"A LONGITUDINAL STUDY OF PLACENTA PREVIA AND ITS FETOMATERNAL OUTCOMES AT A TERTIARY CARE CENTER- A ONE YEAR STUDY."

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With reference to the above, we wish to inform you that your proposed research project titled **"A LONGITUDINAL STUDY OF PLACENTA PREVIA AND ITS FETOMATERNAL OUTCOMES AT A TERTIARY CARE CENTRE- A ONE YEAR STUDY",** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee.

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LIST OF ABBREVIATIONS USED

GLOSSARY	ABBREVIATIONS
ACOG	AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGIST
APH	ANTEPARTUM HEMORRHAGE
D&C	DILATATION AND CURRETTAGE
EPH	EMERGENCY PERIPARTUM HYSTERECTOMY
ICU	INTENSIVE CARE UNIT
IUGR	INTRAUTERINE GROWTH RESTRICTION
IVF	IN-VITRO FERTILIZATION
LSCS	LOWER SEGMENT CESAREAN SECTION
MRI	MAGNETIC RESONANCE IMAGING
NICU	NEONATAL INTENSIVE CARE UNIT
PAS	PLACENTA ACCRETA SPECTRUM
PPH	POSTPARTUM HEMORRHAGE
RDS	RESPIRATORY DISTRESS SYNDROME
USG	ULTRASONOGRAPHY

ABSTRACT

Placenta previa (PP) significantly elevates risks for maternal and neonatal complications, particularly when associated with Placenta Accreta Spectrum (PAS). This study aimed to evaluate the incidence, risk factors, clinical outcomes, and management of PP and PAS over a one-year period at a tertiary care hospital.

Introduction

Placenta previa is characterized by abnormal implantation of the placenta near or covering the cervical os, affecting about 0.3-2% of pregnancies. Placenta accreta spectrum, a severe complication, involves abnormal placental adherence and invasion, significantly raising maternal and neonatal morbidity and mortality. Known risk factors include previous uterine surgeries, notably caesarean sections, advanced maternal age, multiparity, and assisted reproductive technologies.

Materials and Methods

A longitudinal observational study was conducted at KLE's Dr. Prabhakar Kore Hospital, Belagavi, from January to December 2024. All pregnant women diagnosed with placenta previa after 28 weeks of gestation were included. Detailed patient data, imaging findings, maternal outcomes, neonatal outcomes, and surgical interventions were collected and analysed using statistical methods.

Results

During the study, there were 4085 deliveries, of which 32 were diagnosed with PP, representing an incidence of 0.78%. Of these, 21.88% (7 cases) had associated PAS. Patients had a mean age of 28 years, with a predominance (71.88%) of multigravidas. Previous caesarean section significantly correlated with PAS development (p=0.010),

particularly in cases with complete placenta previa (Class 4), which showed a high PAS incidence of 42.86% (p=0.0125).

All patients underwent caesarean delivery, with elective caesarean in 56.25% and emergency caesarean in 43.75%. Preterm deliveries were prevalent (53.13%), primarily occurring between 34-37 weeks. Postpartum haemorrhage (PPH) was noted in 37.5% of cases, aligning closely with global data. Additional surgical interventions such as internal iliac artery ligation (18.75%), uterine artery ligation (25%), and hysterectomy (18.75%) were necessary to manage severe bleeding. Blood transfusions were administered to 37.5% of patients, with massive transfusion protocols needed in 15.63%. No maternal deaths occurred during the study period.

Neonatal outcomes included a mean birth weight of 2.47 kg. Approximately 40.6% of neonates had low birth weight (<2.5 kg). NICU admissions were required in 25% of neonates, primarily for respiratory distress syndrome associated with prematurity.

Discussion

The observed incidence of PP and associated PAS aligns with national and international reports. The significant correlation between previous caesarean sections and PAS underscores the crucial role of uterine scarring in abnormal placentation. Complete placenta previa was strongly predictive of PAS, reinforcing the clinical importance of precise antenatal imaging and timely identification of high-risk pregnancies.

The high rates of PPH and subsequent surgical interventions highlight the complex clinical management required for placenta previa, especially when complicated by PAS. The necessity for a multidisciplinary approach, including preoperative planning,

availability of blood products, and surgical preparedness, is evident. This aligns with findings from previous studies emphasizing specialized care at tertiary centres.

The high incidence of preterm deliveries and NICU admissions underscores the significant neonatal risks associated with PP and PAS. Early antenatal detection, judicious use of corticosteroids, and timely delivery in well-equipped facilities are crucial for improving neonatal outcomes.

Conclusion

Placenta previa, especially when complicated by PAS, poses significant challenges for maternal and neonatal health, underscoring the importance of multidisciplinary management in tertiary care settings. Previous caesarean delivery remains the most critical risk factor for PAS, emphasizing the need for rigorous antenatal surveillance, timely diagnosis, and strategic clinical interventions. Enhancing awareness, strengthening referral systems, and improving perinatal care can significantly mitigate the adverse outcomes associated with placenta previa and PAS.

Keywords: Placenta previa, placenta accreta spectrum

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INTRODUCTION

Placenta previa is an important obstetric condition where the placenta implants in the lower segment of the uterus, either very near to or covering the internal OS. It affects about 0.3 – 2% of pregnancies. This abnormal placement of the placenta raises the risk of bleeding before and after delivery, as well as complications for both the mother and the foetus [1][2]. Placenta previa is categorized into complete, partial, marginal, and low-lying types, depending on how much of the cervix is covered. The rising incidence of placenta previa is closely associated with previous uterine surgeries, especially caesarean sections, along with factors like having multiple pregnancies, advanced maternal age, and the use of assisted reproductive technologies [3].

Placenta previa also increases the risk of Placenta Accreta Spectrum (PAS), a serious condition marked by abnormal growth of the trophoblast into the myometrium. [4] When placenta previa occurs alongside previous uterine scars, the chances of developing PAS rise significantly, leading to varying levels of placental attachment: placenta accreta (superficial attachment), placenta increta (invasion into the myometrium), and placenta percreta (penetration through the uterine serosa and nearby structures).[5]

The occurrence of placenta previa along with PAS has surged in recent years, primarily due the increasing number of caesarean deliveries and other uterine surgeries, which are recognized risk factors for both conditions. [6]. Research indicates that the risk of PAS in women with placenta previa who have had prior caesarean deliveries can range from 24% to 67%, depending on how many caesarean sections they have had [7], [8]. This combination poses a serious threat to maternal health, with

severe complications such as significant bleeding, organ damage, and even maternal death reported in extreme cases. [9] Neonatal outcomes are also negatively impacted, with higher rates of preterm birth, low birth weight.[7]

Pathophysiology and Risk Factors: Placenta previa occurs when the placenta attaches in the lower segment of the uterus rather than at the top, bringing it closer to the internal OS. This unusual placement raises the risk of placental adherence issues, such as placenta accreta spectrum (PAS). The underlying mechanisms of PAS involve improper decidualization and excessive trophoblastic invasion, leading to abnormal attachment of the placenta to the uterine wall. [1]

Several factors increase the likelihood of developing placenta previa and PAS, including:

- Previous caesarean sections: Uterine scars from past surgeries heighten the risk of abnormal placentation. [10]
- Multiparity: Having multiple pregnancies can lead to significant changes in the uterus, which may increase the risk of PAS. [11]
- Advanced maternal age: Women over 35 are at a higher risk for abnormal placentation. [12]
- Assisted reproductive technologies: Techniques like in vitro fertilization (IVF) have been associated with a greater occurrence of placenta previa and PAS. [13]
- Prior uterine surgeries: Procedures such as myomectomies and dilation & curettage (D&C) can damage the endometrium, resulting in abnormal placentation [14]

Clinical Presentation and Diagnosis:

Placenta previa usually presents with painless vaginal bleeding during the second or third trimester, while PAS may not show symptoms until delivery or could result in significant bleeding during labour [15]. Early identification through ultrasound (preferably transvaginal) and MRI is essential for determining the best delivery approach. Important imaging findings include:

- Loss of the normal hypoechoic retroplacental zone. [14]
- Increased blood flow at the placental-uterine interface [5]
- Placental lacunae with turbulent flow observed on Doppler imaging. [16], [17]

Management Strategies:

The management of PAS in cases of placenta previa is influenced by the severity of the condition, gestational age, and the health of both the mother and foetus, with key approaches include:

- Multidisciplinary approach: Involvement of obstetricians, anaesthetists, and interventional radiologists for optimal outcomes. [18]
- Conservative management as per McAfee and Johnson regimen in stable cases to give time for foetal lungs to mature without compromising maternal health. [19]
- In cases of anterior placenta, incision is taken just above the edge of the placenta or in some cases the placenta is cut through to reach the membranes. [20]
- Conservative management: In selected cases, leaving the placenta in situ and using uterine artery embolization to control bleeding. [21]

- Elective caesarean hysterectomy: Standard of care for severe cases to prevent catastrophic haemorrhage. [4]

The diagnosis and management of placental accreta spectrum (PAS) in cases of placenta previa continue to pose challenges, even with advancements in prenatal imaging techniques like ultrasound and magnetic resonance imaging (MRI). Identifying PAS early is crucial for improving outcomes, as it facilitates multidisciplinary planning and delivery at specialized centres.[4] However, the accuracy of prenatal diagnoses can vary, and there is no consensus on the best diagnostic criteria and management protocols [3]

Previous research has shed light on the risk factors, diagnostic accuracy, and outcomes associated with PAS in placenta previa. For instance, Fitzpatrick et al. (2014) pointed out a strong link between previous caesarean deliveries and the risk of developing PAS in placenta previa. [8] Additionally, a study by Bailit et al. (2015) [21] stressed the significance of delivering at high-volume centres to minimize maternal morbidity. Nonetheless, there is a lack of longitudinal data regarding the natural history and progression of PAS in placenta previa, especially across diverse populations and healthcare settings. Most existing studies are either retrospective or cross-sectional, which limits their ability to provide a thorough understanding of the timing and progression of placental invasion, the effectiveness of diagnostic and therapeutic interventions, and the long-term health effects on both mothers and infants.

Need for the study:

This study aims to fill these gaps by conducting a comprehensive longitudinal analysis of women diagnosed with placenta previa with or without suspected or confirmed PAS. By tracking these patients from diagnosis through delivery and into the postpartum period, we hope to gain a clearer understanding of the clinical course, identify predictors of adverse outcomes, and assess the effectiveness of various management strategies. The results of this study will help in developing evidence-based guidelines for the prevention, diagnosis, and treatment of placenta previa with or without PAS, enhancing outcomes for both mothers and their newborns.

AIMS AND OBJECTIVES

1. To study the incidence of placenta previa and its feto-maternal outcomes.
2. To study the incidence of Placenta Accreta Syndrome (PAS) in cases of placenta previa.

REVIEW OF LITERATURE

Placenta previa remains a significant obstetric complication, associated with considerable maternal and fetal morbidity and mortality. This literature review explores the aetiology and clinical presentation of placenta previa, its maternal outcomes, progresses into the placenta accreta spectrum (PAS) disorders, and concludes with an examination of fetal and neonatal outcomes.

1. Aetiology and Clinical Presentation of Placenta Previa

Placenta previa is characterized by the abnormal implantation of the placenta in the lower uterine segment, partially or completely covering the internal os. The condition is believed to arise from defective decidualization in areas of prior uterine trauma or scarring. Repeated endometrial injury, such as that from previous caesarean sections, curettage, or uterine surgeries, may impair normal placental implantation, leading to low-lying or previa placentation.

Several risk factors have been consistently associated with placenta previa, including advanced maternal age, multiparity, smoking, previous caesarean section, multiple gestation, assisted reproductive technologies, and uterine anomalies. As highlighted by Meena N et al. [22], maternal age and parity were important contributors, with sonographic determination of placental location being essential for early detection.

Clinically, placenta previa commonly presents with painless vaginal bleeding in the second or third trimester, typically after 28 weeks of gestation. The bleeding is maternal in origin, bright red, and may be recurrent. In many cases, the diagnosis is made incidentally during routine obstetric ultrasound. Other presenting complaints may include malpresentation, preterm labour, or signs of hemodynamic instability in severe bleeding cases. Early diagnosis and risk stratification through imaging are crucial in guiding management decisions.

