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Prevalence and Determinants of Antepartum Haemorrhage Among Pregnant Women at a Tertiary Hospital in Ebonyi State, Nigeria

Egba, Chiamaka Favour*, Kanikwu, Phoebe Nwamaka, Egba, Friday Chibuzor

Department of Nursing Science, Centre for Public Health and Toxicological Research, University of Port Harcourt, Rivers State, Nigeria

Corresponding Author Email:odichiamaka@gmail.com. Tel: +234(0)8069245065*

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Abstract

Background: Antepartum haemorrhage continues to be a major cause of maternal and perinatal morbidity and mortality in developing nations. The available literature regarding the frequency and determinants of APH among patients attending healthcare facilities in South-East Nigeria is limited in spite of its clinical significance.
Objective: This study aimed to assess the frequency and determinants of APH among pregnant women attending the Antenatal Clinic and Obstetrics & Gynecology Emergency Department of Alex Ekwueme Federal University Teaching Hospital Abakaliki (AEFUTHA), Ebonyi State, Nigeria.
Methodology: A descriptive cross-sectional study was carried out among 422 pregnant women (346 from the antenatal clinic and 76 from the Obstetric emergency department). The participants were consecutively sampled in proportion to their respective sizes using a pre-tested questionnaire to collect relevant information. Logistic regression was used to determine the significant determinants of APH at $p<0.05$.
Results: The prevalence of APH was 10.7% (45/422). The multivariate analysis revealed that age ≥35 years, lack of formal education, previous uterine surgery, anaemia, conception through ART, history of abortion/miscarriage, malpresentation, mode of delivery, and presence of a trigger factor before the onset of bleeding were independent predictors of APH (all $p < 0.05$), with previous uterine surgery (AOR = 28.247) and the presence of a trigger factor (AOR = 474.752) having the highest associations. Interestingly, 80% of APH cases had a trigger factor, of which 56% was due to stress.
Conclusion: The prevalence of APH at AEFUTHA (10.7%) was significantly higher when compared to other regions of Nigeria (0.9–3.4%). Maternal advanced age, lack of education, previous uterine surgery, anaemia, assisted conception, history of abortion/miscarriage, malpresentation, mode of delivery, and stress were found to be important predictors of APH.

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Keywords: antepartum haemorrhage, placenta previa, abruptio placentae, maternal outcomes, pregnancy complications, Nigeria, tertiary hospital

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1. Introduction

Antepartum haemorrhage (APH) can be described as vaginal bleeding that happens between 28 gestation weeks and the beginning of labour (World Health Organization, 2021). It is a significant obstetric crisis and the primary cause of maternal and perinatal morbidity and mortality on a global scale, especially in low- and middle-income countries (LMICs) where emergency obstetric services are still not at the optimal level (Ananth et al., 2021; Oyelese & Ananth, 2022). Abnormal placental implantation in the lower part of the uterus (placenta previa) and abruptio placentae, which is the premature delivery of a normally implanted placenta, are the two main causes of APH (Jauniaux et al., 2020). Vasa previa, uterine rupture, and local cervical or vaginal lesions are the other less common causes (Nkwabong & Tiomela, 2020).

Placenta previa complicates around 0.3 5% of pregnancies in high-income environments, but can manifest at higher rates in tertiary referral centers in LMICs because of case-mix and referral bias (Jauniaux et al., 2020). Abruptio placentae has an incidence of 0.4-1.0 percent of all pregnancies, and the disease is more common in the population with hypertensive disorders, older motherhood, and a history of caesarean section (Ananth et al., 2021). Both of the conditions have serious maternal complications such as haemorrhagic shock, disseminated intravascular coagulation, emergency hysterectomy, and maternal death, and unfavorable perinatal outcomes such as preterm birth, low birth weight, perinatal asphyxia, and stillbirth (Downes et al., 2020; Workineh et al., 2021).

