



# Management and Outcomes of Antepartum Haemorrhage at Bombo Regional Referral Hospital

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## Abstract

Antepartum hemorrhage (APH) contributes significantly to maternal and perinatal morbidity and mortality globally, particularly in the developing world like ours. Prevention, early detection, and prompt management cannot be overemphasized to significantly reduce the morbidity and mortality associated with this condition. **Objectives:** The study is aimed at determining the prevalence, etiology, sociodemographic characteristics, and the fetomaternal outcome of pregnancies complicated by APH. A total of 224 cases of APH were recorded out of the 18,273 cases admitted for delivery during the study period, giving an institutional prevalence rate of 1.2%. Two hundred and eighteen folders were retrieved and analyzed giving a retrieval rate of 97.3%. The mean gestational age at presentation was  $35.3 \pm 2$  weeks and the most common causes were abruptio placenta and placenta previa constituting 68.3% and 30.0%, respectively. Sociodemographic characteristics associated with the occurrence of APH included age, booking status, parity, and socioeconomic status. There were 123 live births and 92 stillbirths. The cesarean section rate was 53.5%. Major complications were intrauterine fetal deaths in 42.8%, postpartum hemorrhage in 24.2% of cases, and anemia necessitating blood transfusion in 61.5%. There were three maternal deaths all due to abruptio placentae during the study period giving a case specific fatality rate of 2%. The prevalence of APH in our setting is high. The major causes were abruptio placenta and placenta previa. The major fetal complication was intrauterine fetal death, and the major maternal complications were postpartum hemorrhage and anemia with consequent high blood transfusion rate. Early detection, provision of antenatal care, and emergency obstetric care services can reduce the negative effects of APH.

## Subject Areas

Gynecology & Obstetrics

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## Keywords

Antepartum, Haemorrhage, Placental Abruption, Placenta Praevia

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### 1. Introduction

Antepartum haemorrhage (APH) is usually defined as bleeding from the birth canal after the 24<sup>th</sup> week of pregnancy (Say *et al.*, 2023) [1]. It can occur at any time until the second stage of labour is complete; bleeding following the birth of the baby is postpartum haemorrhage.

Adverse pregnancy outcomes including maternal and perinatal morbidity and mortality constitute major public health problems in the developing world. The risk of dying from maternal causes is 100 times higher for women in developing countries compared to those in developed countries. Developing countries contribute to 99% of the world's maternal deaths (WHO, 2023) [2]. In 2023, sixty percent of Sub-Saharan African countries had a Maternal Mortality Ratio (MMR) of above 400 maternal deaths per 100,000 live births (MDG, 2023) [3]. Ethiopia has one of the world's highest MMRs at 676 maternal deaths per 100,000 live births in 2021 (Central Statistical Agency, ICF International, 2022) [4], showing no reduction from its 2005 level of 673 maternal deaths per 100,000 live births. Despite reductions observed during the last decade, perinatal mortality also remained high compared to other developing and developed countries. For the period 2006 to 2011, the average perinatal mortality rate in Ethiopia was 46 perinatal deaths per 1000 pregnancies of seven or more months of gestation (Central Statistical Agency, ICF International, 2022) [4]. Obstetric haemorrhage remains one of the major causes of maternal deaths, and one of the primary obstetric causes of perinatal mortality (Ngoc *et al.*, 2022) [5]. Antepartum hemorrhage (APH), bleeding from the genital tract of a pregnant mother with a viable fetus before the onset of labour, complicates 3.5% of pregnancies and it constitutes one of the reasons for emergency hospital visits among pregnant women (Creasy *et al.*, 2023) [6]. Abruption placentae and placenta previa are the major causes of APH (Cunningham *et al.*, 2023) [7]. Even though a number of obstetric and non-obstetric situations are identified as risk factors for APH; it still remains a predominantly unpredictable condition (Mukherjee & Bhide, 2023) [8]. Access to quality basic and emergency obstetric care services remains the major plausible explanation for disparities in the risk of maternal and perinatal mortality and morbidity from APH in different parts of the world. Once it occurs, hemorrhage is likely to be fatal to the mother or her baby in situations where actions cannot be taken immediately to stop further bleeding, replace excessive blood loss, and prevent fetal complications. Evidence shows that variability in the burden of APH is primarily a result of variations in outcomes instead of variations in incidence, suggesting the vital role that improved obstetric care can play in addressing the issue. Studies from Africa have shown comparable prevalence of causes

of APH compared to those from Europe and the United States; however, maternal and newborn outcomes of APH varied vastly between developing and developed countries.