2. Maternal Outcomes in Placenta Previa

Several studies have highlighted the high-risk nature of placenta previa with regard to maternal health. Shreya Sahu et al. [23] presented a comprehensive review detailing serious maternal complications such as haemorrhage and placenta accreta. Advanced maternal age and increasing caesarean section rates were significant contributing factors. Similarly, Walfisch et al. [24] found that women with placenta previa were more likely to have prior caesarean sections and pathological presentations, necessitating complex obstetric interventions like caesarean hysterectomy.

Huseyin Durukan et al. [25] analysed maternal surgical outcomes between planned and emergency caesarean deliveries in placenta previa cases. Emergency caesareans were associated with significantly lower maternal haemoglobin, increased blood transfusion needs, longer surgery duration, and extended hospital stays. The findings emphasize the advantage of timely diagnosis and elective surgical planning.

Other notable maternal risks include postpartum haemorrhage (PPH), as quantified by Dazhi Fan et al. [26], who estimated a pooled PPH incidence of 22.3% in women with placenta previa, with regional variations noted globally. Marya Zlotnik et al.[27] reported a strong association between placenta previa and preterm delivery, adding to the maternal burden.

Several studies identify risk factors influencing maternal outcomes in placenta previa. Meena N et al. [22] confirmed increased maternal age, higher parity, and previous caesarean sections as prominent predictors. Ayman H. Shaamash et al. [28] further emphasized that prior caesarean delivery significantly increases maternal morbidity, including caesarean hysterectomy.

3. Placenta Accreta Spectrum (PAS)

Placenta previa is a leading risk factor for PAS disorders, which include placenta accreta, increta, and percreta. These conditions often result in severe haemorrhage, surgical complications, and increased maternal mortality. Dubravko Havek et al. [29] documented an incidence of emergency peripartum hysterectomy (EPH) of 0.078%, with a majority associated with caesarean sections, indicating an overlap with PAS.

In a case series by Mittal et al. [30], a frequency of PAS of 0.09% per 1000 deliveries was reported. Antenatal diagnosis significantly reduced perinatal mortality and maternal morbidity. Similarly, Xueyan Han et al. [31] noted that 30.6% of women with PAS had coexisting placenta previa, resulting in higher maternal and surgical morbidity. Conservative management in carefully selected cases was found feasible by another observational study, although caesarean hysterectomy remained the mainstay for most.

Diagnostic improvements have also been emphasized. Flore Ann Pain et al. [32] evaluated the diagnostic utility of ultrasound and MRI in classifying PAS and predicting placenta percreta. They concluded that accurate prenatal classification significantly improves clinical management and outcomes.

In addition to imaging, pathophysiological markers have been explored. Abu Bredu et al. [33] investigated 2D ultrasound markers and their utility in distinguishing PAS from uterine scar dehiscence. Their findings support the integration of imaging with pathophysiological markers for enhanced diagnostic precision.

4. Fetal and Neonatal Outcomes

Fetal and neonatal outcomes in pregnancies complicated by placenta previa and PAS are often poor, with increased risks of preterm birth, intrauterine growth restriction (IUGR), and neonatal intensive care unit (NICU) admission. Asnat Walfisch et al. [24] found that term neonates born to mothers with placenta previa had significantly lower birth weights (<2500 g), though Apgar scores and perinatal mortality rates were comparable to controls.

Jiaming Rao et al. [34] compared outcomes between women with placenta previa with and without uterine scars, finding worse neonatal outcomes in the scarred group, including higher rates of preterm delivery and NICU admissions. In another study, Abdul Ghani Nur Azurah et al. [35] observed that multigravidas with placenta previa had lower APGAR scores and required earlier delivery.

PAS disorders further complicate fetal outcomes. The retrospective analysis by the Menoufia University Hospitals found high rates of perinatal mortality and NICU admission among neonates born to mothers with placenta accreta. Stillbirths were not uncommon, and APGAR scores were significantly lower in severe cases. Kandil MAS [36]

In the study by Nahid Salim et al. [37], advanced maternal age, multiparity, and uterine scarring were associated with adverse fetal outcomes. Similarly, Minhazur R. Sarker et al. [38] found that thick placentas in mid-trimester ultrasound were associated with persistence of previa and poor foetal outcomes at delivery.

5. Gaps in Current Knowledge

Despite extensive research, several knowledge gaps persist:

- **Long-term neonatal outcomes** post-PAS or placenta previa, such as neurodevelopmental progress, remain underexplored.
- **Predictive biomarkers** and advanced imaging techniques for early PAS diagnosis need more validation.
- The **impact of various management protocols** across different healthcare settings is not uniformly evaluated.
- **Preventive strategies** for high-risk groups, especially in resource-limited settings, require further research.

6. Conclusion / summary

Placenta previa and PAS are associated with significant maternal and foetal complications. Risk factors such as advanced maternal age, prior caesarean deliveries, and IVF increase susceptibility. Accurate prenatal diagnosis and multidisciplinary management are critical for improving outcomes. Further research into diagnostic, preventive, and management strategies is essential to reduce the global burden of these obstetric challenges.

MATERIALS AND METHODS

Study Design

This study is a longitudinal, observational study conducted over a period of one year at a tertiary care centre**.**

Study Setting

The study was conducted at KLE's Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum.

Study Duration

The study was conducted from 01/01/2024 to 31/12/2024, covering all eligible cases during this period.

Study Population

Pregnant women diagnosed with Placenta Previa who were admitted to the hospital for delivery were taken into the study

Sample Size

A total of 32 patients diagnosed with Placenta Previa were included in the study. Among them, cases suspected or confirmed to have Placenta Accreta Spectrum (PAS) based on imaging and intraoperative findings were analysed further.

Sampling technique:

Universal sampling

Inclusion Criteria

- Pregnant women diagnosed with Placenta Previa with or without PAS with ≥28 weeks of gestation.

Exclusion Criteria

- Pregnant women with gestational age less than 28 weeks

Data collection procedure:

- All women presenting with pregnancy >/= 28 weeks gestation with placenta previa were enrolled in this study. A self-designed questionnaire was prepared by the investigator to collect information on maternal characteristics including age, booking status, socioeconomic status, risk factors, presenting complaints, scan findings, preoperative haemoglobin levels, details of intraoperative findings like mode of delivery, gestational age at delivery, estimated blood loss, need for additional haemostatic measures, need for hysterectomy and blood transfusions were noted.
- Neonatal outcomes such as birth weight, APGAR scores and NICU admissions were noted.
- Patients with suspicion of PAS on USG were screened further. MRI report if available were compared with the HPR if hysterectomy was done.

Study protocol:

1. **Clinical Assessment:** Each patient underwent a detailed obstetric and medical history evaluation, including:
    - Maternal characteristics including age, parity, and gravidity, parity, h/o abortions, previous history of caesarean sections and/or other uterine

surgeries, previous history of vaginal delivery, booking status, type of conception, history of placental abnormalities in previous pregnancies, comorbidities such as hypertension, DM, thyroid disorders, symptoms at presentation including antepartum haemorrhage, vitals, per-abdominal examination, local examination (per speculum) , and gestation age.

- **Imaging and Diagnosis:** Details regarding placental location was taken from USG reports and patients who had a placenta located within 2 cms from internal OS were taken into the study.
- Magnetic Resonance Imaging (MRI): In cases where there was suspicion of myometrial invasion on USG, MRI was done for confirmation.

3. Delivery and post-natal assessment

- Maternal outcomes were assessed by considering various aspects such as mode and gestational age at delivery. In cases if caesarean delivery, perioperative aspects such as gestational age at delivery, elective or emergency delivery, intraoperative findings such as blood loss, need for additional oxytocic's, need for additional haemostatic sutures, need for blood transfusion, shock, DIC, additional measures such as bladder repair, presence of uterine fibroids, uterine anomalies etc, were noted. In cases of associated PAS. Post delivery details such as postnatal haemoglobin levels, need for ICU admission, duration of hospital stay etc were noted.
- Foetal outcomes: neonatal birth weight, Apgar score at 1 and 5 months, admission to neonatal ICU, or any other complications were noted.

- In cases of PAS, all findings of imaging modalities were compared with intra-operative findings and histopathology (the gold standard for confirmation of diagnosis),

Data processing and analysis/statistical analysis:

- The data was entered from the predesigned proforma into a Microsoft Excel sheet and the master chart was prepared.
- Summary statistics of the demographic and clinical characteristics is presented in tables and graphs.

RESULTS

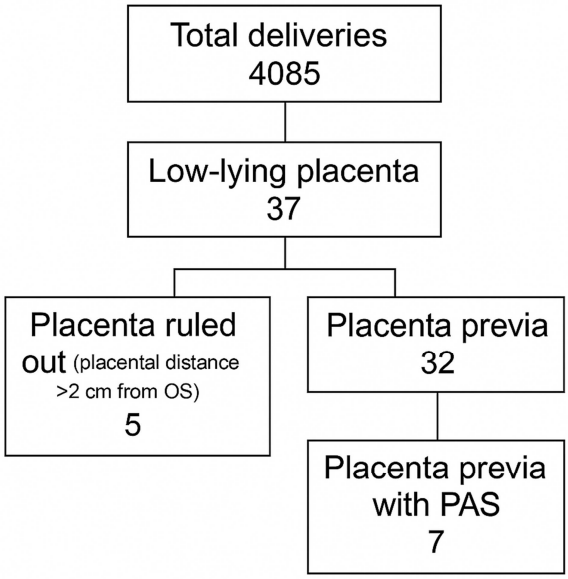

Figure 1: Consort diagram showing the study population: selection of cases with Placenta Previa and PAS

Table 1: Table for incidence

Parameter	Value
Total deliveries	4085
Placenta previa	32 (**0.78%**)
Placenta previa with PAS	7 (**0.17%**)
PAS among placenta previa	7 of 32 (**21.88%**)

Incidence of Placenta Previa: 0.7834% (≈ 7.83 per 1000 deliveries)

Incidence of PAS with placenta previa (overall): 0.1714% (≈ 1.71 per 1000 deliveries)

Proportion of PAS among placenta previa cases: 21.88%

2) DISTRIBUTION AS PER AGE:

During the study period, there were 4085 deliveries in the hospital. Among them, there were 32 patients of placenta previa (0.7 percent). Their age ranged from 22 to 42 (mean 28 years, standard deviation 5.27 years and median 26 years). Majority of the patients were young, with 78.13% being up to 30 years.5 patients were above the age of 35 years, maximum being 42 years. Age distribution of the patients is shown in figure 1. showing the preponderance of younger women in the study group. Figure 2. shows the box plot depicting the age distribution of the patients.

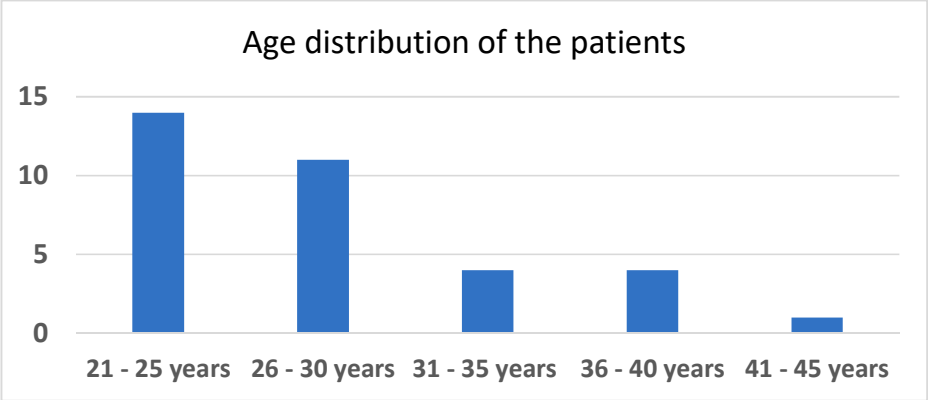

Figure 2a: Bar diagram showing age distribution

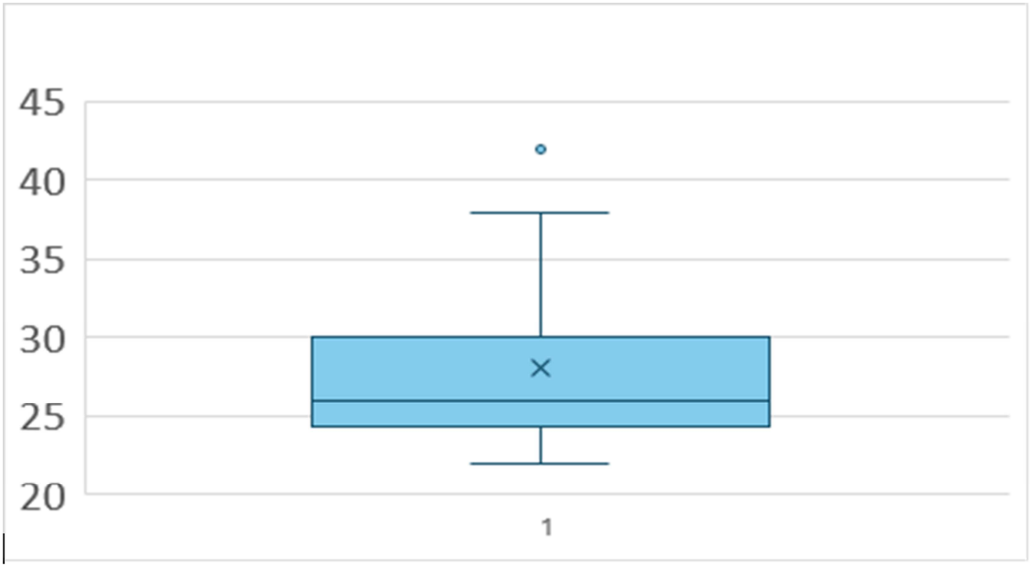

Figure 2b. Shows the box plot depicting the age distribution with mean, mode and interquartile intervals of the patients.

