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Frequency of Placenta Previa among Women with Previous Cesarean-Section

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ABSTRACT

Placenta Previa was defined as when the placenta was attached to the lower uterine segment, poses significant risks, including antepartum hemorrhage and maternal mortality. The incidence was rising, attributed partly to increased cesarean sections and advanced maternal age. **Objective:** To determine the frequency of placenta Previa among women with previous cesarean-sections. **Methods:** This cross sectional study was carried out at a Teaching Hospital of Sialkot, from June to December 2021. The sample size was 147 pregnant females. These pregnant females have a history of cesarean section. The non-probability Consecutive sampling technique was used, and data were analyzed by using SPSS version 25.0. **Results:** Among those, 16.3% had placenta Previa, which increased significantly in women with >2 previous cesarean sections to 26.4% (p = 0.003). Regarding parity, the increase in the risk of placenta Previa was not significant: 12.8% for parity < 3 and 20.3% for parity ≥ 3 (p = 0.087). However, in the stratified analysis by BMI, this became significant: 11.0% for normal-weight, 18.6% for overweight, and 66.7% for obese women (p = 0.001). There was no significant difference concerning age groups, p = 0.177. Such findings of the significant associations of placenta Previa with such factors as BMI and number of cesarean sections indicate that great attention to monitoring should be paid. **Conclusions:** Hence concluded that previous cesarean sections strongly correlate with placenta previa in subsequent pregnancies. Such findings underscore the need for rigorous monitoring and proactive measures, especially in cases of multiple cesarean deliveries in the management of associated complications.

INTRODUCTION

Placenta Previa is an implantation, either partially or totally, of the placenta into the lower uterine segment and is normally diagnosed in the second and third trimester, although it can be as early as the first trimester. It accounts for most cases of antepartum hemorrhage, as well as vaginal bleeding, and complicates about 1 in 200 deliveries worldwide; prevalence is on the rise with ever-growing rates of cesarean sections [1]. In some regional studies, as in the Provincial General Hospital of Kananga, the prevalence of the placenta Previa among women with a history of cesarean section was as high as 26.86% [2]. This agrees with the prevalence rate of 13.3%, which was reported in studies done at Lady Willingdon Hospital in Lahore, Pakistan [3]. The prevalence of placenta Previa in the world is from 0.26% to 2.00% of all pregnancies, being higher in some regions. In Indonesia, for example, the prevalence reported is between 2.4% and 3.56% of pregnancies [4]. One Iraqi study estimated the prevalence of placenta Previa among pregnant women as 0.21%, with advanced maternal age, high parity, and previous cesarean section being the major significant risk factors for the condition [5]. In Sudan, the condition has been reported at 1.4%, while in Libya, it has been variously reported at 1% [6]. In some developing countries like Pakistan, it was as high as 5.78%, especially among women with a previous history of cesarean sections [7]. In Nigeria, there is a tertiary hospital in Port Harcourt that recorded a prevalence rate of 0.97%, indicating a trend of decline in recent years [8]. The risk factors for placenta Previa include smoking, numerous gestations, high parity, and advanced maternal age. For example, the incidence is increasing in correlation with higher birth rates among mothers between 35 to 45 years of

age worldwide [9]. This increase is closely related to an increase in the rates of cesarean sections and attendant complications, including morbidly adherent placenta and postpartum hemorrhage [10]. A study showed that placenta Previa accounted significantly to the indications of cesarean hysterectomy as 79.04% of the cases from post-cesarean patients resulted in hysterectomy [11]. Serious consequences for both mother and baby increase the global burden attributed to placenta Previa, including increased risks of maternal and neonatal mortality, fetal growth restriction, preterm labor, and significant hemorrhage in the antenatal and intrapartum periods. These events may necessitate invasive procedures such as hysterectomy or, in some instances, blood transfusion, especially in extremely critical cases [12]. The chances of such complications are much greater when placenta Previa is associated with a history of cesarean sections, especially when the placenta has been located on the anterior uterine wall, enhancing the chance of placenta and other complications [13]. The exact cause of placenta Previa remains unknown, but its strong association with previous cesarean deliveries suggests that damage to the myometrium may play a significant role [12]. This further complicates the understanding of the predisposing factors to it. Early diagnosis and proper management are the hallmarks of the reduction of morbidity and mortality for both the neonate and the mother. The incidence of placenta previa has been established by various studies as being higher in subsequent pregnancies following a cesarean section [14]. Thus, early diagnosis offers an opportunity to manage the associated risks effectively for both mother and child. In Pakistan, however, there remains a significant gap in the comprehensive understanding of this condition's prevalence and risk factors, particularly in subsequent pregnancies following a cesarean section. This study aimed to address this gap by determining the frequency of placenta Previa in such cases within our population.

