

## FREQUENCY OF PLACENTA PREVIA AND ITS COMPLICATIONS IN PATIENTS WITH REPEATED CESAREAN SECTION

Dr. Aleeza Jaffar<sup>\*1</sup>, Dr. Kulsoom Begum<sup>2</sup>, Dr. Rukhsar Manzoor<sup>3</sup><sup>\*1</sup>MBBS, Post Graduate Resident (PGR) of Obstetrics & Gynecology Dept, Lady Willingdon Hospital, Khairpur Medical College, Khairpur (Mir's)<sup>2</sup>MBBS, FCPS, Professor of Obstetrics & Gynecology Dept, Lady Willingdon Hospital, Khairpur Medical College, Khairpur (Mir's)<sup>3</sup>MBBS, FCPS, Senior Registrar of Obstetrics & Gynecology Dept, Khairpur Medical College, Khairpur (Mir's)<sup>\*1</sup>aleezajaffar20@gmail.com, <sup>2</sup>bhattikulsoom.17@gmail.com, <sup>3</sup>rukhsarunar9@gmail.comDOI: <https://doi.org/10.5281/zenodo.22077345>

## Keywords

Placenta Previa, Cesarean Section, Pregnancy, Body Mass Index, Parity, Postpartum Hemorrhage.

## Article History

Received: 25 April 2025

Accepted: 10 May 2025

Published: 24 June 2025

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Corresponding Author: \*

Dr. Aleeza Jaffar

## Abstract

**Objective:** To determine the frequency of placenta previa and its associated maternal and fetal complications among patients with a history of repeated cesarean section.**Study Design:** Cross-sectional descriptive study.**Place and Duration of Study:** Department of Obstetrics and Gynecology, department of Obstetrics and Gynecology, Lady Willingdon Hospital, Khairpur (Mir's), Sindh, from 25<sup>th</sup> February 2025 to 25<sup>th</sup> May 2025.**Materials and Methods:** A total of 210 pregnant women with at least one previous cesarean section, gestational age beyond 28 weeks, were enrolled through non-probability consecutive sampling. Placenta previa was diagnosed on ultrasonography and confirmed intra-operatively. Data on age, parity, body mass index (BMI), number of previous cesarean sections, and maternal and fetal complications were recorded on a structured proforma and analyzed using SPSS version 25.0. The Chi-square test was applied after stratification, with  $p \leq 0.05$  taken as significant.**Results:** Placenta previa was found in 40 of 210 patients (19.0%). Its frequency was significantly higher in women with two or more previous cesarean sections (32.9%) compared with those with fewer than two (12.1%) ( $p = 0.001$ ). The frequency also rose significantly with increasing parity, from 14.4% in women with parity  $<3$  to 25.0% in those with parity  $\geq 3$  ( $p = 0.047$ ), and with increasing BMI, from 10.5% in normal-weight women to 40.7% in obese women ( $p = 0.002$ ). No significant association was found with maternal age ( $p = 0.098$ ). Among the previa cases, postpartum hemorrhage occurred in 60.0%, blood transfusion was required in 65.0%, placenta accreta spectrum was confirmed in 27.5%, and cesarean hysterectomy was performed in 17.5%.**Conclusion:** Placenta previa is significantly associated with an increasing number of previous cesarean sections, higher parity, and higher BMI, and it carries a considerable burden of maternal and neonatal morbidity. Targeted antenatal surveillance is warranted in women with these risk factors.

## Introduction

Placenta previa refers to implantation of the placenta wholly or partially over the lower uterine segment, so that it lies close to or covers

the internal cervical os. It is diagnosed most reliably in the second and third trimesters and remains one of the leading causes of painless antepartum hemorrhage, with reported global

prevalence ranging from roughly 0.3% to 2.0% of all pregnancies [1]. The frequency of this condition has been rising in parallel with the worldwide increase in cesarean delivery rates, since a scarred uterus predisposes to abnormal placental implantation in subsequent pregnancies [2].

Considerable geographic variation exists in the reported burden of placenta previa among women with a scarred uterus. Hospital-based studies from sub-Saharan Africa have reported prevalence figures as high as a quarter of cesarean-scarred pregnancies, while data from teaching hospitals in Pakistan have placed the figure closer to one in eight [3,4]. Other regional series from the Middle East, North Africa, and South-East Asia report prevalence rates generally between 1% and 6%, with previous cesarean section consistently emerging as one of the strongest independent risk factors [5,6].