3) DISTRIBUTION AS PER BOOKING STATUS

Table 2: Distribution as per booking status:

	Number (n=32)	Percentage
registered	19	59.375%
unregistered	13	40.625%

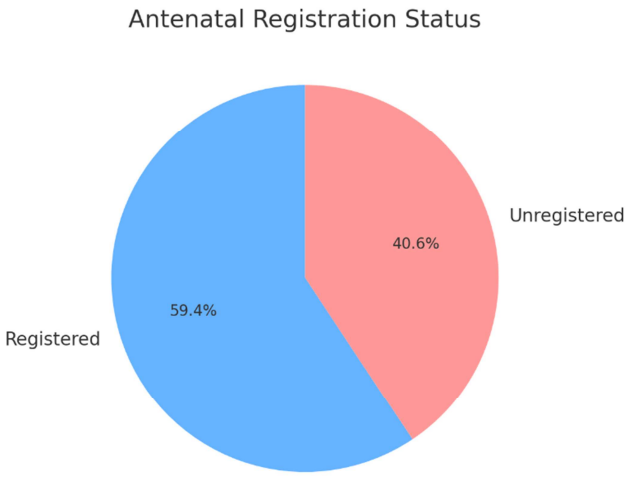

Figure 3: Pie diagram depicting the antenatal registration status.

Majority of the patients were registered in the antenatal clinic (19; 59.375%) and 13 were unregistered cases which were referred from other hospitals and clinics. (40.625%).

- **High Rate of Registration (59.4%)**

This reflects good antenatal surveillance and utilization of maternity services within the catchment area.

It suggests that a majority of patients with placenta previa were diagnosed and followed up appropriately, allowing for elective delivery planning and preoperative optimization.

- **Significant Proportion of Unregistered Cases (40.6%)**

Nearly **2 out of 5 patients** were referred as emergencies or for safe confinement

These cases often pose higher **maternal and foetal risks** due to:

Lack of prior imaging (USG/MRI)

No antenatal corticosteroids for lung maturity

No pre-arranged blood products or surgical preparedness

Implications for Health System

The high number of unregistered cases underlines the **need to strengthen referral systems**, awareness, and early detection at peripheral centers.

It also highlights the **critical role of tertiary centers** in managing high-risk obstetric complications associated with placenta previa with or without PAS.

DISTRIBUTION AS PER ANTENATAL COMORBIDITIES

One patient had hypertension (3.125%), four had hypothyroidism (12.5%) and three patients had diabetes mellitus (9.375%) all patients currently on treatment for the same at the time of delivery.

Table 3: Showing the antenatal comorbidities in the patients

Antenatal comorbidities	Number	percentage
Hypertension	1	3.125%
Hypothyroid	4	12.5%
Diabetes	3	9.375%

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DISTRIBUTION AS PER GRAVIDA STATUS

Table 4: Distribution as per Gravida status

Gravida	Frequency(n=32)	Percent
1	9	28.125%
2	11	34.375%
3	8	25%
4	3	9.375
5	1	3.125%
Total	**32**	**100.0**

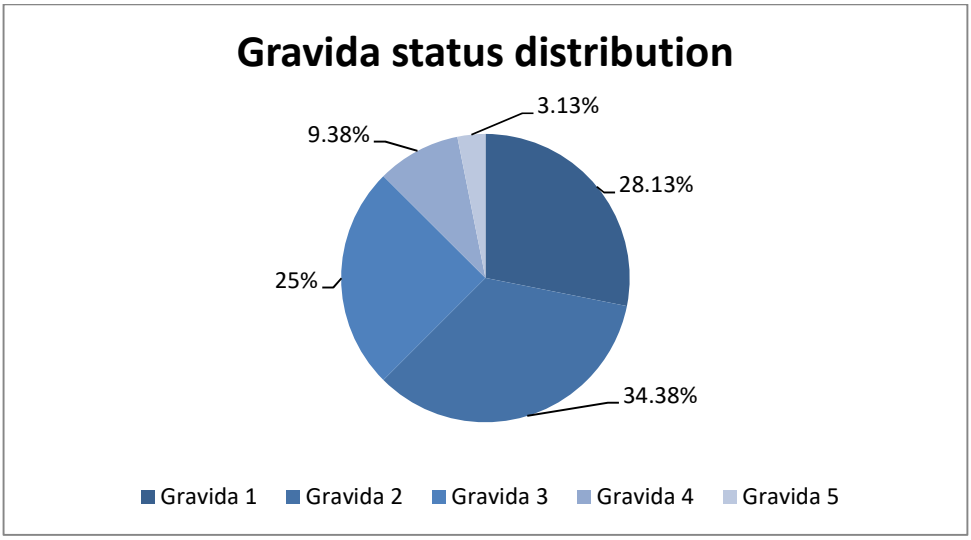

Figure 4: Pie diagram showing the gravida status distribution in the cohort.

A large proportion of patients were **multigravidas**, especially Gravida 2 and 3, suggesting that **parity may increase the risk** of abnormal placental implantation.

This supports the known association of **placenta previa** with **previous pregnancies**, particularly if they involved uterine surgeries like LSCS, curettage, or other uterine surgeries and only **28.13% were primigravida's**.

DISTRIBUTION AS PER PREVIOUS UTERINE SURGERIES

Sixteen patients had undergone lower section caesarean section in the previous pregnancies (50%). 11(31.275%)1 patient had previous 1 caesarean delivery, 4 (12.5%) had previous 2 caesarean deliveries and 1(3.125%) patient had previous 3 caesarean delivery. One had undergone hysteroscopy, and three patients had dilatation and curettage in the past.

Table 5: Distribution as per previous uterine surgeries

Type of surgery		**Frequency**	**Percentage**
LSCS	No	16	50%
	Yes	16	50%
Number of LSCS	1	11	31.375%
	2	4	12.5%
	3	1	3.125%
	Total	32	100%
Other uterine surgeries	Hysteroscopy	1	3.125%
	Dilatation and curettage	3	9.375%

- **50% of patients** had at least one prior **LSCS**, reinforcing the association between previous caesarean and **placenta previa**.
- **Multiple LSCS** (2 or more) were seen in **15.6%**, raising concern for **placenta accreta spectrum (PAS)** in future pregnancies.

- **Other uterine interventions** (like curettage or hysteroscopy) were observed in **12.5%**, also known to disrupt the endometrial lining and **predispose to abnormal placentation**.

This data aligns with existing literature on uterine trauma being a strong risk factor for placenta previa and PAS.

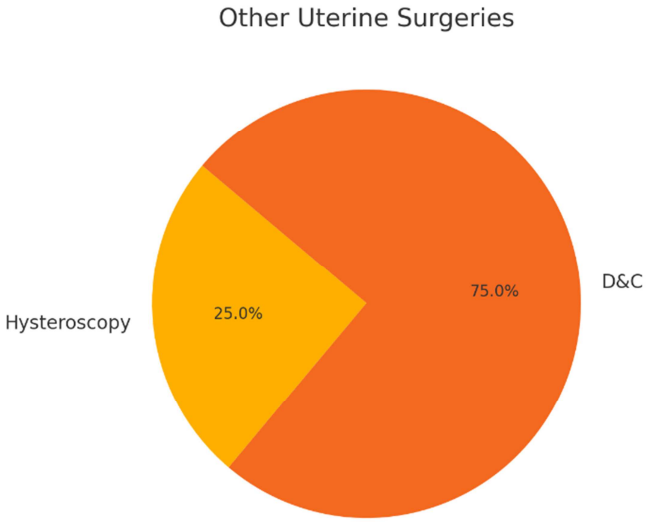

Figure 5a: Pie chart depicting previous uterine surgeries

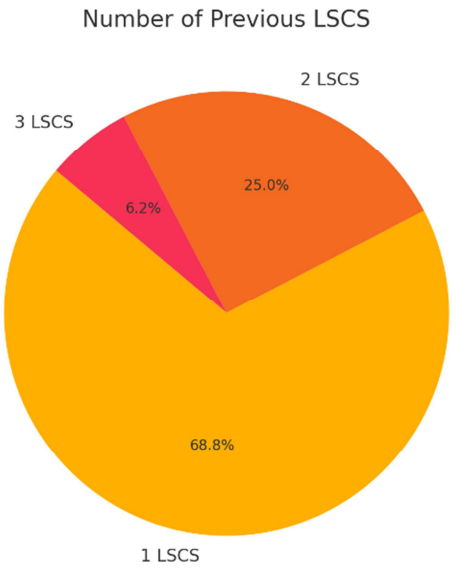

Figure 5b: Pie chart depicting number of previous LSCS

ASSOCIATION BETWEEN PREVIOUS UTERINE SURGERIES AND PAS

Table 6: Association between previous LSCS surgeries and PAS

LSCS History	PAS Absent	PAS Present	Total	% with PAS
No LSCS	16	0	16	0.00%
History of LSCS	9	7	16	43.75%

Table 6a: Association between previous other uterine surgeries and PAS

Other Uterine Surgery	PAS Absent	PAS Present	Total	% with PAS
Yes	3	1	4	25%
No	22	6	28	21.4%

25% (1 out of 4) of patients with other uterine surgeries developed PAS.

21.4% (6 out of 28) of patients without other uterine surgeries developed PAS.

Table 6b: Statistical association between prior uterine surgeries and incidence of Placenta Accreta Spectrum (PAS)

Comparison	Chi² Value	p-value	Interpretation
Previous LSCS vs PAS	6.58	0.010	Statistically significant – prior LSCS is associated with PAS
Other Uterine Surgery vs PAS	0.00	1.000	Not significant – no clear link to PAS

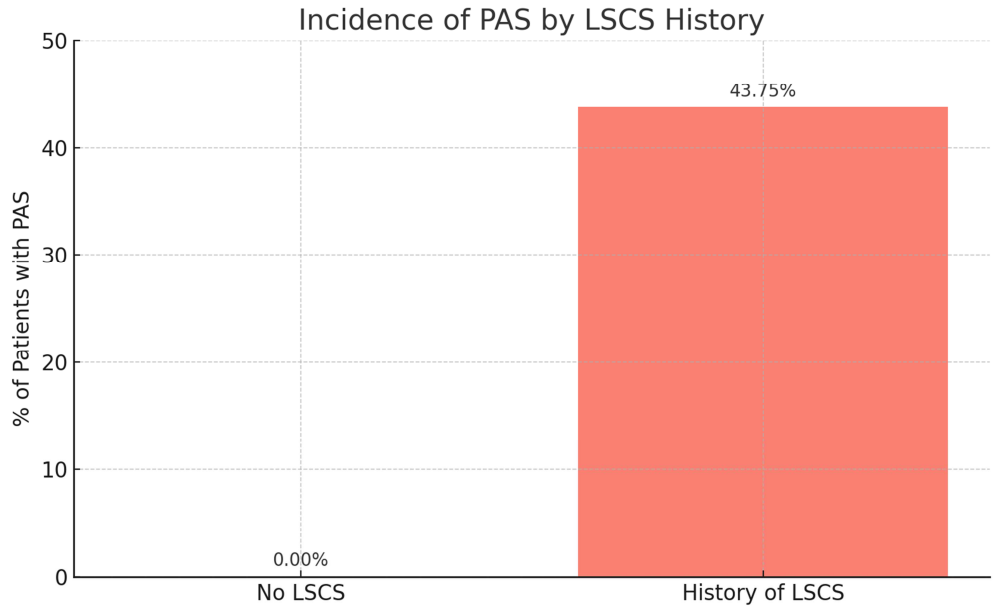

Figure 6: Bar diagram showing association of previous LSCS with PAS

This analysis clearly demonstrates that a **history of LSCS** significantly increases the risk of PAS, emphasizing the need for heightened antenatal surveillance and multidisciplinary planning in such patients. In contrast, other uterine surgeries did not exhibit a statistically significant association, although further studies with larger samples may be warranted.