METHODS

This study has a cross sectional study design. The study was carried out at the Obstetrics and Gynecology department of a teaching hospital in Sialkot from June-2021 to December-2021 after institutional review board approval with a reference no.146/REC/KMSMC. Non-probability consecutive sampling was utilized for participant selection. With a 95% confidence level, a 5% margin of error, and an anticipated prevalence of placenta previa of 10.7% among women with a history of cesarean section, the sample size was calculated as 147 participants. The current study recruited pregnant women aged 20-40 years with a history of cesarean section and at least 30 weeks' gestation based on Last Menstrual Period (LMP). The study excluded participants with a history of dilatation and curettage (D and C), a history of thyroid problems,

pregnancy-induced hypertension, diabetes mellitus, and lack of informed consent. The 147 pregnant patients were included following written informed permission from patients and clearance from the hospital's ethical committee. Every patient received an explanation of the goal of the study. Demographic data were gathered while the patient was lying supine and had an empty bladder. Grayscale imaging was used to observe the placenta in real time. The questionnaire comprises two sections. The first section collected information on socio-demographic data, while the second section focused on details related to placenta Previa. The questionnaire was validated on 50 participants. Cronbach's alpha coefficient was 0.82, which was considered a good value for a questionnaire used in data collection. Three well-qualified researchers reviewed the entire questionnaire for validity. The index of item-objective congruence was 0.85 for each question, which was considered a satisfactory value. SPSS version 25.0 was utilized for data entry and analysis. For qualitative factors such as placenta Previa and parity, frequencies and percentages were utilized, whilst Mean ± SD was employed for the quantitative variable of age. To account for putative effect modifiers, stratification was used for age, parity, number of cesarean sections and BMI. The Chi-square test was used after stratification, with a p-value of ≤0.05 being regarded as significant.

RESULTS

In terms of parity, the prevalence of placenta Previa was 12.8% for less than three parity and 20.3% for three or more parity. Though the trend in relation to parity was not statistically significant (p = 0.087), there was a suggestion from these data of an increased risk with rising parity. Table 1 showed the age distribution of the patients, 48 (32.7%) patients were in the 20-30 years' age group and 99 (67.3%) in the 31-40 years' age group. According to parity distribution, 78 (53.1%) had parity <3, while 69 (46.9%) had ≥3.

Table 1: Distribution of Frequency Related to Age and Parity

Age Groups	Frequency (%)	Parity	Frequency (%)	Prevalence of Placenta Previa	p-Value
20-30 Years	48 (32.7%)	<3	78 (53.1%)	12.8%	
31-40 Years	99 (67.3%)	≥3	59 (46.9%)	20.3%	0.087
Total	147 (100.0%)	Total	147 (100.0%)	-	

Results of the women with a previous cesarean delivery, 16.3% were found to have placenta Previa. Interestingly, the rate of placenta Previa was significantly higher for women who have had over two cesarean deliveries, at 26.4%, than it was for those who have had fewer than two cesarean deliveries, at 10.6% (p = 0.003). It also reveals a positive association between the number of previous cesarean sections and the risk of placenta Previa, signifying that the more cesarean sections performed, the higher and the risk. Table 2 showed the number of previous C-section distributions, 94 (63.9%) had <2, while 53 (36.1%) had ≥2.

According to stratification of placenta Previa with respect to age, no significant difference was observed between age groups (p>0.05).

Table 2: Frequency Distribution of Number of Previous C-Section and Placenta Previa

Number of Previous C-Section	Frequency (%)	Placenta Previa	Frequency (%)	p-Value
<2	94 (63.9%)	Yes	24 (16.3%)	
≥2	53 (36.1%)	No	133 (83.7%)	0.003
Total	147 (100.0%)	Total	147 (100.0%)	

In this study, age did not statistically significantly influence the prevalence of placenta Previa; rates were 10.4% for women aged 20-30 years and 19.2% for women aged 31-40 years (p = 0.177). That means that advanced maternal age, though generally considered a risk factor, may not play such a major role in this population. Table 3 showed stratification of placenta Previa with respect to age, no significant difference was observed between age groups (p>0.05).