It is one of the leading causes of obstetric emergencies in health facilities (Amitava *et al.*, 2020) [9]. On average, 0.5% to 5% of all pregnancies are complicated by antepartum hemorrhage, with the incidence of placenta previa being 0.33% to 0.55% and placenta abruption 0.5% to 1%. It is a major cause of perinatal and maternal morbidity and mortality worldwide (Singhal *et al.*, 2022) [10]. In developed countries, antepartum hemorrhage accounts for only 16.3% of maternal deaths, whereas in Sub-Saharan Africa the rate remains high (24.5%) (Lakshmipriya *et al.*, 2022) [11]. The complications of antepartum hemorrhage vary between 0.5% - 5% of pregnancies and with sociodemographic variables. The main cause of antepartum hemorrhage is placenta abruption, placenta previa, uterus rupture and unknown aetiology or local causes of genital tract. Placenta previa refers to the condition when the placenta is situated wholly or partially in the lower uterine segment and accounts for one third of all cases of antepartum hemorrhage. It is further classified as type I, if implantation is in lower segment but does not reach the internal os, type II, placenta reaches the internal os but does not cover it, type III, placenta covers the internal os but not at full dilatation and type IV when placenta covers internal os even at full dilatation of cervix.

An Abruption placenta is the condition whenever bleeding occurs due to premature separation of normally situated placenta and it also contributes to nearly one third of cases. Various extra placental causes are cervical polyp, carcinoma cervix, varicose veins, local trauma, condylomata, cervical erosion etc. The maternal complications in patients with antepartum hemorrhage are malpresentation, premature labor, postpartum hemorrhage, sepsis, shock and retained placenta. Various fetal complications are premature baby, low birth weight, intra-uterine death, congenital malformation and birth asphyxia (Park, 2023) [12]. Maternal and fetal morbidity and mortality due to antepartum hemorrhage are significantly decreased in developed countries due to better obstetrical outcome. In Sub-Sahara Africa, maternal and fetal mortality are unacceptably high. Approximately 295,000 women died during and after pregnancy and childbirth in 2021 with the vast majority of these deaths (94%) occurring in low-resource settings, and most could have been prevented (WHO, 2023) [2].

In Tanzania, the Demographic and Health Survey (DHS) 2015 and 2016 established that the country's maternal mortality ratio was 556 per 100,000 live births but did not specifically identify the causes of death. However, a recent study of health facility data collected by the Ministry of Health, Gender Development, Elderly and Children from all regions in Mainland Tanzania, showed that haemorrhage was the leading cause of maternal mortality in Tanzania. Other studies on causes of maternal mortality occurring at the national and regional referral hospital levels also showed that haemorrhage was the leading cause. In Tanzania, trends of maternal mortality have remained high. According to TDHS

which uses the sisterhood method to estimate maternal mortality, the ratio was 578 per 100,000 live births in 2004-2005 which went down slightly to 454 per 100,000 live births in 2010. However, in TDHS-MIS 2015-16, the ratio had again gone up to 556 per 100,000 live births, a trend which shows that strategies for reduction of maternal mortality have not worked. The overall purpose of this article is to examine the management and outcomes of antepartum haemorrhage at Bombo Regional Referral Hospital. The article will include causes of antepartum haemorrhage, risk factor of antepartum haemorrhage, analysis of prevalence of antepartum haemorrhage among pregnant women and conclusions.