History of antepartum haemorrhage was present in six patients (18.75%) in their antenatal course. Eleven presented with complaints of APH at admission (34.375%). Blood pressure was normal at evaluation in 31 patients (96.875%), one patient had hypertension none had hypotension. Pulse rate was normal in 29 patients (90.625%) and three patients had tachycardia.

CLINICAL FEATURES

Table 7: Table showing clinical features.

		Number (n=32)	Percentage
Blood pressure	Normotensive	31	96.875%
	Hypertensive	1	3.125%
	Hypotensive	0	0%
Pulse	Normal	29	90.625%
	Tachycardia	3	9.375%
	Bradycardia	0	0
Per abdomen	Relaxed	24	75%
	Contractions	5	15.625
	Scar tenderness	1	3.125%
Local examination	No bleed	19	59.375%
	Altered bleed	10	31.25%
	Active bleed	1	3.125%
	Leak	2	6.25%
H/O APH		6	18.75%
C/O APH		11	34.375%

Abdominal examination revealed relaxed abdominal wall in 24 patients (75%), palpable contractions in five patients (15.625%) and one patient had scar tenderness (3.125%). Local examination revealed altered bleed in 10 patients (31.25%), active bleeding in one patient (3.125%), active leak was seen in 2 patients (6.25%) and 19 patients had no bleeding at the time of admission (59.375%).

DISTRIBUTION AS PER SCAN FINDINGS

Table 8: Table depicting scan findings

		Number (n=32)	Percentage
Ultrasound examination (Oppenheimer classification)	2 (11-20mm)	14	43.75%
	3 (0-10 mm)	4	12.5%
	4 (complete)	14	43.75%
USG s/o PAS		7	21.875%
MRI s/o PAS		7	21.875%

This table first describes the distribution of patients as per Oppenheimer's classification of placenta previa. 14 patients (43.75%) had class 2 (11 – 20mm) , 4 patients (12.5%) had Class 3 (0 – 10mm) and 14 patients (43.75%) had class 4 (complete) placenta previa according to the Oppenheimer classification.

Ultrasound examination revealed features suggestive of placenta accreta syndrome (PAS) in seven patients. MRI imaging was done in 7 patients with suspicion of placenta accreta spectrum and findings confirmed.

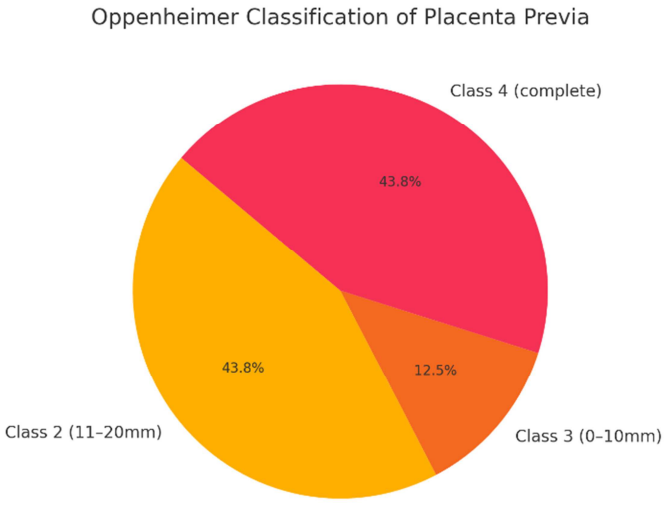

Figure 7: Pie chart showing case distribution as per Oppenheimer classification

This section describes the distribution of patients according to **Oppenheimer's classification** of placenta previa and findings related to **placenta accreta spectrum (PAS)** based on ultrasound and MRI imaging.

Out of 32 patients:

- **14 patients (43.75%)** had **Class 2 previa** (placenta 11–20 mm from the internal os).
- **4 patients (12.5%)** had **Class 3 previa** (0–10 mm from the os).
- **14 patients (43.75%)** had **Class 4 previa**, indicating **complete coverage** of the internal os.

Ultrasound examination showed features suggestive of **PAS in 7 patients (21.88%)**. In all these cases, **MRI was performed** and **confirmed the diagnosis** in the same number, supporting the reliability of combined imaging modalities.

Table 9: Association Between Oppenheimer Classification and PAS

Oppenheimer Class	PAS Present	PAS Absent	Total	% with PAS	% without PAS
Class 2 (11–20 mm)	1	13	14	7.14%	92.86%
Class 3 (0–10 mm)	0	4	4	0.00%	100.00%
Class 4 (Complete)	6	8	14	42.86%	57.14%
Total	**7**	**25**	**32**	—	—

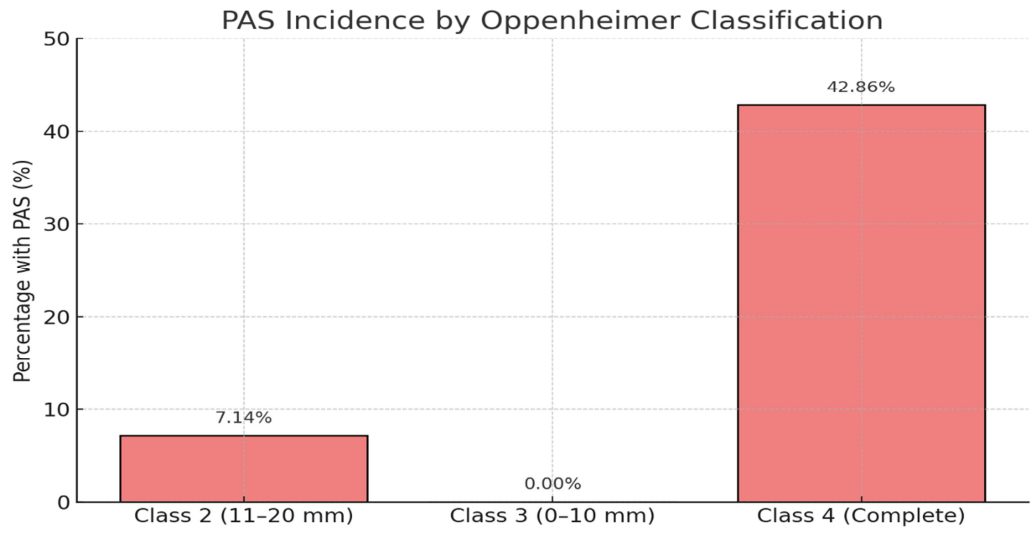

Figure 8: Bar diagram showing the percentage of PAS cases by Oppenheimer class

- **Class 4 previa (complete)** had a significantly higher PAS incidence (**42.86%**).
- **Class 2 previa** had a low PAS rate (**7.14%**).
- **Class 3 previa** had **no PAS cases**.

Table 9a: Table depicting statistical correlation between PAS in Placenta previa based on Oppenheimer classification

Oppenheimer Class	Chi² Value	p-value	Significant (p < 0.05)
Class 2 (11–20 mm)	0.64	0.4243	No
Class 4 (Complete)	6.23	0.0125	Yes

Class 3 (0–10 mm) was excluded from individual Chi-square analysis due to absence of PAS cases

There is a **significant association** between the class of placenta previa and the incidence of PAS (*p = 0.039*).

Class 4 previa showed the highest PAS risk (42.86%), while **Class 3 had none**.

This supports the clinical notion that **the closer the placenta is to or covering the os, the higher the risk of abnormal invasion**.

DISTRIBUTION BASED ON MODE OF DELIVERY

Table 10: Table depicting mode of delivery

Mode			Frequency (n=32)	percentage
Vaginal			0	0%
Caesarean delivery	Elective (18) [56.25%]	Term	10	31.25%
		Preterm	8	25%
	Emergency (14) [43.75]	Term	5	15.625%
		Preterm	9	28.125

All the 32 patients underwent caesarean section for delivery. Elective caesarean delivery was performed in 18 patients (56.25%) among whom, ten were performed at term and eight were performed pre-term. Emergency caesarean delivery was performed in 14 patients (43.75%) of whom five were performed at term and nine patients underwent emergency preterm caesarean delivery. In total, 15 patients had term delivery (46.875%) and 17 patients had preterm delivery (53.125%).

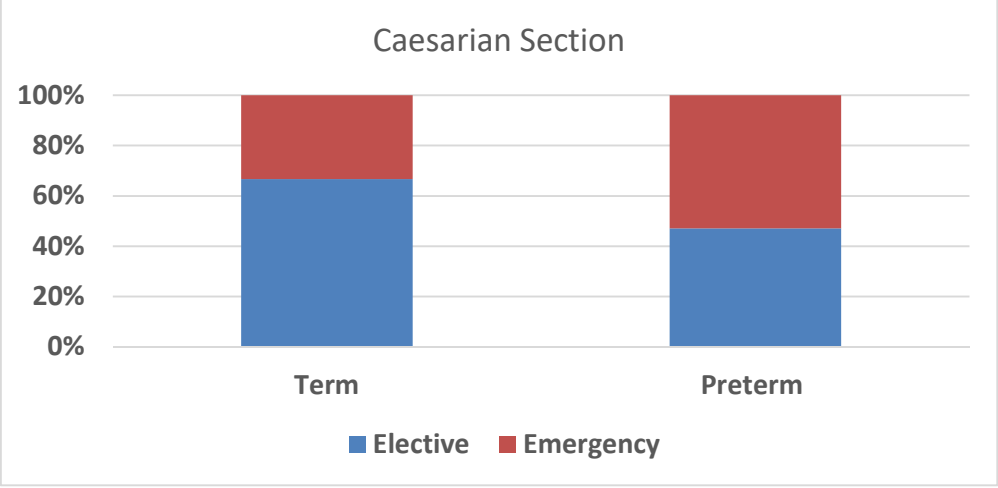

Figure 9: Bar chart visually compares the mode of cesarean section (Elective vs Emergency) between Term and Preterm deliveries

DISTRIBUTION BASED ON GESTATIONAL AGE AT DELIVERY

Stratified gestational age at delivery is shown in the table shows that 17 patients (53.125%) had preterm deliveries, and 15 patients (46.875%) delivered at term.

Table 11: Table depicting gestational age at delivery

		Number (n=32)	Percentage
Preterm	28 to 31 +6 weeks	2	6.25%
	32 to 33 + 6 weeks	2	6.25%
Late preterm	34 to 36+6 weeks	13	40.625%
Term	37 to 40 weeks	15	46.875%
Total		32	100%

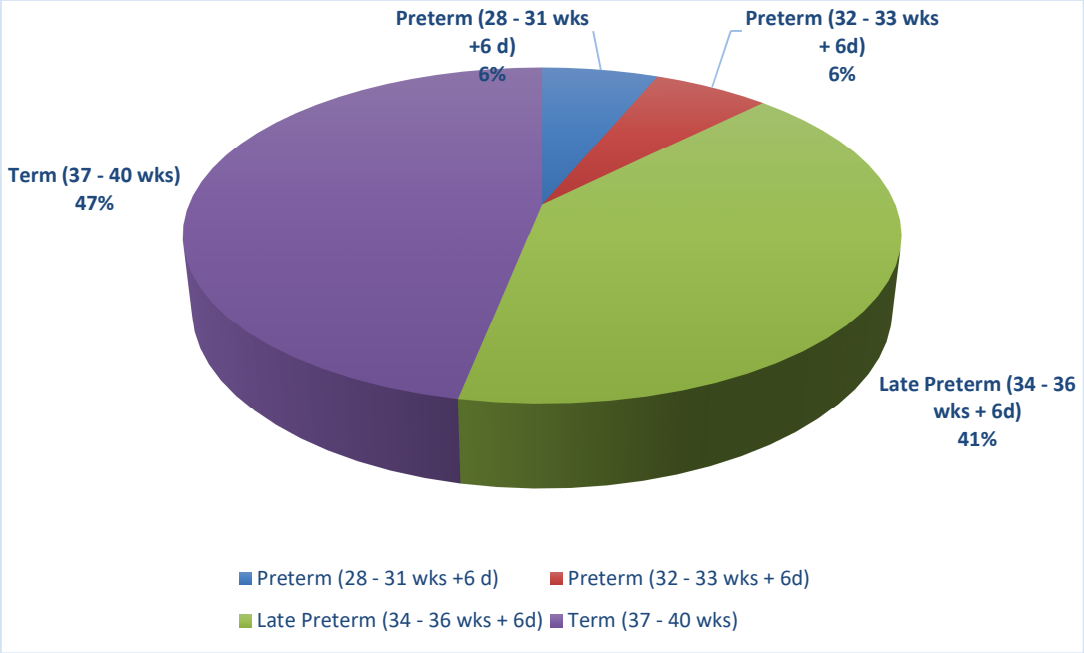

Figure 10: Bar diagram showing GA at delivery

INTRAOPERATIVE INTERVENTIONS

Table 12: Table depicting intraoperative interventions

	Parameter	Frequency (n=32)	Percent
Use of Additional oxytocic's	No	20	62.5%
	Yes	12	37.5%
Internal iliac artery ligation	No	26	81.2%
	Yes	6	18.7%
Uterine artery ligation	No	24	75%
	Yes	8	25%
Additional Haemostatic Sutures	No	27	84.37%
	Yes (isthemic)	2	6.25%
	Yes(B-lynch)	1	3.1%
	Yes(Mahesh Gupta)	1	3.1%
	Yes(transverse B-Lynh)	1	3.1%
Need for hysterectomy (total hysterectomy)	No	26	81.25
	Yes	6	18.75%
Caesarean myomectomy	No	29	90.625
	Yes	3	9.375%
Bladder repair	No	31	96.875
	Yes	1	3.125%

Additional oxytocic's were used in 12 patients (37.5%) whereas 20 patients did not require use of oxytocic's. During the LSCS, six patients (18.7%) underwent internal iliac artery was ligation and 26 patients did not require IIA ligation. Eight patients underwent uterine artery ligation (25%).

