

Assessment of Risk Factors Associated with Placenta Previa in a Tertiary Health Institution in Southeast Nigeria

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Abstract:

Background: Placenta previa is a significant obstetric complication that can lead to adverse maternal and fetal outcomes. Understanding its risk factors is crucial for early diagnosis and management, particularly in healthcare settings in Nigeria.

Objective: To assess the risk factors associated with placenta previa among pregnant women in a tertiary health institution in Southeast Nigeria.

Materials and Methods: This prospective descriptive study was conducted over two years (January 2021 to December 2022) and included all pregnant women who delivered in the institution during this period. Data were collected using a structured, interviewer-administered questionnaire after obtaining informed consent from participants. Placenta previa was identified through abdominal ultrasonography, and all confirmed cases were managed according to the MacAfee regimen. Descriptive statistics and chi-square tests were used to analyze the data using SPSS version 26.

Results: Out of the 8,766 deliveries recorded in the hospital during the period of this study, 94 (1.07%) were diagnosed with placenta previa. Significant associations were found between placenta previa and factors such as advanced maternal age (≥ 40 years, $p=0.041$), history of complications during previous pregnancies ($p=0.039$), previous cesarean section ($p=0.009$), history of placenta previa ($p<0.001$), multiple pregnancies ($p=0.001$), bleeding during pregnancy ($p<0.001$), and uterine surgeries apart from cesarean sections ($p=0.001$). Smoking history was also a significant risk factor ($p<0.001$).

Conclusion: The study identified several risk factors for placenta previa, including advanced maternal age, previous cesarean section, history of placenta previa, multiple pregnancies, uterine surgeries, and smoking. These findings highlight the importance of targeted interventions and close monitoring of at-risk pregnant women to reduce complications.

Keywords: Placenta previa; risk factors; pregnancy complications; cesarean section; multiple pregnancies; maternal health

Introduction

Placenta previa, a significant obstetric complication, remains one of the leading causes of maternal morbidity and mortality worldwide. This condition is characterized by the placenta's abnormal implantation in the lower uterine segment, often resulting in painless vaginal bleeding in the second or third trimester of pregnancy [1]. It poses significant risks not only

to the pregnant woman but also to the fetus, necessitating urgent medical intervention and often leading to preterm delivery or cesarean section [2].

The prevalence of placenta previa varies globally, with higher rates reported in developing countries due to differences in maternal healthcare access, socioeconomic factors, and varying degrees of awareness regarding prenatal

care [3]. In Nigeria, particularly in the Southeast region, placenta previa remains a significant contributor to maternal and perinatal morbidity and mortality [4]. The region's unique demographic and cultural characteristics further compound the challenge of managing this condition effectively.

Several risk factors have been identified for placenta previa, including advanced maternal age, multiparity, history of cesarean delivery, and previous uterine surgeries, among others [5]. Advanced maternal age, particularly women over 35, has been linked to an increased risk due to degenerative changes in the uterine vasculature, which may affect placental implantation [6]. Multiparity has also been shown to be a significant risk factor, as repeated pregnancies can lead to uterine scarring and changes that predispose women to abnormal placental implantation [7].

Another crucial factor is the history of cesarean sections and uterine surgeries. Studies have demonstrated that the risk of placenta previa increases with each subsequent cesarean section due to the development of scar tissue, which may alter the normal placental implantation process [8]. This is particularly concerning in regions where cesarean delivery rates are rising, leading to an increased burden of placenta previa [9].

Lifestyle and environmental factors, such as smoking and exposure to secondhand smoke, have also been associated with placenta previa, with nicotine affecting placental development and function [10]. Additionally, multiple pregnancies, closely spaced pregnancies, and infertility treatments have been highlighted as contributing factors [11].

Despite the recognition of these risk factors, there is still limited data on the incidence and specific risk factors associated with placenta previa in Southeast Nigeria. Understanding these factors is critical for developing targeted preventive strategies and improving maternal and neonatal outcomes. The lack of comprehensive studies in this region underscores the need for research that focuses on identifying and assessing the risk factors specific to this population, as cultural, socioeconomic, and healthcare-related factors can significantly influence the incidence and management of placenta previa [12].