## 2. Causes of Antepartum Haemorrhage

No definite cause is diagnosed in about 50% of all women who present with antepartum haemorrhage; however, placenta praevia and placental abruption are the major identifiable causes:

**Placenta praevia:** insertion of the placenta, partially or fully, in the lower segment of the uterus. See the separate Placenta Praevia article. A 2017 study found a total of 29 articles were included. The pooled overall prevalence of APH among pregnant women with placenta praevia was 51.6%

**Placental abruption:** premature separation of a normally placed placenta. See the separate Placenta Problems (Placenta Accreta and Placental Abruption) article. Local causes—e.g., vulval or cervical infection, trauma or tumours. Partner violence is common in pregnancy, occurring in 2.8% of pregnant women in a Canadian population-based study (Kadir & Aledot, 2020) [13]. It may result in APH. Women should be asked about this, particularly if there are repeated episodes. See the separate Domestic Violence article. **Vasa praevia:** bleeding from fetal vessels in the fetal membranes, leading to high risk of fetal haemorrhage and death at rupture of the membranes. See the separate Placenta Problems (Placenta Accreta and Placental Abruption) article **Uterine rupture:** rare but very dangerous for both mother and baby. See the separate Uterine Rupture Article **Inherited bleeding problems** are very rare, occurring in 1 in 10,000 women (Downes *et al.*, 2023) [14].

Whilst risk factors for APH, in particular for placenta praevia and placental abruption, have been identified, APH cannot be predicted; 70% of cases of placental abruption occur in low-risk pregnancies. There is limited evidence that APH can be prevented but women should be encouraged to change modifiable risk factors such as smoking and cocaine and amphetamine abuse. Antenatal anaemia should be investigated and treated. Iron-deficiency anaemia not only reduces a woman's tolerance to bleeding but may also contribute to uterine atony (Bhandari *et al.*, 2022) [15].

## 3. Risk Factors of Antepartum Haemorrhage

A number of clinical and epidemiological studies have identified predisposing

risk factors for placental abruption (Raymond & Mills, 2023) [16]. The most predictive is abruption in a previous pregnancy. A large observational study from Norway reported a 4.4% incidence of recurrent abruption (adjusted OR 7.8, 95% CI 6.5 - 9.2). Abruption recurs in 19% - 25% of women who have had two previous pregnancies complicated by abruption. Other risk factors for placental abruption include: pre-eclampsia, fetal growth restriction, non-vertex presentations, polyhydramnios, advanced maternal age, multiparity, low body mass index (BMI), pregnancy following assisted reproductive techniques, intrauterine infection, premature rupture of membranes, abdominal trauma (both accidental and resulting from domestic violence), smoking and drug misuse (cocaine and amphetamines) during pregnancy.

First trimester bleeding increases the risk of abruption later in the pregnancy. A retrospective cohort study from Denmark found that threatened miscarriage increases the risk of placental abruption from 1.0% to 1.4% (OR 1.48, 95% CI 1.30 - 1.68) (Lykke *et al.*, 2020) [17]. A systematic review reported first trimester bleeding to be associated with an increased risk of placental abruption (OR 1.6, 95% CI 1.1 - 2.6); when an intrauterine haematoma is identified on ultrasound scan in the first trimester, the risk of subsequent placental abruption is increased (RR 5.6, 95% CI 2.8 - 11.1) (Van Oppenraaij *et al.*, 2022) [18].

Maternal thrombophilias have been associated with placental abruption. In a systematic review, Robertson *et al.* (2022) [19] identified seven studies that evaluated the association between thrombophilias and placental abruption. Overall, thrombophilias were associated with an increased risk of placental abruption, but significant associations were only observed with heterozygous factor V Leiden (OR 4.70, 95% CI 1.13 - 19.59) and heterozygous prothrombin 20210A (OR 7.71, 95% CI 3.01 - 19.76). More recently, a systematic review and meta-analysis of prospective cohort studies investigating the relationship between factor V Leiden, the prothrombin gene mutation and placental abruption reported only a weak association (pooled OR estimate for placental abruption in women with factor V Leiden was 1.85 [95% CI 0.92 - 3.70], and prothrombin 20210A was 2.02 [95% CI 0.81 - 5.02]).