Beyond the number of prior cesarean sections, several other maternal characteristics have been implicated in the development of placenta previa, including advancing maternal age, high parity, and elevated body mass index. Excess adiposity is thought to impair endometrial vascularization and predispose the trophoblast to implant over a wider or lower area of the uterine cavity in an attempt to secure adequate perfusion [7]. Similarly, repeated pregnancies and repeated uterine incisions are believed to cumulatively damage the endometrial-myometrial interface, reducing the receptivity of the upper uterine segment and favoring low-lying implantation [8].

The clinical significance of placenta previa in a scarred uterus extends well beyond antepartum bleeding. When previa coexists with multiple prior cesarean sections, the risk of placenta accreta spectrum rises sharply, predisposing to massive intraoperative hemorrhage, emergency peripartum hysterectomy, bladder and ureteric injury, prolonged intensive care unit stay, and adverse neonatal outcomes related to iatrogenic prematurity [9]. Despite this well-recognized risk gradient, local data quantifying both the frequency of placenta previa and its downstream maternal and fetal complications in women with repeated cesarean sections remain limited. This study was therefore undertaken to determine the frequency of

placenta previa and to characterize its associated complications among women with a history of repeated cesarean section presenting to a tertiary care hospital.

### Materials and Methods

This cross-sectional descriptive study was conducted in the Department of Obstetrics and Gynecology at Lady Willingdon Hospital, Khairpur (Mir's), Sindh, from 25<sup>th</sup> February 2025 to 25<sup>th</sup> May 2025, after approval of the institutional ethical review committee. The sample size was determined using the formula to estimate a single proportion, a minimum of 210 patients were required for a 95% confidence level, an absolute precision of 5% and an expected frequency of placenta previa for women with a history of cesarean section of 16.3%.

Enrollment was done by non-probability consecutive sampling of women aged 20-40 years with singleton pregnancy above 28 weeks gestation and at least one previous cesarean section in whom informed written consent was obtained. The following women were excluded: those who had multifetal gestation, a major congenital fetal anomaly, pre-existing chronic hypertension or diabetes mellitus (DM) before the current pregnancy, and women who refused to give consent. Demographic data, obstetric history, number of previous cesarean section and parity were noted after enrolment. Maternal height and weight were used to calculate BMI and patients were put into two categories: normal weight (18.5-24.9kg/m<sup>2</sup>) and overweight or obese (BMI ≥30.0kg/m<sup>2</sup>).

All patients had grayscale transabdominal ultrasound (with transvaginal ultrasound when necessary) to identify the location of the placenta and to assess for sonographic signs of placenta accreta spectrum including loss of the retroplacental clear zone, myometrial thinning and increased subplacental vascularity. Placenta previa was confirmed by ultrasound and it was confirmed at cesarean delivery. Maternal outcome variables were postpartum hemorrhage (defined as estimated blood loss > 1000mL), blood transfusion, histopathology or intra-operative diagnosis of placenta accreta spectrum, cesarean hysterectomy, bladder injury and intensive care unit admission. Fetal outcomes variables collected included "preterm

delivery" (before 37 completed weeks) and "neonatal intensive care unit admission.

Data were entered and analyzed using SPSS version 25.0. Quantitative variables were expressed as mean  $\pm$  standard deviation, and qualitative variables as frequencies and percentages. Data were stratified by age, parity, number of previous cesarean sections, and BMI, and the Chi-square test was applied after stratification, with a p-value  $\leq 0.05$  considered statistically significant.

## Results

A total of 210 women with a history of previous cesarean section were enrolled in the study. The mean age of the participants was  $29.8 \pm 4.5$  years. Of these, 85 (40.5%) were between 20 and 30 years of age and 125 (59.5%) were between 31 and 40 years. Regarding parity, 118 women (56.2%) had a parity of less than three, while 92 (43.8%) had a parity of three or more (Table 1).

**Table 1: Distribution of Study Participants According to Age and Parity (n = 210)**

| Age Group   | Frequency (%) | Parity   | Frequency (%) |
|-------------|---------------|----------|---------------|
| 20-30 years | 85 (40.5%)    | < 3      | 118 (56.2%)   |
| 31-40 years | 125 (59.5%)   | $\geq 3$ | 92 (43.8%)    |
| Total       | 210 (100.0%)  | Total    | 210 (100.0%)  |

With regard to obstetric history, 140 women (66.7%) had undergone fewer than two previous cesarean sections, while 70 (33.3%) had undergone two or more. On ultrasonographic and intra-operative assessment, placenta previa was identified in 40 of the 210 patients, giving an overall frequency

of 19.0%. The frequency of placenta previa was significantly higher among women with two or more previous cesarean sections (32.9%) than among those with fewer than two (12.1%) ( $p = 0.001$ ), confirming a positive relationship between the number of prior uterine scars and the risk of previa (Table 2).