This study aims to fill the gap in knowledge by assessing the risk factors associated with placenta previa in a tertiary health institution in Southeast Nigeria. The findings will be instrumental in informing healthcare policies and developing intervention strategies to reduce the incidence and complications associated with placenta previa in the region.

Materials And Methods

This prospective descriptive study was carried out for two years, from January 2021 to December 2022. All pregnant women who delivered their children during the period of this study were enrolled in this study. Data were collected using a structured, interviewer-administered questionnaire. Participants were assured of the confidentiality of their responses, and data

was anonymized to protect their identity. Informed consent was obtained from all participants, and they were informed of their right to withdraw from the study at any time without any consequences to their medical care.

Placenta praevia was identified via abdominal ultrasonography, revealing the placenta situated in the lower uterine section, with its lowest edge positioned beneath the dome of a distended urinary bladder. All preterm diagnoses of placenta previa were admitted and handled according to the MacAfee regimen (expectant management), with interventions implemented only at term or in the event of complications. Immediate delivery was performed in symptomatic instances endangering mother or foetal life, regardless of gestational age, as well as in cases presenting at term. In this hospital, Caesarean sections were routinely performed for all instances of placenta praevia, with the diagnosis confirmed intraoperatively. The collected data was analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics such as frequencies and percentages were used to summarise the demographic characteristics and obstetrics and gynaecology history. The proportion of women diagnosed with placenta previa was calculated for prevalence assessment. Chi-square tests were used to determine associations between categorical variables such as age, parity, etc. with the prevalence of placenta previa.

Results

During the period of this study, a total of 8766 deliveries were recorded in this hospital. Most of them were aged 30-39 years (38.71%), with a significant number having attained secondary education (60.54%). Most respondents were married (99.14%), employed in the public sector (45.13%), and resided in urban areas (80.54%) (Table 1).

The majority had been pregnant 2-3 times (63.79%), with 36.38% having one delivery (parity). Previous pregnancy complications were reported by 8.16%, with premature birth being the most common complication (57.06%). Cesarean sections were reported by 34.33%, and a small proportion (0.44%) had a history of placenta previa, mostly diagnosed in the third trimester (71.79%) (Table 2). Regular antenatal care attendance was high (90.88%), with most participants satisfied with the information provided (42.43%). Only 11.34% reported challenges in accessing antenatal care (Table 3).

Only 1.07% of the women experienced placenta previa, indicating a relatively low occurrence (Figure 1). Most participants were non-smokers (96.55%), did not consume alcohol (93.82%), and did not have a history of hypertension (96.22%) (Figures 2-4). Significant associations were found with factors like age ($p = 0.041$), parity ($p = 0.005$), history of pregnancy complications ($p = 0.039$), cesarean section ($p = 0.009$), history of placenta previa ($p = 0.000$), multiple pregnancies ($p = 0.001$), bleeding during pregnancy ($p = 0.000$), uterine surgery ($p = 0.001$), smoking status ($p = 0.000$), and fibroid diagnosis ($p = 0.011$).

Socio-Demographic Information	Frequency (n = 8766)	Percentage (%)
Age (in Years)		
Below 20	362	4.13
20-29	2896	33.04
30-39	3393	38.71
40 and above	2115	24.13
Educational Level		
No formal Education	18	0.21
Primary Education	126	1.44

Secondary Education	5307	60.54
Tertiary Education	3315	37.82
Marital Status		
Single	31	0.35
Married	8691	99.14
Divorced/Widowed	44	0.50
Employment Status		
Unemployed	334	3.81
Self-employed	2495	28.46
Private sector employee	1854	21.15
Public sector employee	3956	45.13
Student	127	1.45
Residence		
Rural	1706	19.46
Urban	7060	80.54