In sub-Saharan Africa, APH is also a major cause of maternal mortality ratio that continues to be high (approximately 542 deaths per 100,000 live births) significantly surpassing the rest of the world (211 per 100,000) (Kassebaum et al., 2020). Nigeria has a high percentage of maternal deaths, with an estimated maternal mortality ratio of 512 per 100,000 live births (National Population Commission & ICF, 2019). The prevalence rates of APH in Nigeria are 0.9% to 3.4% with placenta previa consuming 0.97-1.9% of the deliveries, which is according to the recent research findings on prevalence rates of APH in tertiary centres (Ugwa et al., 2022; Nwobodo et al., 2020). However, these rates vary greatly based on the area, trends in referrals, and other aspects of the study group; therefore, there should be facility-specific surveillance data.

The literature has been able to consistently come up with several risk factors of APH. Endometrial atrophy and abnormal placentation link placenta previa and placental abruption to previous uterine surgery, specifically caesarean section and dilatation and curettage (Jauniaux et al., 2020; Nwobodo et al., 2020). The risk factors associated with pre-eclampsia also include advanced maternal age (≥35 years), increased parity, multiple gestation, hypertensive conditions, smoking and substance use (Ananth et al., 2021; Getahun et al., 2020). The socio-demographic factors associated with late presentation and poor prognosis of preeclampsia in LMICs are low education level, poor socioeconomic background, and inadequate antenatal care (Onah et al., 2021; Workineh et al., 2021).

Although the clinical importance of APH and its role in maternal and perinatal morbidity and mortality in Nigeria is paramount, current, facility-specific information for South-East Nigeria, most especially Ebonyi State, is lacking. The Ebonyi State is characterized by the majority of rural population, lack of access to specialist care in obstetrics and socio-economic factors that could affect the prevalence and results of APH. The primary tertiary referral hospital in the state and surrounding areas is Alex Ekwueme Federal University Teaching Hospital Abakaliki (AEFUTHA), to which booked antenatal referrals and emergency obstetric referrals are received. Knowledge of the local burden of APH and its predictors is crucial to informing interventions, resource allocation, and enhancing maternal and perinatal outcomes.

The present study was conducted with the objective of establishing the prevalence rate of APH among pregnant women who visited AEFUTHA, as well as the sociodemographic, obstetric, and clinical characteristics of this condition. The results will add to the body of evidence regarding the role of APH in South-East Nigeria and offer practical implications to practice and health policy in the area.

2. Methodology

2.1 Study Design and Setting

This was a cross-sectional study which was conducted in a hospital in a bid to determine the prevalence and the determinants of antepartum haemorrhage in pregnant women who attended the Antenatal Clinic and Obstetrics and Gynaecology Emergency Unit of the Alex Ekwueme Federal University Teaching Hospital Abakaliki (AEFUTHA).

2.2 Study Population and Sampling

The population under study included all pregnant women coming to the Antenatal Clinic or to the Obstetrics and Gynaecology Emergency Unit of AEFUTHA at the time of the study and all the women that met the inclusion criteria.

The formula used in estimating a single proportion was used to determine the sample size:

$$n = Z^2 \times P\frac{(1 - P)}{d^2}$$

where:

- Z = 1.96 (standard normal deviate at 95% confidence level)
- P = 0.50 (prevalence of antepartum haemorrhage based on previous studies by Onebunne & Aimakhu, 2019)
- d = 0.05 (desired precision)

Substituting these values gave a minimum sample size of 384. To accommodate an anticipated attrition rate of 10% (38 participants), the minimum sample size was adjusted to 422 participants.

A proportionate allocation technique was used to distribute the sample across the two recruitment sites, based on average daily attendance figures. On average, 20 pregnant women present to the Antenatal Clinic per day, while about 5 women are seen at the Obstetrics Emergency Unit, giving a combined daily average of 25 women. This translates to approximately 82% of attendees from the Antenatal Clinic and 18% from the Obstetrics Emergency Unit. Applying these proportions to the total sample size of 422 gave 346 participants to be recruited from the Antenatal Clinic and 76 participants from the Obstetrics Emergency Unit.

A consecutive sampling method was used, whereby every eligible woman presenting each day was recruited until the required sample size was attained. Participant folders were tagged to prevent double sampling. All pregnant women who were at 28 weeks of gestation or more and who gave informed consent to participate were included in the study. Women with a known bleeding disorder, those too ill to give informed consent, and those who declined to participate were excluded.