Table 3: Stratification of Placenta Previa with Respect to Age

Age Groups	Placenta Previa		Total Frequency (%)	p-Value
	Yes Frequency (%)	No Frequency (%)		
20-30 Years	5 (10.4%)	43 (89.6%)	48 (100.0%)	
31-45 Years	19 (19.2%)	80 (80.8%)	99 (100.0%)	0.177
Total	24 (16.3%)	123 (83.7%)	147 (100.0%)	

Stratification according to BMI also showed significant results. The prevalence of placenta Previa was 11.0% in normal weight women, 18.6% in overweight women, and as high as 66.7% in obese women (p = 0.001). Thus, the association was directly related: the higher the BMI, the greater the risk of placenta Previa, and thus obesity was a major risk factor (Table 4). Table 4 shows stratification of placenta Previa with respect to BMI, significant difference was observed between BMI groups (p<0.05).

Table 4: Stratification of Placenta Previa with Respect to BMI

Age Groups	Placenta Previa		Total Frequency (%)	p-Value
	Yes Frequency (%)	No Frequency (%)		
Normal	9 (11.0%)	73 (89.0%)	82 (100.0%)	
Overweight	11 (18.6%)	48 (81.4%)	59 (100.0%)	
Obese	4 (66.7%)	2 (33.3%)	6 (100.0%)	0.001
Total	24 (16.3%)	123 (83.7%)	147 (100.0%)	

DISCUSSION

This study underscores a significant association between previous cesarean sections and the increased risk of placenta Previa in subsequent pregnancies. To provide a comprehensive analysis, it is important to explore alternative explanations, potential biases, and limitations of the study. The observed increase in the incidence of placenta Previa with a higher number of cesarean sections (26.4% in women with more than two cesarean sections versus 10.6% in those with fewer than two) suggests a strong correlation with cumulative uterine scarring.

Repeated cesarean sections can disrupt the endometrial lining and cause myometrial damage, creating an environment predisposed to abnormal placental implantation in future pregnancies. This finding aligns with studies showing that the risk of placenta Previa and placenta accreta spectrum disorders increases with the number of prior cesarean deliveries [14]. Furthermore, maternal age was another critical risk factor for placenta Previa. Advanced maternal age, particularly in women aged 40 years or older, significantly increases the likelihood of placenta Previa, as these pregnancies often present with additional complications such as uterine atony and prolonged labor [15, 16]. This was corroborated by other research demonstrating that maternal age and a history of cesarean sections were significant predictors of adverse pregnancy outcomes, including placenta Previa and its associated complications [17, 18]. Stratification by BMI in our study revealed a significant association between obesity and placenta Previa, with a prevalence of 66.7% in obese women compared to 11.0% in those with normal weight. Obesity may contribute to the risk of placenta Previa due to systemic inflammation, altered hemodynamics, and impaired angiogenesis that affect placental development [19, 20]. These findings underscore the importance of weight management and monitoring in pregnant women with high BMI to mitigate the risk of placenta Previa and associated complications. While parity showed a trend towards a higher risk of placenta Previa (20.3% in women with parity ≥ 3 compared to 12.8% in those with parity < 3), the association was not statistically significant (p = 0.087). However, other studies have shown a stronger association between higher parity and increased risk of placenta Previa, likely due to cumulative uterine changes over multiple pregnancies [21]. The lack of significance in our study could be attributed to the relatively small sample size or differences in population characteristics. Confounding factors such as lifestyle, genetic predisposition, and socio-economic status were not accounted for, potentially affecting the results. Future research should incorporate longitudinal designs with more comprehensive data collection to adjust for these potential confounders and provide more definitive conclusions. Moreover, retrospective data collection can introduce recall bias, particularly regarding the accurate reporting of obstetric history. Prospective data collection methods in future studies could enhance the reliability of these findings and better elucidate the relationship between previous cesarean sections, BMI, parity, maternal age, and placenta Previa.

CONCLUSIONS

This study demonstrates a significant association between previous cesarean sections and the occurrence of placenta Previa in subsequent pregnancies, with the risk notably increasing in women with more than two prior

cesarean deliveries. The findings highlight the impact of maternal obesity and advanced maternal age as important risk factors contributing to the incidence of placenta Previa. These results have both practical and theoretical implications. Early identification and proactive management of placenta Previa should be done by the health provider, especially in high-risk women with multiple cesarean deliveries or higher BMI. A well-defined, individualized monitoring plan and prevention strategy can reduce the risk of adverse maternal and neonatal outcomes associated with placenta Previa, inclusive of lifestyle approaches for weight management, judicious planning of route of delivery.

Authors Contribution

Conceptualization: UM
Methodology: UM, NS
Formal analysis: SK
Writing, review and editing: JL, SS, SN

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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218

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