Table 1: Socio-Demographic Information of Participants

Variable	Frequency (n = 8766)	Percentage (%)
How many times have you been pregnant including this present one (Gravida)?		
1	1893	21.59
2-3	5592	63.79
4-5	834	9.51
More than 5	447	5.10
How many deliveries have you had (Parity)?		
None	1912	21.81
1	3189	36.38
2-3	3127	35.67
4 or more	538	6.14
Did you experience any complications during previous pregnancies?		
Yes	715	8.16
No	6158	70.25
Not Applicable	1893	21.20
If yes, please specify		
Pre-eclampsia	217	30.35
Placenta previa	11	1.54
Premature birth	408	57.06
Others	79	11.04
Have you ever had a Cesarean section?		
Yes	3009	34.33
No	5757	65.67
If yes, how many times?		
1	1674	55.63
2-3	1324	44.00
More than 3	11	0.37
Have you had any previous miscarriages?		
Yes	811	9.25
No	7955	90.75
Do you have a history of placenta previa in previous pregnancies?		
Yes	39	0.44

No	8727	99.56
At what gestational age were you diagnosed with placenta previa (if applicable)?		
First trimester	00	0.00
Second trimester	11	28.21
Third trimester	28	71.79
Have you ever had multiple pregnancies (twins, triplets, etc.)?		
Yes	1719	19.61
No	7047	80.39
Have you experienced any bleeding during this pregnancy?		
Yes	683	7.79
No	8083	92.21
Do you have a history of diabetes (gestational or otherwise)?		
Yes	561	6.40
No	8205	93.60
Have you ever been diagnosed with fibroids?		
Yes	1105	12.57
No	7661	87.39
Have you ever had uterine surgery apart from C-sections?		
Yes	1111	12.67
No	7655	87.33
Have you ever used assisted reproductive technology (e.g., IVF)?		
Yes	985	11.24
No	7781	88.76
Do you have a history of anemia during pregnancy?		
Yes	1008	11.50
No	7758	88.50

