

Placenta Accreta Spectrum: Prevalence, Trend and Association with Sociodemographic/Obstetric Factors in a Tertiary Health Facility in Niger Delta, Nigeria

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Abstract

Background: Placenta accreta spectrum (PAS) describes the abnormal adherence of the placenta trophoblast to the myometrium and is associated with high foeto-maternal morbidity and mortality. This study was aimed at determining the prevalence, and trend of placenta accreta spectrum (PAS), as well as its association with sociodemographic/obstetrics factors at the Rivers State University Teaching Hospital (RSUTH).

Methodology: An analytical cross-sectional study of all recorded cases of placenta accreta spectrum managed at RSUTH from 1st January 2016 to 31st December 2021. Descriptive and inferential statistics were derived using IBM, Statistical Product and Service Solution (SPSS) version 25.0 Armonk, NY.

Results: There were 14195 deliveries, 137 cases of placenta praevia and 39 cases of placenta accreta spectrum. The prevalence of PAS at the RSUTH was 0.27% or 2.7 /1000 deliveries or 1in 370 deliveries. The rate of PAS among cases of placenta praevia was 28.5% or 1 in 4 cases. More than half of the variants of PAS were accreta 23 (59.0%) while 13(33.3%) and 3(7.7%) were increta and percreta respectively. The mean (SD) age and gestational age of the participants were 32.28 (\pm 5.13), [95% Confidence Interval (CI): 30.63, 33.92] and 36.43(\pm 2.01), (95%CI: 35.18, 37.07) respectively. The modal age group was 35-39 years. The median blood loss was 650mls range of 450-2000mls. The majority of the study participants were booked 34(87.2%) and had secondary level education 17(43.6%). History of a previous caesarean section was statistically significantly associated with PAS $P < 0.001$ while other factors did not attain significance.

Conclusion: Placenta accreta spectrum is not uncommon among women with pregnancies complicated by placenta praevia at the RSUTH. PAS occurred more among booked multiparous women with secondary level education and with an increasing trend. History of previous caesarean section is strongly associated with PAS.

Keywords: Morbidly adherent placenta; Placenta praevia; Accreta; Increta; Haemorrhage; RSU.

Introduction

The term placenta accreta spectrum (PAS), formerly known as morbidly adherent placenta (MAP) generally describes the range of abnormal adherence of the placenta trophoblast to the

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myometrium^[1,2]. It is associated with a life-threatening obstetric haemorrhage and adverse foeto-maternal outcomes^[3,6]. In pregnancies complicated by placenta accreta, obstetric haemorrhage is a leading cause of major maternal morbidity and mortality^[7,8]. PAS results from the absence of normal decidua basalis of the uterus due to trauma. As such, the trophoblast attaches to and/or invades the myometrium. The incidence of placenta accreta spectrum is said to be on the increase due to factors such as the increasing age at first pregnancy and the rising rate of caesarean section^[1,9,10]. In the last 2 decades, evidence from multicentre epidemiological studies has revealed the effect of an increasing rate of CS on the occurrence of placenta accreta spectrum (PAS)^[1,11,12].

A case-control study carried out in the United Kingdom using the obstetric surveillance system revealed an increased incidence of 577/10,000 among obstetric women with a history of a previous caesarean section and placenta praevia compared to an overall incidence of 1.7/10,000 maternities^[9]. The rate of PAS in the 1970s was 1 in 4000 deliveries, and in the 1980s 1 in 2500 deliveries^[1]. Studies carried out in the US have revealed an incidence of PAS of 1 in 533^[13] and 1 in 730 deliveries^[14]. There is an 8-fold increase in the incidence of PAS since the 1970s^[1]. The incidence of placenta accreta from a study carried out in South Eastern Nigeria was 1 in 282 deliveries (0.35%)^[15].

The PAS includes 3 variants based on the level of villous penetration into the uterine wall: (1) placenta accreta, where the placental villi attach to the surface of the myometrium without intervening decidua; (2) placenta increta, in which the villi invade the myometrium; and (3) percreta in which placental villi penetrates through the myometrium to the serosa and in some cases invades adjacent organs like the bladder^[9,11,16]. This abnormal placentation (morbidly adherent placenta) is associated with life-threatening obstetric haemorrhage, increased requirement for blood transfusion, peripartum hysterectomy and foeto-maternal complications^[11,18].

A previous study on antepartum haemorrhage at the RSUTH revealed that placenta praevia was the most common cause of antepartum haemorrhage and

significantly associated with history of previous caesarean section^[17]. Another study has revealed an increased odds of PAS among women with history of previous caesarean section and placenta praevia^[9]. Placenta praevia and previous caesarean section are risk factors for PAS amongst others. The risk of accreta in the presence of placenta praevia is known to be 10% and with previous history of caesarean section without placenta praevia, the risk of PAS is 12%^[19]. The risk of PAS increases to about 25% in a patient with both placenta praevia and a history of previous Caesarean section^[19]. Study on placenta accreta spectrum is scarce in our setting. Thus, this study focuses on assessing the prevalence of PAS, trend and its relationship with sociodemographic/obstetric factors at the RSUTH.