2.3 Data Collection

The researcher developed a structured interviewer-administered questionnaire which was used to gather data. There were four sections in the questionnaire:

1. Socio-demographic factors: age, marital status, education level, work, religion and ethnicity.
2. Obstetric history: parity, gestational age, prior uterine surgery (caesarean section, myomectomy, dilatation and curettage), history of previous APH and antenatal booking status.
3. Clinical presentation: vaginal bleeding is present or absent, when and how much bleeding occurs, other symptoms (abdominal pain, uterine contractions), and any identified precipitating factors (e.g., stress, trauma, coitus).
4. Diagnosis and management: clinical and ultrasound diagnosis of type of APH (placenta previa, abruptio placentae, or other), fetal presentation, and immediate management.

To verify this, the questionnaire was pre-tested on 10 pregnant women in a neighbouring health facility to make it clear and understandable. Data were collected over a period of three months, with the help of trained research assistants who were supervised by the principal investigator.

2.4 Data Analysis

The data were entered into Microsoft Excel and analysed with the help of IBM SPSS Statistics version 27.0. Socio-demographic and clinical characteristics were summarized using descriptive statistics (frequencies, percentages, means, and standard deviations). The prevalence of APH was determined as the percentage of respondents with a positive APH among the total number of respondents.

To assess the relationships between the potential determinants (socio-demographic, obstetric and clinical factors) and APH, bivariate analysis (chi-square and Fisher's exact tests) was undertaken. Variables that had $p < 0.25$ in the bivariate analysis were included in a multivariate logistic regression model to determine independent predictors of APH. Adjusted odds ratio (AOR) and 95% confidence intervals (CI) were provided and statistical significance was established at $p < 0.05$.

2.5 Ethical Considerations

The Research Ethics Committee of Alex Ekwueme Federal University Teaching Hospital Abakaliki gave its approval concerning the ethical aspect of the study. All the participants gave informed consent in writing after discussing the aim of the study, procedures, risks, and benefits of the study. Participation was voluntary, and the participants were not obligated to stay, this is because the participation was free. The data were stored safely and confidentiality and anonymity were ensured during the study using unique identification code.

3. Results

3.1 Socio-Demographic Characteristics of Participants

There were 422 pregnant women in the study. Most of the respondents were 2035 years (78.7%), with 21.3% being above 35 years. The majority of the respondents were married (96.2), and a small percentage were single (3.8%). In terms of residence, 68.5% were in urban areas, and 31.5% were in rural locations. The majority of the participants (96.9) were Christians, and they were also in monogamous families (94.5), with the Igbo ethnic group constituting the majority (92.9). Over half of the respondents (51.4%) reported low monthly income (<70,000 Naira), while 33.4% earned between 100,000 and 200,000 Naira, and 15.2% earned above 200,000 Naira. Concerning education, over half had tertiary education (50.9%), then secondary education (35.5%), and a lower percentage had either primary education (6.5%) or no formal education (7.5%). The largest proportion of participants was traders or artisans (47.3%), then civil/public servants (19.4%). The socio-demographic characteristics are described in detail in Table 1.

Table 1: Socio-Demographic Characteristics of Participants (N = 422)

Characteristic	Frequency (n)	Percentage (%)
Age Group (years)		
20–35	332	78.7
>35	90	21.3
Marital Status		
Single	16	3.8
Married	406	96.2
Place of Residence		
Urban	289	68.5
Rural	133	31.5
Religion		
Christianity	409	96.9
Others	13	3.1
Family Type		
Monogamous	399	94.5
Polygamous	23	5.5
Ethnic Group		
Igbo	392	92.9
Others	30	7.1
Average Monthly Income (₦)		
Low (<70,000)	217	51.4
Average (100,000– 200,000)	141	33.4
High (>200,000)	64	15.2
Educational Level		
No formal education	32	7.5
Primary	27	6.5
Secondary	150	35.5
Tertiary	213	50.9
Occupation		
Civil/Public servant	82	19.4
Traders/Artisan	201	47.3
Farmer	5	1.1
Unemployed/Housewife	59	14.0
Student	59	14.0
Others	18	4.3

3.2 Prevalence of Antepartum Haemorrhage

Out of 422 participants, 103 (24.4) said that they were experiencing vaginal bleeding in the index pregnancy, with a bleeding onset before 20 weeks of gestation in 58 (13.7) and after 20 weeks in 45 (10.7). After clinical and ultrasound assessment, 45 out of 422 participants were found to have a confirmed diagnosis of APH, providing an overall prevalence of 10.7. The most common cause was placenta previa, with 28 (62.2) of 45 confirmed cases of APH; abruptio placentae was 6

(13.3), and 11 (24.5) cases were of unknown or other causes.

