasing the risk of placental complications. Repeated cesarean sections can lead to scar tissue that affects placental attachment, smoking can impact vascular health and oxygen delivery to the placenta, and a previous history of placenta previa raises susceptibility in subsequent pregnancies. The insignificance of these risk factors may be attributed to limitations in research methodologies, such as limited sample sizes or potential selection bias. These complexities underscore the need for further in-depth research into placenta previa and its determinants. A more comprehensive understanding of the underlying mechanisms and risk factors is essential to improve patient care and reduce the incidence of high-grade placenta previa, ultimately ensuring safer pregnancies and better outcomes for expectant mothers.

Conclusion

In conclusion, this study emphasized the substantial burden of placenta previa on both maternal and neonatal health, with Type IV being the most prevalent form. Major hemorrhage, postpartum hemorrhage (PPH), hysterectomy, and blood transfusions observed to be the most common maternal complications, with while fetal complications mainly involved preterm births and low birth weight. Unbooked status, maternal age over 35, high parity, previous C-sections, smoking, and a history of previous placenta previa, appeared to increase the risk of high-grade placenta previa. This underscores the complexity of placenta previa and the need for further research to better understand its determinants and improve patient care.

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