Materials and Methods

The study was conducted at the Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Rivers State, Nigeria. RSUTH is one of the tertiary health facilities in Rivers State and is located at the heart of Port Harcourt the capital of Rivers State. The Hospital receives referrals from within and neighbouring states^[20]. The Hospital has an average of 2,500 deliveries annually and a caesarean section rate of 41.4%^[21].

This was an analytical cross-sectional study of all recorded cases of placenta praevia and placenta accreta spectrum managed at the RSUTH, from 1st January 2016 to 31st December 2021. All cases of placenta praevia and placenta accreta spectrum were collated from the labour ward, post-natal and the theatre registers. The total number of deliveries during the review period was obtained from the labour ward and theatre records/registers. A study protocol was designed and used to collect data on sociodemographic/obstetric factors, risk factors, type of placenta praevia, nature of the surgery and foeto-maternal outcomes. Antepartum haemorrhage was defined as bleeding from the genital tract after the period of foetal viability (which in our environment is 28 weeks). Placenta praevia was defined as a placenta that is partially or wholly implanted in the lower uterine segment after the period of foetal viability. PAS refers to the range of abnormal adherence of the placenta trophoblast to the myometrium, including placenta accreta, increta and percreta. Diagnosis of placenta praevia was

made both clinically and radiologically; PAS was confirmed histologically (in hysterectomy specimen of the three participants that had hysterectomy).

Data collected were entered into Microsoft word Excel office 2019 and exported to IBM, Statistical Product and Service Solution (SPSS) version 25.0, Armonk, NY, for analysis. Categorical variables were summarized in frequencies and percentages while symmetrical and asymmetrical continuous variables were summarized using mean and standard deviations with 95% confidence intervals around the point estimates and median with range respectively. The trend of PAS over the review period was presented descriptively. Chi-square (X^2) test or Fisher's exact test, as appropriate for the data, was used to test for the association between the sociodemographic/obstetric characteristics, and severity of cases according to whether they were morbidly adherent or not. Ethical clearance for the study was obtained from the Hospital's Research and Ethics Committee.

Results

Over the period of review, there were fourteen thousand, hundred and ninety -five (14,195) deliveries, 137 cases of placenta praevia and 39 cases of placenta accreta spectrum, giving the prevalence of placenta praevia and placenta accreta spectrum as 0.97% or 9.7 per 1000 deliveries and 0.27% or 2.7 per 1000 deliveries respectively. Of 137 cases of placenta praevia, PAS accounted for 28.5%. The majority [98 (71.5%)] of the cases of placenta praevia reviewed were not morbidly adherent.

More than half 23 (59.0%) of the variants of PAS observed were accreta while 13(33.3%) and 3(7.7%) were increta and percreta respectively (Figure 1).

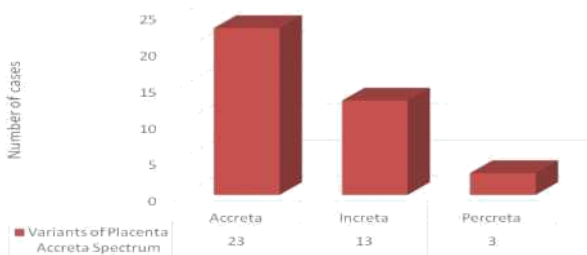


Figure 1: Variants of Placenta Accreta Spectrum

(PAS)



Figure 2: The trend of placenta praevia and placenta accreta spectrum at the RSUTH. Source of data Wekere et.al.

Although the absolute count of the cases of placenta accreta spectrum was stable in the first 2 years (2016 & 2017) as well as the subsequent two years (2018 & 2019), it decreased to 2 in 2020 and then increased from 2 in 2020 to 9 in 2021 (Figure 2). In terms of the rate of occurrence of PAS among the recorded cases of placenta praevia, there was a decrease from 28.6% in 2016 to 16.7% in 2017 and a rise from 23.3 in 2018 to 43.5% in 2019 with a further decrease to 18.2 in 2020 and subsequent increase from 18.2 in 2020 to 40.9 in 2021(Figure 3).