3.3 Association Between APH and Socio-Demographic Characteristics

APH was significantly associated with age group (χ^2 = 13.108, p < 0.001) and level of education (Fisher's exact = 25.368, p < 0.0001). There was no statistically significant correlation between marital status, place of residence, religion, family type, ethnic group, and average monthly income and APH (p > 0.05). Table 3 summarizes these findings.

Table 2: Prevalence and Causes of Antepartum Haemorrhage (N = 422)

Variable	Frequency	Percent (%)
Confirmed APH diagnosis		
Present 4	5 1	0.7
Absent 3	77 8	9.3
Type of APH diagnosed (n = 45)		
Placenta previa 2	8 6	2.2
Abruptio placentae 6	1	3.3
Unknown/Other causes 1	1 2	4.5

Table 3: Association between APH and Socio-Demographic Characteristics (N = 422)

Characteristic	APH Present n (%)	APH Absent n (%)	χ^2 / Fisher's Exact	p-value
Age Group (years)				
20–35	26 (7.8)	306 (92.2)	13.108	<0.001*
>35	19 (21.1)	71 (78.9)		
Marital Status				
Single	1 (6.3)	15 (93.8)	0.340[F]	0.713
Married	44 (10.8)	362 (89.2)		
Place of Residence				
Urban	36 (12.5)	253 (87.5)	3.095	0.068
Rural	9 (6.8)	124 (93.2)		
Level of Education				
No formal education	13 (40.6)	19 (59.4)	25.368[F]	<0.0001*
Primary	4 (16.0)	21 (84.0)		
Secondary	9 (6.0)	141 (94.0)		
Tertiary	19 (8.8)	196 (91.2)		
Religion				
Christianity	44 (10.8)	365 (89.2)	0.124[F]	0.724
Others	1 (7.7)	12 (92.3)		
Family Type				
Monogamous	41 (10.3)	358 (89.7)	1.156[F]	0.291
Polygamous	4 (17.4)	19 (82.6)		
Ethnic Group				
Igbo	44 (11.2)	348 (88.8)	1.822[F]	0.231
Others	1 (3.3)	29 (96.7)		
Average Monthly Income				
Low (<70,000)	28 (12.9)	189 (87.1)	4.081	0.120
Average (100,000– 200,000)	9 (6.4)	132 (93.6)		
High (>200,000)	8 (12.5)	56 (87.5)		

*F = Fisher's exact statistic; *Statistically significant at p < 0.05*

3.4 Association Between APH and Obstetric/Gynaecological Factors

APH was significantly associated with gravidity (χ^2 = 7.538, p = 0.021), parity (χ^2 = 7.126, p = 0.008), history of uterine surgery (χ^2 = 53.700, p < 0.001), anaemia status based on packed cell volume (χ^2 = 26.632, p < 0.001), conception through assisted reproductive technology (χ^2 = 15.404, p = 0.001), history of premature rupture of membranes (χ^2 = 7.347, p = 0.007), malpresentation (χ^2 = 31.938, p < 0.001), and mode of delivery (χ^2 = 6.559, p = 0.010). Previous APH (χ^2 = 1.598, p = 0.206), multiple foetus (χ^2 = 1.818, p = 0.178),

and diagnosed hypertension ($\chi^2 = 2.506$, $p = 0.113$) were not significantly associated with APH. The results are shown in detail in Table 4.