Additional haemostatic suture was need in five patients (15.625%). Isthemic suture was used in two patients, B – Lynch suture was used in one patient, Mahesh Gupta haemostatic suture was used in one patient and transverse B – Lynch suture was used in one patient. Total hysterectomy during the delivery was required in six patients (18.75%) whereas 26 patients including 1 patient with PAS did not require hysterectomy.

POST OPERATIVE COMPLICATIONS

Table 13: Table depicting post-operative complications

Complication	Number of patients	Percentage
Post partum haemorrhage	12	37.5
Total abdominal hysterectomy	6	18.75
Shock / hypotension	5	15.625
Maternal death	0	0
Sepsis	0	0
Need for blood transfusion	12	37.5
Need for massive transfusion protocol	5	15.6
Need for intensive care admission	2	6.25

- PPH was the most common complication, affecting more than a third of patients. This aligns with placenta previa's known association with atonic uterus or morbid adhesion (PAS).
- Blood transfusion and hysterectomy rates are notably high, reinforcing the need for well-equipped obstetric care.
- 15.63% needed massive transfusion, indicating severe haemorrhage in a substantial number of cases.
- Despite these, no maternal deaths or sepsis were recorded, showing the effectiveness of tertiary-level interventions.
- ICU admission was required in 6.25%, for hemodynamic stabilization and post-operative monitoring

DURATION OF HOSPITAL STAY

Table 14: Table depicting duration of hospital stay

Duration of Hospital Stay (days)	Frequency	Percent
0 - 5	6	18.8
5 - 10	12	37.5
10 - 20	11	34.4
20 - 30	3	9.4

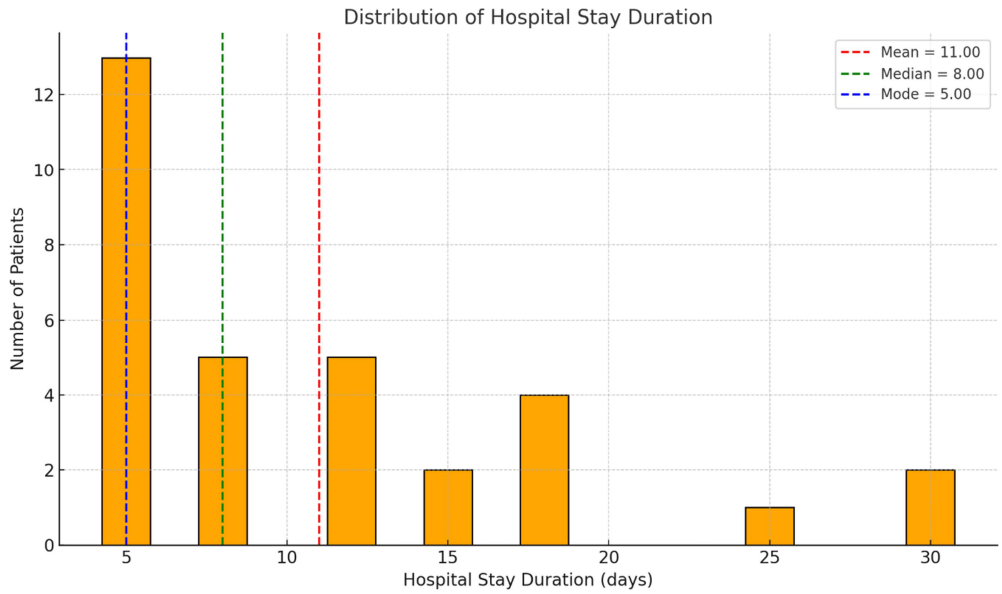

Figure 11: Bar diagram depicting duration of hospital stay

There was marked variation in the hospital stay of the patients, ranging from 4 to 30 days. Mean duration of hospital stay was 11.31 days (standard deviation), being higher due to few patients with longer hospital stay. The median duration of hospital stay was 8.5 days and most frequent duration of hospital stay (mode) was 6 days.

NEONATAL OUTCOMES

Table 15: Distribution as per birth weight

Birth Weight (kilograms)	Frequency	Percent
1-1.5	2	6.25%
1.5- 2	3	9.375%
2-2.5	8	25.0%
2.5 -3	19	59.375%

Table xx showing the frequency of the birth weight.

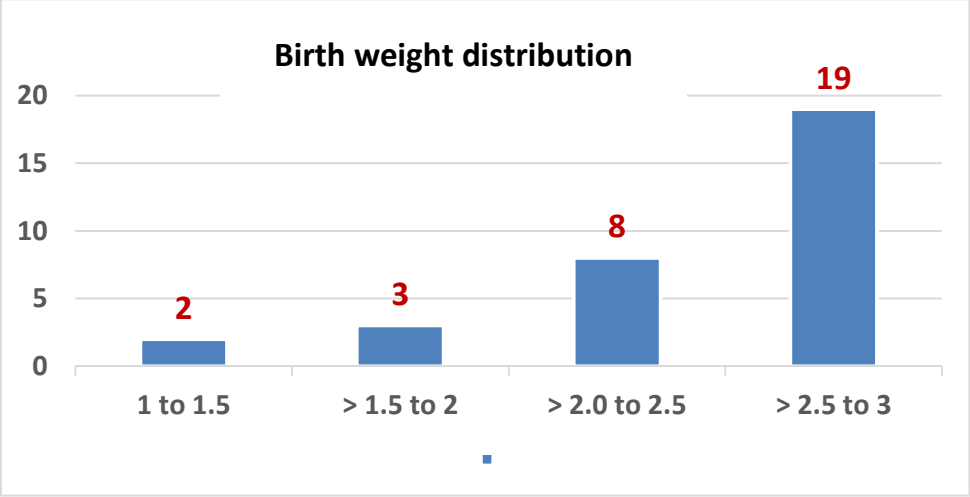

Figure 12: Distribution as per birth weight

Figure showing the distribution of the frequency of birth weight.

The mean birth weight of the babies was 2.475 kg (standard deviation 0.664kg). Among the 32 neonates born to mothers with placenta previa with or without PAS, the majority i.e 19 patients (59.375%) had a birth weight >2.5 kg, indicating favourable outcomes in most cases. However, a subset, 13 patients (40.6%) of neonates had low birth weight (<2.5 kg), 25% weighing 2-2.5 kg, 9.4% weighing 1.5-2kg and 6.3% weighing 1-1.5kg likely reflecting the impact of preterm deliveries or placental insufficiency.

GRAVIDA STATUS VS NEONATAL OUTCOMES

Table 16: Table comparing neonatal outcomes between primigravidas and multigravidas

Outcome	Primigravida (n=9)	Multigravida (n=23)
Mean Birth Weight (kg)	2.52 ± 0.48	2.41 ± 0.44
APGAR Score (1 min)	7.33 ± 0.71	7.04 ± 0.56
APGAR Score (5 min)	8.67 ± 0.71	8.17 ± 0.89
NICU Admissions	2	6

Interpretation:

- **Primigravida patients** had slightly better neonatal outcomes across all parameters:
    - Higher **mean birth weight**
    - Slightly better **APGAR scores** at 1 and 5 minutes
    - **Fewer NICU admissions** (2 vs 6)
- **Multigravida cases**, while more prevalent, showed marginally lower foetal outcomes, which could be influenced by:
    - Increased maternal comorbidities or uterine scarring
    - Higher risk of placenta accreta or PPH leading to emergency deliveries

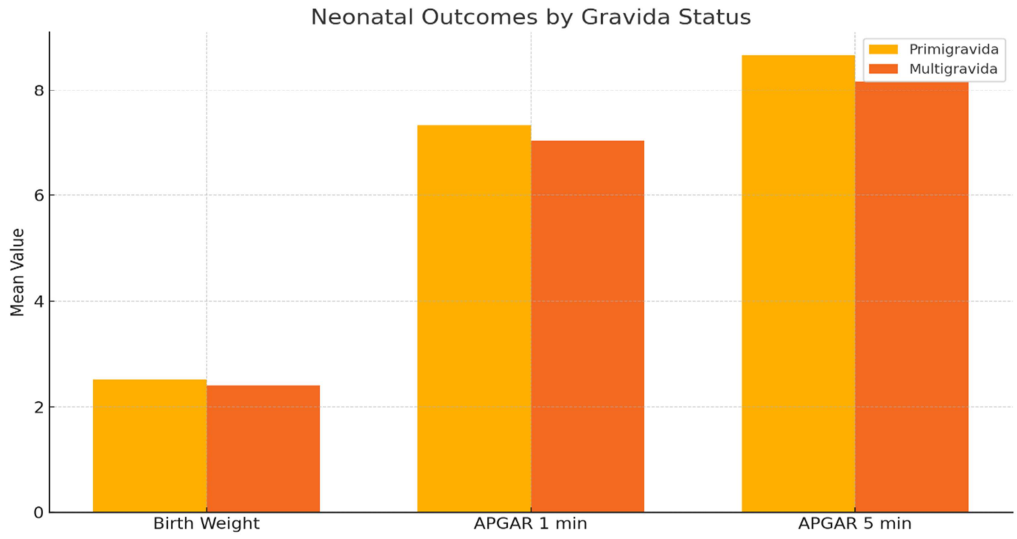

Figure 13: Bar diagram comparing neonatal outcomes in primigravida vs multigravida

NICU ADMISSIONS AND INDICATIONS

Out of 32 neonates delivered to mothers with placenta previa:

- **8 neonates (25%)** required **NICU admission**.
- **24 neonates (75%)** were managed in the routine postnatal ward without complications.

Among the 8 NICU admissions:

- **7 neonates (87.5%)** were admitted for **respiratory distress syndrome (RDS) associated with preterm birth**.
- **1 neonate (12.5%)** developed **RDS despite being born at term**, indicating perinatal stress or transient tachypnoea.

FETO-MATERNAL OUTCOMES IN CASES OF PLACENTA ACCRETA SPECTRUM (PAS)

Maternal Outcomes

Table 17: Table depicting maternal outcomes in PAS

Parameter	PAS Cases (n = 7)
Postpartum Haemorrhage	6 cases (**85.7%**)
Hysterectomy	6 cases (**85.7%**)
ICU Admission	2 cases (**28.6%**)
Blood Transfusion	6 cases (**85.7%**)
Massive Transfusion	5 cases (**71.4%**)
Mean Estimated Blood Loss	**1655.7 ± 803.3 ml**
Mean Duration of Hospital Stay	**10.29 ± 5.15 days**

Table 18: Neonatal Outcomes in PAS

Parameter	PAS Cases (n = 7)
Preterm Births	4 cases (**57.1%**)
NICU Admission	2 cases (**28.6%**)
Mean Birth Weight	**2.40 ± 0.38 kg**

Maternal morbidity was significantly high in PAS cases, with major interventions like hysterectomy, transfusion, and ICU care frequently required.