While these and other risk factors for placental abruption are recognised, causal pathways remain largely speculative (Nath *et al.*, 2023) [20]. Women should be assessed for these factors at each antenatal contact. This information may be used to assign women to high-risk or low-risk antenatal care.

In a comparison of maternal risk factors for placenta praevia and placental abruption, Yang *et al.* (2022) [21] concluded that abruption is more likely to be related to conditions occurring during pregnancy and placenta praevia is more likely to be related to conditions existing prior to pregnancy.

#### **4. Analysis of Prevalence of Antepartum Haemorrhage among Pregnant Women**

A total of 224 patients were diagnosed with APH during the study period and a total of 18,273 as indicated in **Table 1** deliveries were similarly recorded during

**Table 1.** Prevalence of Antepartum Haemorrhage among pregnant women.

Signs/Symptoms	Placenta Praevia (%)	Accidental Haemorrhage (%)	Unclassified Group (%)	Combined Group (%)
<b>Vaginal Bleeding (%)</b>				
<b>Painless</b>	88 (100)	4 (12.90)	6 (100)	0
<b>Painful</b>	0	27 (87.10)	0	3 (100)
<b>Recurrent</b>	58 (65.91)	11 (35.48)	3 (50)	0
<b>Continuous</b>	30 (34.09)	20 (64.52)	3 (50)	3 (100)
<b>Uterine Atony</b>	0	16 (15.61)	0	0
<b>Absent FHR (UID)</b>	2 (13.64)	14 (45.16)	2 (33.33)	1 (33.33)
<b>Need Blood Transfusion</b>	0 (34.09)	20 (64.52)	3 (50)	3 (100)
<b>BP <math>\geq</math> 140/190 mmHg</b>	9 (10.23)	23 (74.19)	2 (33.33)	1 (33.33)

the same period giving an institutional prevalence of 1.2%, with abruptio placentae having 0.82%, placenta previa 0.36, while unknown causes had 0.02%. Two hundred and eighteen folders were retrieved and analyzed, giving a retrieval rate of 97.3%. The mean age of the patients was  $32.8 \pm 5.5$  years with a range of 20 - 44 years. Data shows the causes of APH. The major causes were abruptio placentae in 150 (68.8%) cases, and placenta previa accounted for 65 (29.9%), while 3 (1.3%) were of unknown cause. Data shows the comparison of sociodemographic characteristics of the patients and their relative occurrence among patients with abruptio placentae and placenta previa. All the patients were married. It is seen that the occurrence of abruptio placentae was significantly higher in the younger ( $P = 0.002$ ) and primigravida mothers ( $P = 0.000$ ), while placenta previa was significantly higher among older ( $P = 0.002$ ) and multiparous patients ( $P = 0.000$ ). APH occurred more in the 35 - 39 year age group accounting for 33.0% and the higher parity mothers accounting 70.7%. Significantly, more abruptio placentae are seen among the unbooked patients (0.010) when compared with the booked with 124 out of 150 developing abruptio placentae while placenta previa was more common in the booked patients. There was also statistically significant occurrence of abruptio placentae among homemakers (0.042), while gainful employment is significantly associated (0.042) with placenta previa. Religion however did not show any statistically significant influence on the occurrence of placental abruption over placenta previa and vice versa. Other factors such as marital status and place of residence did not appear to affect APH. Not shown in the table are the three unknown causes of APH which constituted about 1.3%.

Data shows the comparison of fetomaternal outcome between abruptio placentae and placenta previa. The mean gestational age at presentation was  $35.3 \pm$