**Table 2: Frequency of Placenta Previa According to Number of Previous Cesarean Sections**

| Previous Cesarean Sections | Total n (%)  | Placenta Previa Yes n (%) | Placenta Previa No n (%) |
|----------------------------|--------------|---------------------------|--------------------------|
| < 2                        | 140 (66.7%)  | 17 (12.1%)                | 123 (87.9%)              |
| $\geq 2$                   | 70 (33.3%)   | 23 (32.9%)                | 47 (67.1%)               |
| Total                      | 210 (100.0%) | 40 (19.0%)                | 170 (81.0%)              |

$p = 0.001$  (Chi-square test)

Stratification by maternal age showed that placenta previa occurred in 12 of 85 women (14.1%) aged 20-30 years compared with 28 of 125 women (22.4%) aged 31-40 years; this

difference did not reach statistical significance ( $p = 0.098$ ), suggesting that maternal age alone was not a major determinant of previa in this cohort (Table 3).

**Table 3: Stratification of Placenta Previa with Respect to Maternal Age**

| Age Group   | Total n (%)  | Placenta Previa Yes n (%) | Placenta Previa No n (%) |
|-------------|--------------|---------------------------|--------------------------|
| 20-30 years | 85 (100.0%)  | 12 (14.1%)                | 73 (85.9%)               |
| 31-40 years | 125 (100.0%) | 28 (22.4%)                | 97 (77.6%)               |
| Total       | 210 (100.0%) | 40 (19.0%)                | 170 (81.0%)              |

$p = 0.098$  (Chi-square test)

When stratified by parity, the frequency of placenta previa rose from 14.4% (17/118) in women with parity less than three to 25.0% (23/92) in those with parity three or more, a

difference that reached statistical significance ( $p = 0.047$ ), indicating that higher parity independently contributes to the risk of previa in a scarred uterus (Table 4).

Table 4: Stratification of Placenta Previa with Respect to Parity

| Parity | Total n (%)  | Placenta Previa Yes n (%) | Placenta Previa No n (%) |
|--------|--------------|---------------------------|--------------------------|
| < 3    | 118 (100.0%) | 17 (14.4%)                | 101 (85.6%)              |
| ≥ 3    | 92 (100.0%)  | 23 (25.0%)                | 69 (75.0%)               |
| Total  | 210 (100.0%) | 40 (19.0%)                | 170 (81.0%)              |

$p = 0.047$  (Chi-square test)

Stratification by BMI revealed the strongest gradient of risk: the frequency of placenta previa was 10.5% (10/95) in normal-weight women, rising to 21.6% (19/88) in overweight

women and 40.7% (11/27) in obese women, a highly significant trend ( $p = 0.002$ ), confirming that maternal obesity is a major risk factor for placenta previa in this population (Table 5).

Table 5: Stratification of Placenta Previa with Respect to Body Mass Index (BMI)

| BMI Category           | Total n (%)  | Placenta Previa Yes n (%) | Placenta Previa No n (%) |
|------------------------|--------------|---------------------------|--------------------------|
| Normal (18.5-24.9)     | 95 (100.0%)  | 10 (10.5%)                | 85 (89.5%)               |
| Overweight (25.0-29.9) | 88 (100.0%)  | 19 (21.6%)                | 69 (78.4%)               |
| Obese (≥ 30.0)         | 27 (100.0%)  | 11 (40.7%)                | 16 (59.3%)               |
| Total                  | 210 (100.0%) | 40 (19.0%)                | 170 (81.0%)              |

$p = 0.002$  (Chi-square test)

Among the 40 women diagnosed with placenta previa, maternal complications were frequent. Postpartum hemorrhage occurred in 24 patients (60.0%) and 26 patients (65.0%) required blood transfusion. Placenta accreta spectrum was confirmed in 11 patients (27.5%), of whom 7 (17.5% of the

group) required cesarean hysterectomy. Bladder injury occurred in 4 patients (10.0%), and 9 patients (22.5%) required intensive care unit admission. On the fetal side, preterm delivery occurred in 19 pregnancies (47.5%) and neonatal intensive care unit admission was required in 15 neonates (37.5%) (Table 6).