Massive blood loss and longer hospital stay highlight the severity of these cases and the need for multidisciplinary planning.

Fetal outcomes were moderately affected, with a preterm delivery rate of 57.1% and NICU admission in 28.6%, largely driven by prematurity rather than direct PAS complications.

DISCUSSION

This observational study evaluated maternal and neonatal outcomes in pregnancies complicated by placenta previa, including cases with concurrent placenta accreta spectrum (PAS), in a tertiary care setting. Of 4085 deliveries, the incidence of placenta previa was 0.78%, and 21.88% of these were further complicated by PAS. These figures align with global trends, which report placenta previa in 0.3–1.8% of pregnancies and PAS in 0.1–0.3%, especially in women with prior caesarean sections.

Demographic and Risk Factor Analysis

The study population predominantly included younger women, with 78.13% aged under 30 and a mean maternal age of 28 years. Multiparity (71.88%) and a history of prior lower segment caesarean section (50%) emerged as key risk factors. This is consistent with findings from Ipek Gurol-Urganci et al., who demonstrated that prior caesarean delivery significantly increases the risk of placenta previa in subsequent pregnancies. In our study, a statistically significant association between prior caesarean and PAS was observed ($p = 0.010$), corroborating the work of Ayman Shaamash et al., who identified prior CS as a strong predictor of PAS and caesarean hysterectomy.

Antenatal Diagnosis and Imaging

Nearly 60% of cases were booked and monitored antenatally, while 40.63% presented as emergency referrals. The use of Oppenheimer's criteria for ultrasound-based classification effectively stratified risk. Class 4 placenta previa showed the highest correlation with PAS (42.86%; $p = 0.0125$), reinforcing the predictive validity of sonographic grading. Our experience supports the findings of Flore Ann Pain et al.,

who emphasized the value of combining ultrasound and MRI in antenatal PAS diagnosis, with MRI playing a critical confirmatory role.

Maternal Morbidity and Surgical Outcomes

All patients underwent caesarean section, with 43.75% being emergency procedures, often precipitated by antepartum haemorrhage. Postpartum haemorrhage (PPH) was the most frequent maternal complication, observed in 37.5% of patients, significantly higher than the 22.3% pooled incidence reported by Dazhi Fan et al. in their meta-analysis. Surgical interventions such as uterine artery ligation (25%), internal iliac ligation (18.75%), and hysterectomy (18.75%) were predominantly necessitated in PAS cases. These rates are consistent with those described by Havek et al., who noted a high proportion of elective caesarean hysterectomies in PAS management.

Despite significant haemorrhagic morbidity, no maternal deaths or cases of sepsis were recorded in this cohort. This contrasts with several studies from resource-limited settings, such as the one by Singh and Pradeep, where maternal deaths and intensive care admissions were more prevalent. The absence of maternal mortality in our study underscores the value of early diagnosis, antenatal preparedness, and availability of multidisciplinary support.

Neonatal Outcomes and NICU Admissions

Among neonates, 40.6% were of low birth weight (<2.5 kg), and 25% required NICU admission. Respiratory distress syndrome (RDS) in the setting of prematurity was the leading indication (87.5%). These results are in agreement with the findings of Marya Zlotnik et al. and Walfisch et al., who reported increased rates of low birth weight and NICU admissions in pregnancies complicated by placenta previa.

Interestingly, one neonate developed RDS despite being born at term, pointing to potential perinatal stress. While primigravida's showed slightly better neonatal outcomes, the difference was not statistically significant—echoing findings by Abdul Ghani Nur Azurah et al., who also observed that multiparous women were at greater risk of early delivery and poor neonatal outcomes.

Placenta Accreta Spectrum (PAS)

PAS was diagnosed in 21.88% of placenta previa cases in our study, a prevalence comparable to figures reported by Jyotsana Suri et al. and Han Xueyan et al. These studies emphasize the growing burden of PAS, particularly in women with prior uterine surgeries. All PAS cases in our study underwent surgical management, with 100% requiring caesarean delivery and 85.7% of cases of PAS undergoing caesarean hysterectomy. Conservative management was not attempted due to the severity and anticipated surgical complexity. These findings mirror global consensus on the importance of planned surgical intervention in PAS to reduce maternal and neonatal risk.

Additionally, our PAS subgroup experienced higher transfusion rates and operative morbidity, reinforcing the importance of anticipatory management, as supported by findings from Sarker et al. and Karenn Gibbins et al.

STRENGTHS OF THE STUDY

- Tertiary Care Setting: The study was conducted in a tertiary care center equipped with multidisciplinary support, ensuring accurate diagnosis, timely intervention, and optimal outcomes in high-risk pregnancies.
- Systematic Antenatal Evaluation: The use of standardized imaging criteria (Oppenheimer's classification) and MRI for suspected PAS cases provided robust antenatal risk stratification.
- Complete Case Follow-Up: All cases were followed through delivery and the immediate postpartum period, ensuring comprehensive data capture on maternal and neonatal outcomes.
- Clinical Relevance: The study reflects real-world obstetric challenges and management strategies, making the findings highly applicable to similar healthcare settings.

LIMITATIONS OF THE STUDY

- Single-Center Design: As the study was conducted in a single tertiary center, the findings may not be generalizable to primary or secondary care facilities or to rural populations with limited access to imaging and surgical expertise.
- Limited Sample Size: Although reflective of the actual incidence, the sample size (32 cases of placenta previa, 7 with PAS) limits the power for subgroup analyses and may affect statistical significance in some comparisons.
- Lack of Long-Term Follow-Up: Neonatal outcomes were assessed only during the immediate postnatal period. Long-term developmental and health outcomes were not evaluated.
- No Conservative PAS Management Arm: Due to institutional protocol or case severity, all PAS cases were managed surgically. The study does not explore the feasibility or outcomes of conservative management approaches.

CONCLUSION

Placenta previa and placenta accreta spectrum (PAS) continue to be significant contributors to maternal and neonatal morbidity, particularly in the context of increasing cesarean delivery rates. This study demonstrated that prior cesarean section, multiparity, and advanced grades of placenta previa are key risk factors associated with the development of PAS.

Timely antenatal diagnosis using ultrasonography, supported by MRI in selected cases, allowed for risk stratification and surgical preparedness, which significantly impacted maternal outcomes. Although postpartum hemorrhage, blood transfusion, and operative interventions were common, there were no maternal deaths, underscoring the value of multidisciplinary planning in tertiary care.

Neonatal complications primarily stemmed from prematurity and low birth weight, with NICU admissions largely attributed to respiratory distress syndrome. These findings reaffirm the importance of gestational age optimization and neonatal preparedness in the management plan.

Overall, the study emphasizes the need for heightened vigilance in women with prior uterine surgeries and highlights the effectiveness of imaging-based classification and coordinated peripartum management in improving clinical outcomes. Further studies with larger cohorts and long-term neonatal follow-up are warranted to build upon these findings and guide evolving clinical practices.

BIBLIOGRAPHY

1. Silver RM. Abnormal placentation: Placenta previa, Vasa Previa, and Placenta Accreta. Obstet Gynecol 2015;126(3)654-668.

2. Silver RM, Branch DW. Placenta accreta spectrum. N Engl J Med. 2018;378(16):1529-1536. doi: 10.1056/NEJMcp1709324

3. Jauniaux E, Chantraine F, Silver RM, Langhoff-Roos J; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Epidemiology. nt J Gynaecol Obstet. 2018;140(3):265-273. doi: 10.1002/ijgo.12407.

4. American College of Obstetricians and Gynecologistsn (AOCG); Society of Fetal Medicine. Obstetric Care Consensus No. 7. Placenta Accreta Spectrum. Obstet Gynecol. 2018;132(6):e259-e275. doi: 10.1097/AOG.0000000000002983.

5. Morlando M, Collins S. Placenta accreta spectrum disorders: challenges, risks and management strategies. Int J Womens Health 2020;12:1033–1045. DOI: 10.2147/IJWH.S224191

6. Baldwin HJ, Patterson JA, Nippita TA, Torvaldsen S, Ibiebele I, Simpson JM, et al. Antecedents of abnormally invasive placenta in primiparous women : risk associated with gynecologic procedures. Obstet Gynecol 2018;131(2):227-233. *DOI:* 10.1097/AOG.0000000000002434.

7. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. Maternal morbidity associated with multiple repeat caesarean deliveries. Obstet Gycnol 2006;107(6):1226-1232. doi: 10.1097/01.AOG.0000219750.79480.84

8. Fitzpatrick KE, Sellers S, Spark P, Kurinczuk HH, Brocklehurst P, Knight M. The management and outcomes of placenta accreta, increta, and percreta in the UK: a

population-based descriptive study. BJOG 2014;121(1):62-70. doi: 10.1111/1471-0528.12405.

9. Wortman AC, Alexander JM. Placenta accreta, increta, and percreta. Obstet Gynecol Clin North Am. 2013;40(1):137-154. https://doi.org/10.1016/j.ogc.2012.12.002

10. Wu S, Kocherginsky M, Hibbard JU. Abnormal placentation: twenty-year analysis. Am J Obstet Gynecol 2005;192(5):1458-1458. doi: 10.1016/j.ajog.2004.12.074.

11. Jauniaux E, Gronbeck L, Bunce C, Langhoff-Roos J, Collins SL. Epidemiology of placenta previa accreta: a systematic review and meta-analysis. BMJ Open 2019;9:e031193. doi: 10.1136/bmjopen-2019-031193

12. Garmi G, Salim R. Epidemiology, Etiology, Diagnosis, and Management of Placenta Previa. Obstet Gynecol Int. 2012;2012:873929. doi: 10.1155/2012/873929

13. Petersen SH, Bergh C, Gissler M, Asvold BO, Romundstad LV, Tiitinen A. Time trends in placenta-medited pregnancy complications after assisted reproductive technology in the Nordic countries. Am J Obstet Gynecol 2020;223(2):226.31-19. DOI: 10.1016/j.ajog.2020.02.030

14. Jauniaux E, Alfierevic Z, Bhide AG, Belfort MA, Burton GJ, Collins SL, et al. Placenta previa and placenta accreta: diagnosis and management: Green-top Guideline No. 27a. BJOG 2019;136(1):e1-e48. doi: 10.1111/1471-0528.15306.

15. Im DH, Kim YN, Cho EH, Kim DH, Byun JM, et al. Risk factors and pregnancy outcomes of antepartum hemorrhage in women with placenta previa. Reprod Sci. 2023;30(9):2728-2735. https://doi.org/10.1007/s43032-023-01191-2

16. Nicola F, Anna F, Federico P. An update of diagnostic efficacy of ultrasound and magnetic resonance imaging in the diagnosis of clinically significant placenta accreta spectrum disorders. Curr Opin Obstet Gynecol 2022;34(5):287-291. doi: 10.1097/GCO.0000000000000811.

17. Hessami K, Horgan R, Munoz JL, Norooznezhad AH, Nassr AA, Fox KA, et al. Trimester-specific diagnostic accuracy of ultrasound for detection of placenta accreta spectrum: systematic review and meta-analysis. Ultrasound Obstet Gynecol. 2024;63(6):723-730. doi: 10.1002/uog.27606.

18. Rosen MA, DiaGranados D, Dietz AS,Benishek LE, Thompson D, Pronovost PJ, et a. Am Psychol. 10`8;73(4):433-450. doi: 10.1037/amp0000298.

19. Konar H. Ed. DC Dutta's Textbook of Obstetrics. 9th edition. Jaypee Brothers Medical Publishers. New Delhi. 2018.

20. He Y, Liu M, Yang YJ, Li L, Huang Q, Liu L. Prophylactic uterine artery embolization during cesarean delivery for management of hemorrhage in complete placenta previa: an observational study. Medicine (Baltimore). 2023;102(24)e34052, doi: 10.1097/MD.0000000000034052

21. Bailit JL, Grobman WA, Rice MM, Reddy UM, Wapner RJ, Varner MW, et al. Morbidly adherent placenta treatments and outcomes. Obstet Gynecol 2015;125(3):663-689. doi: 10.1097/AOG.0000000000000680.

22. Meena N, Dae A, Meena S, Meena A, Shrivatsava A. Impact of placenta previa on obstetric outcome. *Int J Reprod Contracept Obstet Gynecol. 2015 Feb;4(1):76-80.*

23. Sahu S A, Shrivatsava D. Maternal and prenatal outcomes in placenta previa : a comprehensive review of evidence. Cureus. 2024;6; 16(5):e59737.doi: 10.7759/cureus.59737.