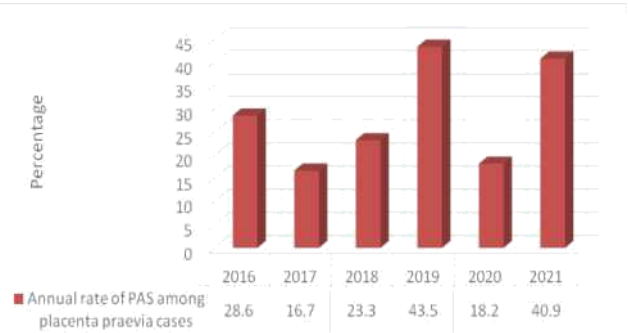


Figure 3: The annual rate of placenta accreta spectrum among placenta praevia cases, n=39

Table 1 shows the sociodemographic/ obstetric characteristics of the study participants. The mean (SD) age and gestational age of the participants at delivery were 32.28 (±5.13) years (95% CI: 30.63, 33.92) and 36.43 (±2.01) weeks (95% CI: 35.78, 37.07) respectively. The modal age group was 35-39 years (Table 1). The majority 34(87.2%) were booked, and less than half 17(43.6%), and 17(43.6) were multiparas and had

secondary level education respectively.

Table 1: Sociodemographic/Obstetric characteristics of study participants with Placenta accreta spectrum, n=39

Variables	Number	Percentage
Age (years)		
20-24	3	7.7
25-29	11	28.2
30-34	7	17.9
35-39	17	43.6
40-44	1	2.6
Parity		
0 (Nullipara)	9	23.1
1 (Primipara)	13	33.3
2-4 (Multipara)	17	43.6
(Grand multipara)	0	0
Educational Status		
Primary	8	20.5
Secondary	17	43.6
Tertiary	14	35.9
Religion		
Christianity	39	100
Islam	0	0
Median blood loss	650mls*	Range (450-2000mls)
Nature of Surgery (index pregnancy)		
Emergency CS	14	35.9
Elective CS	25	64.1
Booking Status		
Booked	34	87.2
Unbooked	5	12.8

CS-Caesarean section *Millilitres.

The relationship between sociodemographic/obstetric factors and placenta accreta spectrum is presented in Table 2.

Table 2: Relationship between Sociodemographic/Obstetric factors and Placenta accreta spectrum among placenta praevia cases n=137

Variables	Placenta accreta spectrum		Total	X ² (d.f.) Fisher#	p-value 95%CI
	Yes (%)	No (%)			
Age (years)					
20-24	3(30)	7(70)	10	4.257#	0.377
25-29	11(34.4)	21(65.6)	32	(4)	(0.367,0.386)
30-34	7(18.4)	31(81.6)	38		
35-39	17(34.7)	32(65.3)	49		
40-44	1(12.5)	7(87.5)	8		
Parity					
0 (Nullipara)	9(36.0)	16(64.0)	25	1.664#	0.606(0.597,0.616)
1 (Primipara)	13(29.5)	31(70.5)	44	(3)	0.637(0.627,0.646)
2-4 (Multipara)	17(26.2)	48(73.8)	65		
(Grand multipara)	0	3(100)	3		
Educational Status					
Primary	8(23.5)	26(76.5)	34	2.107(2)	0.366(0.357,.376)
Secondary	17(36.2)	30(63.8)	47		
Tertiary	14(25.0)	42(75)	56		
Religion					
Christianity	39(30.0)	91(70.0)	130	2.936#	0.087(0.191,.090)
Islam	0	7(100)	7	(1)	
Nature of Surgery					
Emergency CS	14 (20.6)	54(79.4)	68	4.116(1)	0.058(1.019, 4.714)
Elective CS	25(36.2)	44(63.8)	69		
Booking Status					
Booked	34(29.3)	82(70.7)	116	0.264(1)	0.607(0.794, 0.411)
Unbooked	5(23.8)	16(76.2)	21		
Number of Previous CS					
0	6(6.7)	80(93.3)	90	61.53 (3)	<0.001* (0.000,0.000)
1	16(66.7)	8(33.3)	24		
2	14(73.7)	5(26.3)	19		
3	3(75)	1(25)	4		

*Significant # Fisher exact test d.f -degree of freedom, CS – Caesarean Section

Placenta accreta spectrum was observed in 67%, 74% and 75% of study participants who had a history of 1, 2 and 3 previous caesarean sections respectively. Of the 39 participants who had PAS, majority 33 (84.6%) presented with a history of at least one previous caesarean section while 6(15.4%) had no history of previous caesarean section.

Sixteen (41%), 14 (35.9%), and 3(7.7%) of participants with PAS had a history of 1, 2 and 3 previous caesarean section respectively. There was a statistically significant difference in the association of placenta accreta spectrum and history of previous caesarean section (p<0.001). Three parturient (7.7%) had caesarean hysterectomy due to massive blood loss from morbidly adherent placenta, in particular, percreta.