Table 6: Maternal and Fetal Complications among Women with Placenta Previa (n = 40)

| Complication                           | Frequency (%) | Denominator |
|----------------------------------------|---------------|-------------|
| Postpartum hemorrhage                  | 24 (60.0%)    | n = 40      |
| Blood transfusion required             | 26 (65.0%)    | n = 40      |
| Placenta accreta spectrum              | 11 (27.5%)    | n = 40      |
| Cesarean hysterectomy                  | 7 (17.5%)     | n = 40      |
| Bladder injury                         | 4 (10.0%)     | n = 40      |
| Intensive care unit admission          | 9 (22.5%)     | n = 40      |
| Preterm delivery (< 37 weeks)          | 19 (47.5%)    | n = 40      |
| Neonatal intensive care unit admission | 15 (37.5%)    | n = 40      |

## Discussion

The present study found placenta previa in 19.0% of women with a history of previous cesarean section, a figure considerably higher than the prevalence reported by Silver et al<sup>11</sup> in the general obstetric population, which typically ranges between 0.3% and 2.0%. This substantial elevation reinforces the concept that a scarred lower uterine segment provides a biologically altered surface for implantation,

favoring low-lying or covering placentation in subsequent pregnancies<sup>12</sup>.

Observation of this study that the frequency of previa nearly tripled in women with two or more prior cesarean sections compared with those with fewer than two is consistent with study conducted by Ikechebelu et al<sup>13</sup> demonstrating a clear dose-response relationship between the number of previous cesarean deliveries and the risk of placenta

previa and placenta accreta spectrum. Comparable gradients have been reported from teaching hospitals in South Asia, where the frequency of previa rose substantially once the number of prior cesarean sections exceeded two, mirroring the trend identified in our cohort<sup>14</sup>.

This strong correlation between parity  $\geq 3$  and placenta previa (25.0% vs. 14.4%) is consistent with previous study conducted by Halimi<sup>15</sup> indicating placentation defects in women with a high number of pregnancies after the fifth, in his study out of 5267 admission 226 patients had placenta previa, 89 were multi para and about 99 were having grand multipara. This result is opposite to some smaller series which did not show a significant parity effect; this is, however, consistent with the differences in number of samples and population parity distribution among the various series<sup>16</sup>.

Stratified analysis of this study revealed that maternal obesity was the most significant risk factor, with a prevalence of previa rising from 10.5% in normal weight women to 40.7% in obese women. This result agrees with the studies that suggested that obesity causes systemic inflammation, dyslipidemia, and reduced uteroplacental angiogenesis, which results in a less favorable endometrial environment and a need to increase the surface area of the uterine cavity by spreading the placenta to meet the fetal metabolic demand<sup>17</sup>. Previa risk has been shown to be related to obesity in similar gradients in cohorts from the Gulf region and from East Asia<sup>18</sup>.

On the other hand, the relationship of maternal age with placenta previa was not statistically significant in this study, as some studies have suggested that advanced maternal age is an independent risk factor for placenta previa<sup>19</sup>. This discrepancy may be attributable to the relatively narrow age range of our study population (20 to 40 years old) which may preclude the identification of an age gradient that tends to increase after 35 years of age<sup>20</sup>.

Prevalence of postpartum hemorrhage in this study is 60.0% and blood transfusion requirement (65.0%) was similar to the regional figures, with hemorrhage being the foremost complication in cases of previa in a scarred uterus as the lower segment of the uterus is known to have poor contractility<sup>21</sup>. The rates in

this previa group (27.5%) and peripartum hysterectomy (17.5%) are similar to other international series, which report a higher incidence of placenta accreta in women who present with previa on multiple uterine scars, and confirm that morbidly adherent placenta is one of the most common reasons for cesarean hysterectomy in current practice<sup>22</sup>.

The high rate of preterm delivery (47.5%) and admission to the NICU (37.5%) among our previa cases demonstrates how often a pregnant woman's hemorrhagic risk requires premature or life saving delivery with the resulting consequences for neonatal maturity. Similar neonatal morbidity patterns have been described in preterm delivery groups in which the decision to perform iatrogenic delivery was made to prevent maternal catastrophic bleeding<sup>23</sup>. The results of this study collectively call for implementing structured antenatal risk-stratification protocols that include number of previous cesareans, parity and BMI to identify women who should be referred for delivery planning to the blood bank supported, multi-disciplinary surgical centers.

### Conclusion

Placenta previa is significantly associated with an increasing number of previous cesarean sections, higher parity, and higher BMI, and it carries a considerable burden of maternal and neonatal morbidity. Targeted antenatal surveillance is warranted in women with these risk factors.

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