2.0 weeks. Most, 68.8%, of the patients presented preterm between gestational ages of 33 and 36 weeks which was significantly lower for abruptio placentae ( $P = 0.000$ ); 80 out of 91 of those delivering at 28 - 32 had abruptio placentae, while 40 out of 68 of those delivering at 37 weeks and beyond had placenta previa. The fetal outcome was generally better in placenta previa group ( $P = 0.001$ ). Significantly more babies had good Apgar scores of 7 - 10, while 136 out of 150 were either asphyxiated or stillborn in the abruptio placentae group. Up to 87% of the babies in the abruptio placental group were of low birth weight 107 out of 150 ( $P = 0.004$ ). More than half; 53.5% of the patients were delivered via cesarean section; however, significantly more patients with placenta previa ( $P = 0.031$ ) had cesarean section compared to those with abruptio placentae. Majority (82.7%) of the patients with abruptio placentae had PPH compared to 17.3% with placenta previa. Anemia severe enough to necessitate blood transfusion occurred in 65.3% of the patient with APH. Significantly more patients with abruptio placentae ( $P = 0.022$ ) had blood transfusion compared to those with placenta previa. There were three maternal deaths all due to abruptio placentae giving a case-specific fatality rate of 2%. Sex of the baby did not have any statistical influence on the occurrence of APH.

The prevalence of APH was 1.2% in this study which is comparable to 1.5% reported from Adekanle *et al.*, (2021) [22]. It is however lower than 5.4% documented in Pakistan and 15.3% from Qatar (Bener *et al.*, 2022) [23]. Other studies have also reported higher values 2% - 5%, 3.01%, and 2.53% when compared to our result. The lower figure found in our study may be an underestimate of the actual figure as many patients with APH fail to reach the hospital in time or a multitude of cases may not report to the hospital at all. The low prevalence may also reflect the sociocultural and economic factors in the study environment that do not allow most women to seek medical attention unless in dire need (Nwobodo, 2021) [24].

The leading cause of antepartum hemorrhage in this study was found to be abruptio placenta followed by placenta previa as opposed to findings in South-western Nigeria in which placenta previa was found to be the leading cause. Hypertension has also been found to be the most consistent predisposing factor associated with abruptio placentae. The finding of advanced maternal age is similar to findings by other authors. It is also similar to the finding from a study in Enugu (33.3%) and Niger (38.2%). This maybe because up to one-third (33%) of our patients in the study were within the 35 - 39 year age group and probably age-related chronic medical conditions such as hypertension might have set in (Agboola, 2022) [25].

The prevalence of APH in this study is higher in multipara (70.7%) when compared to patients with lower parity (29.3%). This agrees with reports of other studies (Eniola *et al.*, 2022) [26]. Hence being a problem of multiparity, reduction in family size and contraception are highly recommended if the prevalence and associated morbidity and mortality are to be reduced (See **Table 2**).



**Table 2.** Types of APH.

<b>Total Number of Deliveries</b>	218
<b>Incidence</b>	2.9%
<b>Types of APH</b>	
<b>Placenta Praevia</b>	108 (49.5%)
<b>Abruption Placenta</b>	92 (42.2%)
<b>Unexplained or Inderminate</b>	15 (6.8%)
<b>Extraplacental Causes (Local Causes)</b>	3 (1.5%)
<b>Total</b>	218

Up to 77% of unbooked patients suffered APH in a study reported from Hyderabad. Most of the patients (63.3%) who suffered APH in our study were similarly unbooked. This clearly shows the importance of antenatal care in the prevention and early detection of patients with risk factors for APH to reduce morbidity and mortality. Late presentation with complications as shown above was probably due to illiteracy, culture, and poverty which tends to prevent women from coming to the hospital except in life-threatening conditions (Adinma, 2023) [27]. The higher incidence of unbooked patients may also be related to their socioeconomic class as up to 38.6% of patients in our study were found to be homemakers and probably not gainfully employed. However, a study from Peru found no association between placental abruption and socioeconomic status although the study was conducted among low socioeconomic women. On the other hand, a study conducted in the USA found that women on support were more likely to have placental abruption (Sanchez *et al.*, 2023) [28]. In general, the literature has noted an effect of sociodemographic characteristics on placental abruption but not on placenta previa.

Pregnancy outcome among women with APH is associated with both maternal and neonatal complications, and APH has been implicated as a major cause of perinatal death, which is in agreement with other studies in developed settings. This study confirmed the established finding that those with APH were more likely to have an adverse neonatal outcome, such as low birth weight, low Apgar score, stillbirths, and preterm deliveries which were up to 57.2%, 25.6%, 42.8%, and 68.4%, respectively, in our study. In most cases, delivery was iatrogenic in maternal interest. The stillbirth rate was 42.8% in our study, while other studies have quoted a stillbirth rate of 50.2% and 22.2% (Sheikh & Khokhar, 2020) [29] in cases of antepartum hemorrhage. This may likely be related to the rate at which timely intervention is instituted as hemorrhage exposed the fetuses to hypoxia and ultimately death and this again proves the importance of early and rigorous management of APH.