Discussion

The prevalence of placenta accreta spectrum at the Rivers State University Teaching Hospital is 0.27% or 2.7 per 1000 deliveries or 1 in 370 deliveries. This finding is similar to 0.29% reported by Matsuzaki et al., in US [23] and comparable to 0.35% reported by Umezuruike and Nkwocha in South East Nigeria [15] but lower than a rate of 0.91% reported by Gelany et al, in Egypt [24]. All the cases of PAS recorded in this study had placenta praevia. As such, PAS accounted for 28.5 % of all cases of placenta praevia. This is higher than 12.6% reported in a study conducted in Istanbul by Ascioglu et al [25], and 3.4% reported in a study carried out in Chennai [26] by Parachant and colleagues but lower than 31% reported by Saleh and Ismaeel in Iraq [27]. Variations in study populations, case definition as well as methodology could account for the differences in the rates of occurrence of PAS across studies.

Overall, the rate of placenta accreta spectrum increased from 28.6% in 2016 to 40.9% in 2021, despite varying yearly rates of occurrence. The increasing rate of caesarean section in the study centre [28] could account for this finding and consistent with findings of previous studies [23,27,29]. In

present study, majority 23(59%) of the variants of PAS were accreta, corroborating the finding of Heena and Kumari [30].

The mean (SD) age of the participants was 32.28 (±

5.13), [95% CI: 30.63, 33.92], showing the participants were women of reproductive age. Our finding is in keeping with those of previous studies^[24,31]. The participants had a mean (SD) gestational age of 36.43(±2.01) which is comparable to findings of previous study^[32]. Majority 34(87.2%) of the study participants booked for antenatal care. This finding is not surprising since pregnancy complicated by placenta praevia or placenta accreta spectrum is a high risk and as such, are often booked for antenatal care in the tertiary hospital for specialized care. Additionally, those that booked for antenatal care in other categories of health facilities are usually referred to tertiary centres like ours for delivery. Placenta accreta spectrum occurred more among multiparous women compared to other parities though less than half of the study participants. This finding is in keeping with those of previous studies^[24,33].

Caesarean hysterectomy is known to be one of the complications of placenta accreta spectrum^[16]. In present study, 3(7.7%) of the participants had caesarean hysterectomy for massive postpartum haemorrhage from morbid adherence in particular, percreta, and consistent with reports from other centres^[27,34]. Although higher than our finding, a study carried out in Egypt revealed a caesarean hysterectomy rate of 11.3%^[32], buttressing the fact that caesarean hysterectomy is one of the major complications of PAS. It is known that the risk of bleeding in cases of PAS correlates with the degree of adherence to the myometrium, the area involved and the presence or absence of invasion to extrauterine structures^[1,34]. As such, cases of percreta may present with profuse bleeding that can lead to caesarean hysterectomy. Nevertheless, antenatal diagnosis with the help of magnetic resonance imaging has the potential of improving management outcome. Women with placenta praevia will benefit from MRI to determine the level of adherence which would be helpful to the obstetrician in planning the delivery of such women and complication readiness. In cases of PAS caesarean hysterectomy with the placenta left in situ post-delivery of the foetus is generally an accepted measure to reduce severe haemorrhage associated with attempts at removing the placenta^[1,10,34].

Placenta accreta spectrum occurred more among

participants that had a history of previous caesarean section. In present study, the rate of PAS increased with increasing order of previous CS, such that 67%,74% and 75% of study participants who had a history of 1, 2 and 3 previous caesarean sections respectively presented with PAS compared to participants without PAS. This finding of increasing rate of PAS with an increasing number of previous caesarean sections is comparable to those of previous studies^[35-37]. The absence of normal decidua basalis from previous surgeries and instrumentation that potentiates trophoblastic attachment and/or invasion of the scarred myometrium could account for the above. Of the 39 participants who had PAS, majority 33 (84.6%) presented with a history of at least one previous caesarean section while 6 (15.4%) had no history of previous caesarean section. There was a statistically significant association between previous caesarean section and placenta accreta spectrum $P<0.001$ (95% CI: 0.000, 0.000). This finding corroborates those of previous studies^[23,29,31,38]. However, other sociodemographic and obstetric factors studied did not attain significance.

As a single facility-based study, the findings may not be representative of what obtains in other health facilities. However, the findings fill the gap in knowledge of PAS in Port Harcourt, Southern Nigeria and contributes to the body of literature on PAS. Although data on some variables could be missing in one record due to challenges of record keeping in our setting, the review of different records ensured completeness of data on the variables of interest.

Conclusion

Placenta accreta spectrum is not uncommon among women with pregnancies complicated by placenta praevia at the RSUTH. PAS occurred more among booked multiparous women with secondary level education and with an increasing trend over the review period. This knowledge would be helpful to obstetricians in management of cases. There should be a high index of suspicion of PAS in women with placenta praevia and previous caesarean section. Pregnancies complicated with PAS should be managed in a tertiary centre where specialist care is available.

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