24. Walfisch A, Sheiner E. Placenta previa and immediate outcome of the term offspring. Arch Gynecol Obstet 2016;294(4):739-744. doi: 10.1007/s00404-016-4044-7.

25. Duruken H, Duruken OB, Yazici FG. Planned versus urgent deliveries in placenta previa: maternal, surgical and neonatal outcomes. Arch Gynecol Obstet. 2019;300(6): 1541-1549. doi: 10.1007/s00404-019-05349-9.

26. Fan D, Xia Q, Liu L, Wu S, Tian G,Wan g W, et al. The incidence of postpartum hemorrhage in women with placenta previa: a systematic review and meta-analysis. PLoS ONE 12(1): e0170194. doi:10.1371/journal.pone.0170194

27. Zlatnik MG, Cheng YW, Norton ME, Thiet M-P, Caughey AB. Placenta previa and the risk of preterm delivery. J Matern Fetal Neonatal Med. 2007;20(10:719-723. doi: 10.1080/14767050701530163.

28. Shaamash AH, AlQasem MH, Mahfouz AA, Ghamdi DSA, Eskandar MA. Major placenta previa among patients with and without previous cesarean section: maternal characteristics, outcomes and risk factors. Eur J Obstet Gynecol Reprod Biol. 2024;296:280295. doi: 10.1016/j.ejogrb.2024.03.012

29. Havek D, Becarevic R. Emergency peripartum hysterectomy in a tertiary obstetric center: 8 – year evaluation. Fetal Diagn Ther. 2007;22(2):139-142. doi: 10.1159/000097114.

30. Mittal P, Suri J, Pruthi N, Pandey D, Bharti R. Comparison of placenta accreta spectrum disorders diagnosed in intrapartum and antepartum period- A three year experience in a tertiary referral unit of India Eur J Obstet Gynecol Reprod Biol 2019;236:41-45. doi: 10.1016/j.ejogrb.2019.03.001.

31. Han X, Guo Z, Yang X, Yang H, Ma J. Association of Placenta Previa with Severe Maternal Morbidity Among patients With Placenta Accreta Spectrum Disorder. JAMA Netw Open. 2022 Aug 1;5(8):e2228002. doi: 10.1001/jamanetworkopen.2022.28002.

32. Pain F-A, Dohan A, Grange G, Marcellin L, Uzan-Augui J, Goffinet F, et al. Percreta score to differentiate between placenta accreta and placenta percreta with ultrasound and MR imaging. Acta Obstet Gynecol Scand. 2022;101(10):1135-1145. doi: 10.1111/aogs.14420.

33. Adu-Bredu T, Aryananda RA, Mathewalynn S, Collins SL. Exploring pathophysiological insights to improve diagnostic utility of ultrasound markers for distinguishing PAS from uterine scar dehiscence. Ultrasound Obstet Gynecol 2025;65(1):85-93. doi: 10.1002/uog.29144.

34. Rao J, Fan D, Zhou Z, Luo X, Ma H, Wan Y, et al. Maternal and neonatal outcomes of placenta previa with and without coverage of a uterine scar: a retrospective cohort study in a tertiary hospital. Int J Womens Health. 2021;July 6:13:671-681. doi: 10.2147/IJWH.S310097.

35. Azurah AGN, Zainol ZW, Lim PS, Shafiee MN, Kampan N, Mohsin WS, et al. Factors associated with placenta praevia primigravidas and its pregnancy outcome. Scientific World Journal. 2014;2014:270120. doi: 10.1155/2014/270120.

36. Kandil MAS, Sayyed TM, Salah. Maternal and neonatal outcomes of placenta accreta: a descriptive case series study. Menoufia Medical Journal 2019, 32:368–374

37. Salim NA, Satti I. Risk factors of placenta previa associated with maternal and neonatal outcome at Dongola/Sudan. J Family Med Prim Care 2021;10(3):1215-1217. doi: 10.4103/jfmpc.jfmpc_2111_20.

38. Sarker MR, Rosenberg HM, Warren L, Ferrara L, Bianco A, Debolt CA. Mid-trimester sonographic placenta previa thickness and persistence at delivery. Eur J Obstet Gynecol Reprod Biol.2024;296:59-64. https://doi.org/10.1016/j.ejogrb.2024.02.033

ANNEXURE – I – PROFORMA

MATERNAL OUTCOMES

- Patient Name: _____
- Age: ____ years
- Hospital ID: _____
- DOA: _____
- DOD: _____
- Gravida: _____
- Para: _____
- Abortions: _____
- Living: _____
- Death: _____
- previous vaginal deliveries: _____
- Previous LSCS: _____
- Number of LSCS: _____
- History of other uterine surgeries
- Specify surgery: _____
- Booking Status: _____
- Type of Conception: _____
- History of Placenta Previa in Previous Pregnancies
- Antenatal comorbidities _____
- Other Antenatal Complications: _____
- History of Antepartum Hemorrhage : yes/no
- Months of amenorrhea at hemorrhage _____ MOA

- whether presented with complains of APH yes/no
- Blood pressure: _____/_____mmHG
- PR: _____ bpm
- Presentation : cephalic/breech/variable
- FHS: present/absent
- USG report s/o placenta previa: yes/no
- Oppenheimer Classification: class I/classII/class III/ class IV
- Distance from IOS: _____
- Evidence of PAS on USG : yes/no
- MRI s/o PAS: yes/no
- Expectant management (yes/no)
- Antenatal Corticosteroids: yes/no
- Tocolysis: yes/no
- Mode of Delivery: _____
- Elective/Emergency Cesarean: _____
- Indication for Cesarean Section _____
- term/preterm: _____
- Gestational Age at Delivery: _____
- Use of Additional Oxytocics: _____
- internal iliac artery ligation: _____
- uterine artery ligation: _____
- Additional Hemostatic Sutures: _____
- Pre-op HB: _____
- pre op anemia correction: _____
- Method of anaemia correction: _____

- Post-op HB: _____
- Estimated Blood Loss (ml): _____
- Postpartum Hemorrhage: _____
- cause of PPH: _____
- Blood transfusion required post operatively: _____
- PCV: _____
- RDP: _____
- FFP: _____
- SDP: _____
- Massive transfusion required: _____
- Parenteral iron correction: _____
- Need for ICU Admission: _____
- Need for Hysterectomy: _____
- additional intra op findings: _____
- additional complications: _____
- need for higher antibiotics: _____
- Sepsis
- Duration of Hospital Stay: _____
- HPR report: _____

NEONATAL OUTCOMES

- Birth Weight (kilograms): _____
- APGAR Score (1 min): _____
- APGAR Score (5 min): _____
- NICU Admission: _____
- Indication for NICU Admission _____
- condition on discharge: _____

ANNEXURE – II

MASTER CHART

S.no	Hospital ID	Age	Hospital ID	Gravida	Para	Abortions	Living	Death	previous vaginal deliveries	Previous LSCS	Number of LSCS	History of other uterine surgeries	Specify surgery	Booking Status	Type of Conception	History of Placenta Previa in Previous Pregnancies	Hypertension	Diabetes	Thyroid Disorders	Other Antenatal Complications	History of Antepartum Hemorrhage	Months of amenorrhea at hemorrhage	whether presented with complains of APH	Vitals	Blood pressure
1	10091143	23	10091143	2	1	0	1	0	0	yes	1	no		registered	spontaneous	no	no	no	no	nil	yes	8	yes	Stable	Normotensive
2	10092256	38	10092256	1	0	0	0	0	0	no	0	yes	hysteroscopy	unregistered	spontaneous	no	no	no	yes	nil	no		no	Stable	Normotensive
3	10069742	23	10069742	2	1	0	1	0	1	no	0	no		unregistered	spontaneous	no	no	no	no	nil	no		yes	Stable	Normotensive
4	10065889	28	10065889	2	1	0	1	0	0	yes	1	no		unregistered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
5	10076440	30	10076440	2	0	1	0	0	0	no	0	yes	dilatation and currettage	registered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
6	10076153	42	10076153	2	1	0	1	0	0	yes	1	no		registered	Spontaneous	no	no	yes	no	nil	no		yes	Stable	Normotensive
7	10079514	37	10079514	2	1	0	1	0	0	yes	1	no		registered	Ovulation induction	no	no	no	no	nil	no		no	Stable	Normotensive
8	10080286	30	10080286	3	2	0	2	0	1	yes	1	no		unregistered	spontaneous	no	no	no	yes	nil	no		no	Stable	Normotensive
9	10082900	26	10082900	5	3	1	3	0	0	yes	3	yes	dilatation and currettage	registered	spontaenous	no	no	no	no	nil	no		no	Stable	Normotensive
10	10084314	28	10084314	3	2	0	2	0	2	no	0	no		unregistered	spontaneous	no	no	no	yes	nil	no		yes	Stable	Normotensive
11	10095654	26	10095654	4	2	1	1	1	1	yes	1	no		registered	spontaneous	no	yes	no	no	nil	no		no	Stable	Hypertensive
12	10097931	28	10097931	3	2	0	2	0	0	yes	2	no		registered	spontaneous	no	no	yes	no	nil	yes	7	yes	Stable	Normotensive
13	10054770	26	10054770	1	0	0	0	0	0	no	0	no		registered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
14	10054277	24	10054277	3	2	0	2	0	0	yes	2	no		unregistered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
15	10052170	24	10052170	2	1	0	1	0	0	yes	1	no		registered	spontaneous	no	no	no	no	nil	no		yes	Stable	Normotensive
16	10051691	26	10051691	4	1	2	1	0	0	yes	1	yes	dilatation and currettage	registered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive

S.no	Hospital ID	Age	Hospital ID	Gravida	Para	Abortions	Living	Death	previous vaginal deliveries	Previous LSCS	Number of LSCS	History of other uterine surgeries	Specify surgery	Booking Status	Type of Conception	History of Placenta Previa in Previous Pregnancies	Hypertension	Diabetes	Thyroid Disorders	Other Antenatal Complications	History of Antepartum Hemorrhage	Months of amenorrhea at hemorrhage	whether presented with complains of APH	Vitals	Blood pressure
17	10050299	25	10050299	1	0	0	0	0	0	no	0	no		unregistered	spontaneous	no	no	no	no	nil	no		yes	Stable	Normotensive
18	10044863	25	10044863	2	1	0	1	0	0	yes	1	no		unregistered	spontaneous	no	no	no	no	nil	yes	5	no	Stable	Normotensive
19	10043421	28	10043421	2	1	0	1	0	0	yes	1	no		registered	spontaneous	no	no	no	no	nil	yes	3,6	no	Stable	Normotensive
20	10040539	24	10040539	3	2	0	2	0	2	no	0	no		unregistered	spontaneous	no	no	no	no	nil	no		yes	Stable	Normotensive
21	10032530	25	10032530	1	0	0	0	0	0	no	0	no		registered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
22	10035147	38	10035147	3	1	1	1	0	0	yes	1	no		unregistered	ovulation induction	no	no	no	no	nil	no		no	Stable	Normotensive
23	10034316	23	10034316	1	0	0	0	0	0	no	0	no		registered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
24	10034235	25	10034235	1	0	0	0	0	0	no	0	no		unregistered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
25	10099819	31	10099819	3	2	0	2	0	0	yes	2	no		registered	spontaneous	no	no	no	no	nil	yes	8	no	Stable	Normotensive
26	10099249	37	10099249	4	1	2	0	1	1	no	0	no		registered	spontaneous	no	no	yes	yes	nil	no		yes	Stable	Normotensive
27	10103323	25	10103323	1	0	0	0	0	0	no	0	no		unregistered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
28	10105357	25	10105357	2	0	1	0	0	0	no	0	no		registered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
29	10112305	34	10112305	1	0	0	0	0	0	no	0	no		registered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
30	10114543	22	10114543	3	2	0	2	0	0	yes	2	no		unregistered	spontaneous	no	no	no	no	nil	no		no	Stable	Normotensive
31	10115603	26	10115603	2	0	1	0	0	0	no	0	no		registered	spontaneous	no	no	no	no	nil	no		yes	Stable	Normotensive
32	10119435	24	10119435	1	0	0	0	0	0	no	0	no		registered	spontaneous	no	no	no	no	nil	yes	5	yes	Stable	Normotensive