3.5 Association Between APH and Behavioural Factors

The presence of a triggering factor before the onset of bleeding was the only behavioural aspect that was significantly linked to APH (2 = 83.223, p = 0.001). Out of 45 participants who had APH, 36 (80%), were found to have an inciting factor before the onset of bleeding. APH was not significantly related to smoking, alcohol intake in pregnancy, and adherence to antenatal care advice ($p > 0.05$). Among the known triggers, stress was 56% of the cases, other causes (19%), trauma (13%), and sexual intercourse (12%).

Table 4: Association Between APH and Obstetric/Gynaecological Factors (N = 422)

Characteristic * n	*APH Present* (%)** n	*APH Absent* (%) **	*χ^2** *	*p-value**
Gravidity				
Primigravida 9	(6.9) 1	21 (93.1) 7	.538 0	.021*
Multigravida 3	4 (14.2) 2	06 (85.8)		
Grand multigravida 2	(3.8) 5	0 (96.2)		
Parity				
Primipara 1	8 (7.3) 2	29 (92.7) 7	.126 0	.008*
Multipara 2	7 (15.4) 1	48 (84.6)		
Previous APH				
Yes 1	3 (14.3) 7	8 (85.7) 1	.598 0	.206
No	32 (9.7)	299 (90.3)		
Multiple Foetus				
Yes 9	(15.8) 4	8 (84.2) 1	.818 0	.178
No	36 (9.9)	329 (90.1)		
History of Uterine Surgery				
Yes 1	3 (56.5) 1	0 (43.5) 5	3.700	<0.001*
No	32 (8.0)	367 (92.0)		
Anaemia (PCV status)				
Low 2	3 (25.6) 6	7 (74.4) 2	6.632	<0.001*
Normal 2	2 (6.6) 3	10 (93.4)		
Conception via ART				
Normal conception 3	5 (9.0) 3	55 (91.0) 1	5.404 0	.001*
IVF	10 (31.3)	22 (68.8)		
History of PROM				
Yes 1	4 (19.7) 5	7 (80.3) 7	.347 0	.007*
No	31 (8.8)	320 (91.2)		
Malpresentation				
Yes 1	4 (37.8) 2	3 (62.2) 3	1.938	<0.001*
No	26 (7.6)	314 (92.4)		
Not sure 5	(11.1) 4	0 (88.9)		
Diagnosed Hypertension				
Yes 0	(0.0) 2	0 (100.0) 2	.506 0	.113
No	45 (11.2)	357 (88.8)		
Mode of Delivery				
Vaginal 1	8 (7.4) 2	26 (92.6) 6	.559 0	.010*
Caesarean section 2	7 (15.2) 1	51 (84.8)		

*PROM = premature rupture of membranes; ART = assisted reproductive technology; *Statistically significant at p < 0.05*

3.6 Association Between APH and Pregnancy Outcomes

Adverse birth outcomes were highly related to APH. Of the 45 APH cases, 23 (51.1%) resulted in stillbirth or fetal death, compared with 12.2% among those without APH ($\chi^2 = 44.499$, $p < 0.001$). APH also had a strong relationship with maternal mortality, in which 20.0% of women with APH died, and 2.1% of women without APH died (Fisher's exact = 33.235, $p < 0.001$). Women with APH were also more likely to deliver by caesarean section (60.0% versus 40.0% among those without APH;

$\chi^2 = 6.559$, $p = 0.010$) and to develop maternal anaemia (51.1% versus 17.9%; $\chi^2 = 26.632$, $p < 0.001$).

3.7 Multivariate Analysis of Determinants of APH

Bivariate analysis variables that had p less than 0.25 were included into a multivariate logistic regression model. Age above 35 years (AOR = 0.045, 95% CI: 0.167–0.612, p < 0.001), no formal education (AOR = 8.134, 95% CI: 3.212–20.920, p < 0.001), history of previous uterine surgery (AOR = 28.247, 95% CI: 5.779–210.879, p < 0.001), anaemia (AOR = 5.826, 95% CI: 1.535–24.509, p = 0.008), conception through assisted reproductive technology (AOR = 0.029 for normal conception relative to IVF, 95% CI: 0.005–0.132, p < 0.001), history of abortion or miscarriage (AOR = 0.112 for no history relative to a history of abortion, 95% CI: 0.024–0.406, p = 0.002), malpresentation (AOR = 4.870, 95% CI: 1.635–16.698, p = 0.007), mode of delivery (AOR = 0.153 for vaginal delivery relative to caesarean section, 95% CI: 0.037–0.530, p = 0.007), and the presence of a triggering factor before bleeding onset (AOR = 474.752, 95% CI: 67.623–6465.868, p < 0.001) remained significant independent predictors of APH. The final model showed no statistically significant predictors of APH in residence, occupation, gravidity, parity, history of PROM and compliance with the antenatal care advice (p > 0.05). The results are given in detail in Table 5.