Table 2: Obstetric and Gynecological History of Participants

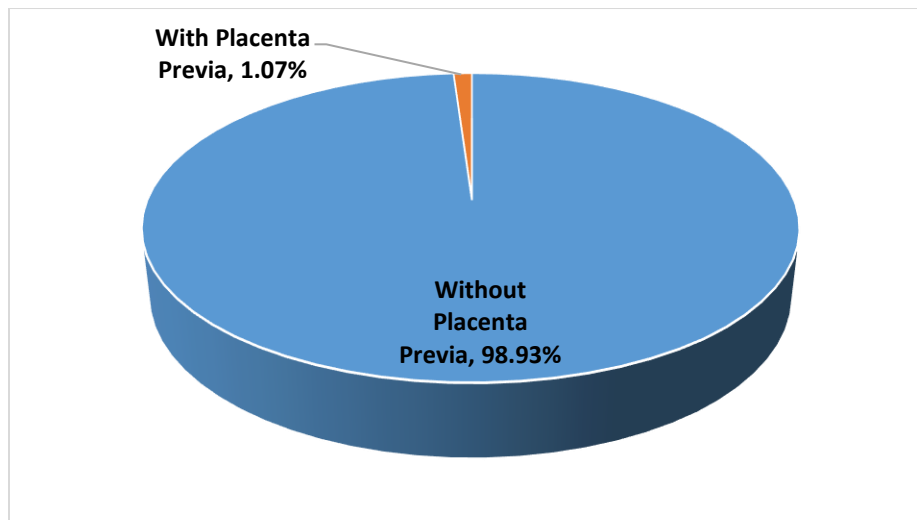


Figure 1: Occurrence of Placenta Previa

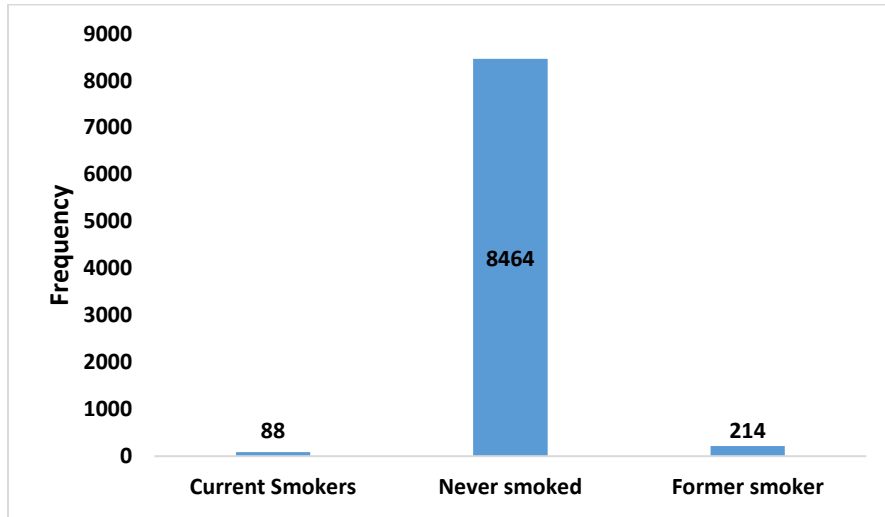


Figure 2: Smoking of Tobacco

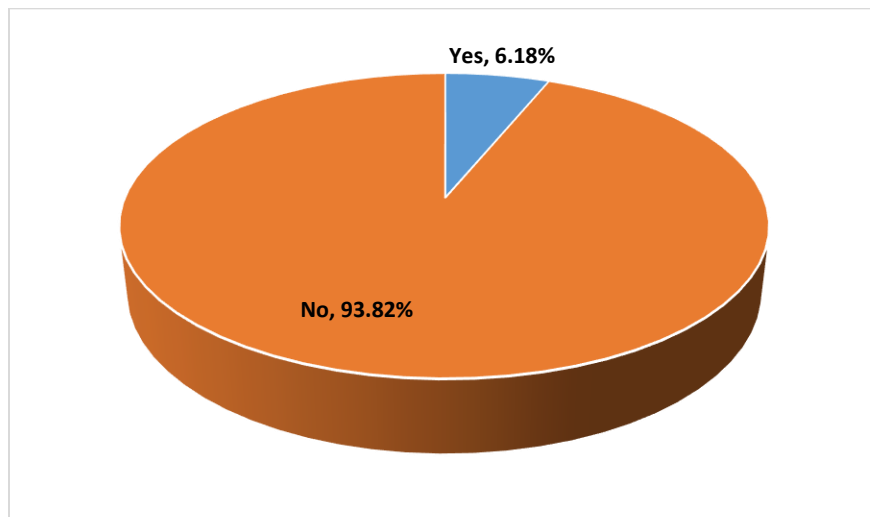


Figure 3: Consumption of Alcohol

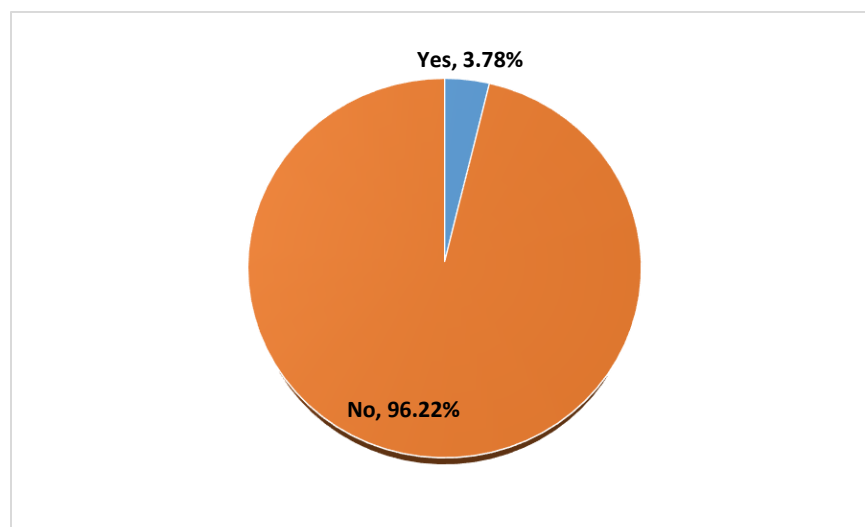


Figure 4: History of Hypertension

Variable	Frequency	Percentage (%)
How often do you attend antenatal care services during pregnancy?		
Regularly (as recommended)	7967	90.88
Occasionally	709	8.09
Rarely	90	1.03
How satisfied are you with the information and care provided by healthcare professionals regarding pregnancy complications, including placenta previa?		
Very satisfied	2654	30.27
Satisfied	3719	42.43
Neutral	1696	19.35
Dissatisfied	444	5.07
Very dissatisfied	253	2.89
Have you ever faced challenges in accessing antenatal care or ultrasound scans during pregnancy?		
Yes	994	11.34
No	7772	88.66

Table 3: Healthcare Services and Accessibility

Risk Factors	Occurrence of Placenta Previa		p-value
	With Placenta Previa (n = 94)	Without Placenta Previa (n = 8672)	
Age (in Years)			0.041*
Below 20	00 (0.00%)	362 (100.00%)	
20-29	00 (0.00%)	2896 (100.00%)	
30-39	21 (0.62%)	3372 (99.38%)	
40 and above	73 (3.45%)	2042 (96.54%)	
How many times have you been pregnant including this present one (Gravida)?			0.216
1	22 (1.16%)	1871 (98.84%)	
2-3	32 (0.57%)	5560 (99.43%)	
4-5	20 (2.40%)	814 (97.60%)	
More than 5	20 (4.47%)	427 (95.53%)	
How many deliveries have you had (Parity)?			0.005*
None	00 (0.00%)	1912 (100.00%)	
1	00 (0.00%)	3189 (100.00%)	