PR	Per abdomen	presentation	FHS	local examination	USG report s/o placenta previa	Oppenheimer Classification	Distance from IOS	Evidence of PAS on USG	MRI s/o PAS	Expectant management (yes/no)	Antenatal Corticosteroids	Mode of Delivery	Elective/Emergency Cesarean	Indication for Cesarean Section	term/preterm	Gestational Age at Delivery
Normal	relaxed	cephalic	present	Altered bleed	yes	3	reaching IOS	no		no	no	cesarean section	elective	previous-lscs	term	37+5
Normal	relaxed	cephalic	present	NAB	yes	2	19mm	no	not done	no	no	cesarean section	elective	placenta previa	term	37+5
Tachycardia	relaxed	cephalic	present	Altered bleed	yes	2	18mm	no	not done	yes	yes	cesarean section	elective	placenta previa	preterm	36+2
Normal	relaxed	cephalic	present	NAB	yes	4	covering IOS	yes	yes	no	yes	cesarean section	elective	PAS	preterm	36+3
Normal	Contractions +	cephalic	present	NAB	yes	3	reaching IOS	no	not done	no	no	cesarean section	emergency	placenta previa in labour	term	39+5
Normal	Contractions +	cephalic	present	Altered bleed	yes	2	16mm	no	not done	yes	yes	cesarean section	emergency	previous-lscs	preterm	36+6
Normal	relaxed	cephalic	present	NAB	yes	4	covering IOS	yes	yes	no	no	cesarean section	elective	PAS	term	37
Normal	relaxed	cephalic	present	NAB	yes	4	covering IOS	yes	yes	no	yes	cesarean section	elective	PAS	preterm	36+2
Normal	relaxed	cephalic	present	NAB	yes	4	covering IOS	yes	yes	no	yes	cesarean section	elective	PAS	preterm	36
Normal	relaxed	cephalic	present	Altered bleed	yes	4	partially covering internal os	no	not done	no	no	cesarean section	emergency	placenta previa	term	39
Normal	relaxed	cephalic	present	NAB	yes	2	19mm	no	not done	no	yes	cesarean section	emergency	severe oligohydramnios	preterm	29+4
Tachycardia	relaxed	cephalic	present	Active bleed +	yes	4	covering IOS	yes	yes	no	yes	cesarean section	elective	PAS	preterm	32+5
Normal	relaxed	cephalic	present	NAB	yes	4	covering IOS	no	not done	no	no	cesarean section	elective	complete placenta previa	term	37
Normal	relaxed	cephalic	present	leak +	yes	3	reaching IOS	no	not done	no	no	cesarean section	emergency	prev LSCS with PROM	term	37+5
Normal	relaxed	cephalic	present	Altered bleed	yes	2	18mm	no	not done	no	yes	cesarean section	emergency	previous-lscs	preterm	34+6
Normal	relaxed	cephalic	present	NAB	yes	2	20mm	no	not done	no	no	cesarean section	elective	previous-lscs	term	37+2

PR	Per abdomen	presentation	FHS	local examination	USG report s/o placenta previa	Oppenheimer Classification	Distance from IOS	Evidence of PAS on USG	MRI s/o PAS	Expectant management (yes/no)	Antenatal Corticosteroids	Mode of Delivery	Elective/Emergency Cesarean	Indication for Cesarean Section	term/preterm	Gestational Age at Delivery
Normal	Contractions +	cephalic	present	Altered bleed	yes	2	20mm	no	not done	yes	yes	cesarean section	emergency	placenta previa	preterm	30
Normal	relaxed	variable	present	NAB	yes	4	covering IOS	no	not done	no	no	cesarean section	emergency	complete placenta previa	term	37+3
Normal	relaxed	cephalic	present	NAB	yes	2	16mm	yes	yes	no	yes	cesarean section	elective	PAS	preterm	36
Normal	relaxed	cephalic	present	Altered bleed	yes	4	covering IOS	no	not done	yes	yes	cesarean section	emergency	complete placenta previa with APH	preterm	33+4
Normal	Contractions +	cephalic	present	NAB	yes	2	18mm	no	not done	no	yes	cesarean section	emergency	placenta previa in labor	term	38 +3
Normal	relaxed	cephalic	present	NAB	yes	2	16mm	no	not done	no	no	cesarean section	elective	previous-lscs with placenta previa	term	37+1
Normal	relaxed	cephalic	present	NAB	yes	3	7mm	no	not done	no	no	cesarean section	elective	placenta previa	term	37+3
Normal	relaxed	cephalic	present	NAB	yes	4	partially covering internal os	no	not done	no	no	cesarean section	elective	placenta previa	term	37+1
Normal	relaxed	breech	present	NAB	yes	4	covering IOS	yes	yes	no	yes	cesarean section	elective	PAS	preterm	34+3
Normal	relaxed	cephalic	present	Altered bleed	yes	4	covering IOS	no	not done	yes	yes	cesarean section	emergency	complete placenta previa with APH	preterm	35+5
Normal	relaxed	cephalic	present	NAB	yes	4	partially covering internal os	no	not done	yes	yes	cesarean section	elective	placenta previa	term	37
Normal	Contractions +	cephalic	present	leak +	yes	2	20mm	no	not done	yes	yes	cesarean section	emergency	PPROM	preterm	35+3
Normal	relaxed	cephalic	present	NAB	yes	4	covering IOS	no	not done	no	no	cesarean section	elective	complete placenta previa	term	37+1
Tachycardia	scar tenderness +	cephalic	present	NAB	yes	2	12mm	no	not done	yes	yes	cesarean section	emergency	previous 2 lscs with scar tenderness	preterm	34+3
Normal	relaxed	cephalic	present	Altered bleed	yes	2	15mm	no	not done	yes	yes	cesarean section	elective	placenta previa	preterm	35+2
Normal	relaxed	cephalic	present	Altered bleed	yes	2	16mm	no	not done	yes	yes	cesarean section	emergency	placenta previa in labour	preterm	36+2

Use of Additional Oxytocics	internal iliac artery ligation	uterine artery ligation	Additional Hemostatic Sutures	Pre-op HB	pre op anemia correction	Method of anaemia correction	Post-op HB	Estimated Blood Loss (ml)	Blood transfusion required post operatively	PCV	RDP	FFP	SDP	Massive transfusion required	Need for ICU Admission	Need for Hysterectomy	additional intra op findings	additional complications	need for higher antibiotics	Sepsis	Duration of Hospital Stay	HPR report	Birth Weight (kilograms)	APGAR Score (1 min)	APGAR Score (5 min)	NICU Admission	Indication for NICU Admission	condition on discharge
no	no	no	no	10.1	no	N/A	11.6	420	no	0	0	0	0	no	no	no	nil	nil	no	no	8		2.4	8	9	no		
no	no	yes	no	11.9	yes	FCM	not done	340	no	0	0	0	0	no	no	no	cesarean myomectomy done	nil	no	no	6		2.8	7	9	no		
no	no	yes	no	9.3	yes	1 PCV	10.1	450	no	0	0	0	0	no	no	no	nil	nil	no	no	28		2.6	7	9	no		
no	yes	no	no	9.1	yes	1 PCV	8.9	2200	yes	4	4	2	0	yes	yes	yes	nil	nil	yes	no	15	placenta accreta	2.4	8	9	no		
yes	no	no	no	14.3	no		11.2	1200	yes	1	0	0	0	no	no	no	nil	nil	no	no	6		2.9	7	8	no		
no	no	no	no	12.2	no		10.8	410	no	0	0	0	0	no	no	no	nil	nil	no	no	13		2.7	7	8	no		
no	yes	no	no	12.1	no		9.9	1040	yes	2	2	2	0	no	no	yes	nil	nil	yes	no	9	placenta increta	2.6	8	9	no		
no	no	yes	yes(B-lynch)	11.7	yes	FCM		600	no	0	0	0	0	no	no	no	nil	nil	no	no	4		2.8	7	9	no		
no	yes	no	no	10.3	yes	FCM	7.4	2300	yes	4	0	4	0	yes	yes	yes	nil	peripartum cardiomyopathy	yes	no	6	placenta accreta	2.6	7	9	no		
yes	no	yes	yes(Mahesh Gupta)	10.4	no		9.9	1000	yes	1	0	0	0	no	no	no	nil	nil	no	no	4		2.9	7	9	no		
no	no	no	no	12.4	no			420	no	0	0	0	0	no	no	no	nil	nil	no	no	6		1.2	6	7	yes	preterm with RDS	active and healthy
yes	yes	no	no	7.7	yes	PCV	8.9	1400	yes	4	2	2	0	yes	no	yes	nil	nil	yes	no	13	placenta accreta	1.7	6	6	yes	preterm with RDS	active and healthy
yes	no	yes	yes (isthemic)	10.9	no		9.7	680	no	0	0	0	0	no	no	no	nil	nil	no	no	7		2.8	7	8	yes	RDS	active and healthy
no	no	no	no	11	no		10.7	400	no	0	0	0	0	no	no	no	nil	nil	no	no	5		2.2	7	9	no		
no	no	no	no	12.8	no		11	450	no	0	0	0	0	no	no	no	nil	nil	no	no	6		2.2	7	7	yes	preterm with RDS	active and healthy
no	no	no	no	10.8	no		10.2	380	no	0	0	0	0	no	no	no	nil	nil	no	no	4		2.9	7	8	no		

Use of Additional Oxytocics	internal iliac artery ligation	uterine artery ligation	Additional Hemostatic Sutures	Pre-op HB	pre op anemia correction	Method of anaemia correction	Post-op HB	Estimated Blood Loss (ml)	Blood transfusion required post operatively	PCV	RDP	FFP	SDP	Massive transfusion required	Need for ICU Admission	Need for Hysterectomy	additional intra op findings	additional complications	need for higher antibiotics	Sepsis	Duration of Hospital Stay	HPR report	Birth Weight (kilograms)	APGAR Score (1 min)	APGAR Score (5 min)	NICU Admission	Indication for NICU Admission	condition on discharge
no	no	no	no	11.2	no		11.7	300	no	0	0	0	0	no	no	no	nil	nil	no	no	12		1.3	6	7	yes	preterm with RDS	active and healthy
yes	no	yes	no	12.7	no		11	820	yes	1	0	0	0	no	no	no	nil	surgical site infection with complete wound gape	yes	no	19		2.6	7	9	no		
yes	yes	no	no	13	no		7.2	1210	yes	5	4	4	0	yes	no	yes	bladder repair	nil	yes	no	18	placenta percreta	2.1	7	8	yes	preterm with RDS	active and healthy
no	no	no	no	11.5	no		12.4	550	yes	1	0	0	0	no	no	no	nil	nil	no	no	14		1.6	6	7	yes	preterm with RDS	active and healthy
yes	no	no	no	11.5	no		9	440	no	0	0	0	0	no	no	no	nil	nil	no	no	19		2.7	7	9	no		
no	no	no	no	9.5	yes	PCV		440	no	0	0	0	0	no	no	no	cesarean myomectomy done	nil	no	no	4		2.7	7	8	no		
no	no	no	no	10.5	no		10.2	750	yes	1	0	0	0	no	no	no	nil	nil	no	no	9		2.8	8	9	no		
no	no	no	no	11.9	no			300	no	0	0	0	0	no	no	no	cesarean myomectomy done	nil	no	no	5		2.4	8	9	no		
no	yes	no	no	11.6	no		7.5	2840	yes	6	4	6	0	yes	no	yes	nil	nil	yes	no	7	placenta increta	2.6	7	8	no		
yes	no	yes	no	11.5	no		12	370	no	0	0	0	0	no	no	no	nil	nil	no	no	30		2.5	7	8	no		
yes	no	yes	yes (isthemic)	11.8	no		11.6	970	yes	1	0	0	0	no	no	no	nil	nil	no	no	13		2.8	8	9	no		
no	no	no	no	13.2	no		11.4	350	no	0	0	0	0	no	no	no	nil	nil	no	no	6		2.6	7	8	no		
yes	no	no	no	12.1	no		10.5	480	no	0	0	0	0	no	no	no	nil	surgical site infection	yes	no	18		2.6	7	9	no		
no	no	no	no	13.4	no		10.6	620	no	0	0	0	0	no	no	no	nil	nil	no	no	6		2	7	7	yes	preterm with RDS	active and healthy
yes	no	no	no	10.4	no		9.8	550	no	0	0	0	0	no	no	no	nil	nil	no	no	15		2.7	8	9	no		
yes	no	no	yes(transverse B-Lynh)	9.5	yes	PCV	9.3	350	no	0	0	0	0	no	no	no	nil	surgical site infection with complete wound gape	yes	no	27		2.5	8	9	no		