Table 5: Multivariate Logistic Regression Analysis of Determinants of APH (N = 422)

Variable *	*β** *	*AOR** *	*p-value** *	*95% CI**
Age >35 years (ref: 20–35)	-1.147	0.045	<0.001*	0.167–0.612
No formal education (ref: tertiary)	2.096	8.134	<0.001*	3.212–20.920
Previous uterine surgery (ref: none)	3.341	28.247	<0.001*	5.779–210.879
Anaemia – low PCV (ref: normal)	1.762	5.826	0.008*	1.535–24.509
Normal conception (ref: IVF) -	3.537 0	.029	<0.001* 0	.005–0.132
No history of abortion (ref: - history of abortion)	2.190 0	.112 0	.002* 0	.024–0.406
Malpresentation – yes (ref: not sure)	1.583	4.870	0.007*	1.635–16.698
Vaginal delivery (ref: caesarean section)	-1.879	0.153	0.007*	0.037–0.530
Triggering factor present (ref: absent)	6.163	474.752	<0.001*	67.623–6465.868

**Statistically significant at p < 0.05*

β = logistic regression coefficient; AOR = adjusted odds ratio; CI = confidence interval; PCV = packed cell volume

4. Discussion

This study identified the prevalence of antepartum haemorrhage (APH) and antepartum determinants that are related to this issue among the pregnant women in a tertiary hospital in South-East Nigeria. The prevalence of APH was 10.7% (45/422), which is much higher than the prevalence rates in other tertiary centres in Nigeria, with a prevalence ranging between 0.9% and 3.4% (Ugwa et al., 2022; Nwobodo et al., 2020). The high prevalence level might be explained by the characteristics of the study population, the type of referrals to AEFUTHA as a tertiary centre, and both booked antenatal and emergency presentations. The difference in prevalence to other Nigerian studies may also be due to differences in case-mix and referral patterns, as APH prevalence may be time- and case-mix dependent.

The data on the ages of the participants (78.7% between 20 and 35 years and 21.3% older than 35 years) are consistent with the reproductive age distribution in other related studies in Nigeria (Nwobodo et al., 2020; Ugwa et al., 2022). The respondents were mostly married (96.2%), urban (68.5%), and had secondary education and above (86.4), which is reflective of the antenatal population in South-East Nigeria. However, 7.5% of those surveyed were uneducated, which has been associated with late presentation and poor performance in LMICs (Onah et al., 2021; Workineh et al., 2021).

The multivariate logistic regression revealed that several independent predictors of APH included advanced maternal age, deficiency of formal education, prior surgery on the uterus, anaemia, conception with assisted reproductive technology, abortion or miscarriage history, malpresentation, mode of delivery, and existence of an antecedent factor (stress).

Women over 35 years were much more likely to have APH compared to women under 35 years. This aligns with the literature that shows advanced maternal age as a well-established risk factor for both placenta previa and abruptio placentae that can be explained by age-related

alterations in uterine vasculature and endometrial receptivity (Ananth et al., 2021; Getahun et al., 2020).

Women who were not educated had much higher odds of APH (AOR = 8.134, $p < 0.001$) than their tertiary-educated counterparts. Such an observation aligns with previous LMIC studies that established that low levels of educational attainment lead to low health-seeking behaviour, late antenatal booking, and low levels of understanding of pregnancy danger signs (Onah et al., 2021; Getahun et al., 2020). Women with low educational attainment may not be able to recognize the early symptoms of APH, access timely antenatal services, and adhere to medical advice, and this predisposes them to poor outcomes. This underscores the importance of health education and community outreach programmes that are focused on promoting maternal health literacy, particularly among low educated women.