2-3	37 (1.18%)	3090 (98.82%)	
4 or more	57 (10.59%)	481 (89.41%)	
Did you experience any complications during previous pregnancies?			0.039*
Yes	33 (4.62%)	682 (95.38%)	
No	61 (0.99%)	6097 (99.01%)	
Not Applicable	00 (0.00%)	1893 (100.00%)	
Have you ever had a Cesarean section?			0.009*
Yes	89 (2.96%)	2920 (97.04%)	
No	5 (0.09%)	5752 (99.91%)	
Have you had any previous miscarriages?			0.062

Yes	2 (0.25%)	809 (99.75%)	
No	92 (1.16%)	7863 (98.84%)	
Do you have a history of placenta previa in previous pregnancies?			0.000*
Yes	39 (100.00%)	00 (0.00%)	
No	55 (0.63%)	8672 (99.37%)	
Have you ever had multiple pregnancies (twins, triplets, etc.)?			0.001*
Yes	91 (5.29%)	1628 (94.71%)	
No	3 (0.04%)	7044 (99.96%)	
Have you experienced any bleeding during this pregnancy?			0.000*
Yes	69 (10.10%)	614 (89.90%)	
No	25 (0.31%)	8058 (99.69%)	
Have you ever had uterine surgery apart from Cesarean sections?			0.001*
Yes	74 (6.67%)	1037 (93.33%)	
No	20 (0.26%)	7635 (99.74%)	
Have you ever used assisted reproductive technology (e.g., IVF)?			0.511
Yes	15 (1.52%)	966 (98.07%)	
No	79 (1.01%)	7702 (98.93%)	
Do you smoke or have you ever smoked?			0.000*
Current Smokers	62 (70.45%)	26 (29.55%)	
Never smoked	00 (0.00%)	8464 (100.00%)	
Former smoker	32 (14.95%)	182 (85.05%)	
Do you consume alcohol?			0.614
Yes	7 (1.29%)	535 (98.71%)	
No	87 (1.06%)	8137 (98.94%)	
Do you have a history of hypertension?			0.594
Yes	4 (1.21%)	327 (98.79%)	
No	90 (1.07%)	8345 (98.93%)	
Have you ever been diagnosed with fibroids?			0.011*
Yes	66 (5.97%)	1039 (94.03%)	
No	28 (0.37%)	7633 (99.63%)	

Table 4: Risk Factors associated with Placenta Previa

Discussion

This study assessed the risk factors associated with placenta previa among pregnant women attending a tertiary health institution in Southeast Nigeria. The majority of participants (38.71%) were aged 30–39 years, with only 4.13% being below 20 years. Notably, the occurrence of placenta previa was significantly higher in women aged 40 and above (3.45%) compared to other age groups ($p = 0.041$). This aligns with the findings of Srisupundit et al. [13], who reported that advanced maternal age is a significant risk factor for placenta previa. The higher risk among older women could be attributed to increased parity and uterine scarring from previous pregnancies [14].

In terms of educational level, a majority (60.54%) had secondary education, and 37.82% had tertiary education. However, there was no significant association between education level and placenta previa occurrence. Similarly, marital status did not show any substantial link with placenta previa, as nearly all participants (99.14%) were married. This finding differs from previous research by Sekiguchi et al. [15], which found that single women were more likely to experience placenta previa. This variation could be due to cultural differences and the predominance of married women in this study population.

The study revealed that multiparity (having 4 or more deliveries) was a significant risk factor for placenta previa ($p = 0.005$), with a prevalence of 10.59% among women with 4 or more deliveries. This finding aligns with the results of Adekanle and Adeyemi [16], who indicated that multiparity is a strong predictor of placenta previa. The higher risk could be due to repeated stretching and scarring of the uterine lining, which may predispose women to abnormal placental attachment [17].

A history of previous cesarean sections was another significant risk factor, as women with prior C-sections had a 2.96% occurrence of placenta previa ($p = 0.009$). This result supports the findings of Silver [18], who reported a strong association between cesarean deliveries and subsequent placenta previa due to scar formation in the uterus. Additionally, the study found that a history of placenta previa in previous pregnancies was a strong predictor of recurrence, with 100% of those with a previous history experiencing it again ($p = 0.000$). This is consistent with the study by Cunningham et al. [19], which indicated that women with a history of placenta previa have a tenfold increased risk of recurrence.

The occurrence of placenta previa was also significantly associated with multiple pregnancies ($p = 0.001$), as 5.29% of women with twins or triplets experienced placenta previa. This finding corresponds with the research of Jauniaux et al. [20], who noted that multiple gestations are linked to an increased risk of placenta previa, possibly due to an increased placental surface area required to support the pregnancy.

The study found that smoking was significantly associated with placenta previa ($p = 0.000$), with 70.45% of current smokers experiencing placenta previa. This aligns with the findings of Salihu et al. [21], who established that smoking increases the risk of placenta previa by up to fourfold, likely due to the vasoconstrictive effects of nicotine, which can affect placental implantation.

A history of fibroids was another significant risk factor, with 5.97% of women with fibroids experiencing placenta previa ($p = 0.011$). This finding is consistent with the study by Masukume et al. [22], which demonstrated that fibroids could interfere with normal placental implantation, leading to an increased risk of placenta previa.

In contrast, factors such as alcohol consumption and hypertension were not significantly associated with placenta previa in this study, which differs from some previous studies [23]. The lack of a significant association in this population might be due to the lower prevalence of these conditions among the study participants.

The majority of participants (90.88%) regularly attended antenatal care services, which is encouraging. However, the occurrence of placenta previa among women who attended antenatal care regularly suggests that early detection and management strategies should be enhanced. This finding is in line with the study by Fausett and Saade [24], which emphasized the importance of regular antenatal care in reducing the complications associated with placenta previa.

Conclusion

This study identified advanced maternal age, multiparity, previous cesarean sections, history of placenta previa, multiple pregnancies, smoking, and fibroids as significant risk factors for placenta previa. These findings are consistent with many previous studies, though some differences were observed, possibly due to variations in population characteristics and healthcare practices. Early detection and targeted interventions for high-risk

women could help reduce the incidence and complications associated with placenta previa in Southeast Nigeria.

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