The strongest predictor of APH that was found in this study was previous uterine surgery (AOR = 28.247, $p < 0.001$). This agrees with the extensive literature on uterine scarring, particularly after caesarean section and dilatation and curettage, in the pathogenesis of placenta previa and abnormal placenta (Jauniaux et al., 2020; Nwobodo et al., 2020). Aberration of the endometrium and scarring disrupt typical trophoblastic invasion, placing them at risk of low-lying placentation and placenta accreta spectrum disorders. With the current trend of increasing caesarean sections in Nigeria and the world in general, this result highlights the significance of close antenatal follow-up, early ultrasound assessment of placental position and tailored birth planning in women who have had a previous uterine surgery.

Applied pressure hematopathology APH was also significantly correlated with anaemia based on low packed cell volume (AOR = 5.826, $p = 0.008$), and there is a compounding effect of blood loss caused by APH itself on maternal anaemia. Likewise, assisted reproductive technology conception and an abortion or miscarriage history were key predictors, which aligns with previous studies that abnormal placental implantation is more likely in the presence of abnormal placentation and endometrial disruption due to a history of abortion or assisted conception (Jauniaux et al., 2020). APH was also found to be significantly related to malpresentation and mode of delivery, which is consistent with the known connection between abnormal placentation, malpresentation, and the high probability of operative delivery.

Pre-bleeding triggering factor, in particular, stress, was significantly linked with APH (AOR = 474.752, $p < 0.001$), and it was also interesting that 80 percent of APH are characterized by a triggering factor, and stress was the most frequently reported triggering factor (56 percent). This is a clinically important finding since the role of psychosocial stress in the aetiology of APH has not been well investigated. Despite the lack of understanding of the biological mechanisms connecting stress to APH, possible mechanisms are stress-induced hypertension, catecholamine-mediated vasoconstriction and placental hypoperfusion, and the activation of pathways that may trigger placental abruption (Ananth et al., 2021). Previous studies have also attributed chronic or acute psychosocial stress to unfavorable pregnancy outcomes, including preterm birth, low birth weight, and hypertensive disorders; thus, this study hypothesizes that stress can also have a role in APH (Workineh et al., 2021).

The large percentage of APH cases related to stress in this study is a reason to conduct further research with prospective cohort studies and mechanistic research. This discovery illustrates the importance of integrating mental health and psychosocial support into standard antenatal services, both clinically and in the context of broader population health. New measures to prevent APH in high-risk groups might include psychosocial stressor screening, counselling, stress management interventions, and attention to social determinants of health (economic hardship, domestic violence, and lack of social support).

In line with the known consequences of APH, the study also concluded that APH had a significant connection with poor pregnancy outcomes, such as an increased rate of stillbirth/fetal death (51.1% versus 12.2%), maternal mortality (20.0% versus 2.1%), caesarean delivery (60.0% versus 40.0%), and maternal anaemia (51.1% versus 17.9%), which supports the clinical urgency of timely diagnosis and effective management of APH.

5. Conclusion

The incidence of APH among the pregnant women in this tertiary hospital in South-East Nigeria was 10.7%, which is higher than the incidence in other regions of Nigeria. Independent predictors of APH were determined as advanced maternal age, lack of formal education, prior uterine surgery, anaemia, conception using assisted reproductive technology, a history of abortion or miscarriage, malpresentation, mode of delivery, and

presence of a triggering factor, especially stress. The observation that stress was an important precipitating factor highlights the possible role of psychosocial factors in APH aetiology, and the strength of the relationship with history of uterine surgery supports the importance of close antenatal monitoring in women with a history of uterine surgery.

The findings highlight the need to strengthen antenatal surveillance, especially in the case of women with a history of previous uterine surgery or anaemia, provide focused health education to enhance maternal health literacy, and include psychosocial support and stress management in 370-378routine antenatal care. In order to decrease both the morbidity and mortality of APH in South-East Nigeria, increased facility preparedness to address APH emergencies and additional research to confirm these results and investigate the mechanisms behind them are needed.

Conflict of Interest

The authors declare no conflict of interest.

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