The maternal complications and/or outcome observed from this study included a cesarean section rate of 53.5% which is similar to the cesarean section rate of 57.1% in Hyderabad and 53.1% in Oshogbo. Postpartum hemorrhage was



found in 24.2% of the women, more than 7.1% found in Oshogbo, and 19% in Hyderabad. This may be related to the significant number of multiparous patients in our study. A transfusion rate of 66.0% was found to be slightly lower than 77.4% in Hyderabad. Anemia severe enough to warrant transfusion of 1 - 2 units of blood was found in 44.7% of our patients and up to 21.4% had more than 2 units transfused. This is a high value when the risks of blood transfusion including the potential risks of transmission of infectious agents are considered. On the contrary, a delay in the correction of hypovolemia can be fatal in cases of hemorrhage. Maternal mortality in this study was due to abruptio placentae and was found to be 2% which is comparable to the study by Pandelis (2022) [30] but lower than the 3% quoted by Sheikh and Khokhar (2020) [29]. This higher rate was attributed to late presentation of the patients and lack of prompt availability of blood and therapy for DIC in Sheikh's study. The low mortality recorded in this study may be due to the higher number of patients in that study and on the other hand improved blood banking services and emergency services scheme provided by our hospital. On a general note, this cannot be said for most areas of the country where difficulties with transportation and restricted medical facilities ensure that APH continues to be responsible for many maternal deaths.

## 5. Prevention of Antepartum Haemorrhage

In view of the known associations between placental abruption and tobacco use, cocaine and amphetamine misuse, women should be advised and encouraged to modify these risk factors. No evidence was identified that specifically investigated smoking cessation and APH. A Cochrane review concluded that smoking cessation programmes in pregnancy reduce the proportion of women who continue to smoke, and reduce low birthweight and preterm birth. The pooled trials have inadequate power to detect reductions in perinatal mortality or very low birthweight and did not specifically analyse rates of APH. The management of cocaine and amphetamine misuse involves a combination of symptomatic interventions during the withdrawal phase and psychosocial interventions. There has been very little systematic research into the effectiveness of this approach in pregnant women (Pinto *et al.*, 2020) [31].

A systematic review of folic acid supplements in pregnancy (involving a re-analysis of a large randomised controlled trial and update of a Cochrane review) found no conclusive evidence of benefit (including risk of placental abruption) in women who took folic acid supplements. In contrast, an observational study conducted in Norway investigating vitamin supplementation and risk of placental abruption found that women who use folic acid and multivitamins during pregnancy are significantly less likely than non-users to develop placental abruption (adjusted OR 0.74, 95% CI 0.65 - 0.84). There are no good data to support a role for antithrombotic therapy (low dose aspirin +/- low molecular weight heparin) in the prevention of abruption in women with thrombophilia (Nilsen *et al.*, 2022) [32].

A pilot study investigating the effects of antithrombotic therapy (the low molecular weight heparin, enoxaparin) in women with a previous placental abruption reported that women randomised to receive enoxaparin in the subsequent pregnancy experienced fewer placental vascular complications (including abruption, pre-eclampsia or low birthweight; adjusted hazard ratio = 0.37, 95% CI 0.18 - 0.77). The authors conclude that their study findings are preliminary and are currently being evaluated in larger multicentre trials to ensure their findings can be generalised.

## 6. Conclusion

Antepartum hemorrhage is a public health problem throughout the world and particularly in Sub-Saharan Africa. Placenta abruption and placenta previa are the major causes of antepartum hemorrhage. Antepartum hemorrhage which often leads to bleeding through the vaginal, is diagnosed clinically and/or by urgent obstetrical ultrasound and is managed by cesarean section in most cases. It is therefore important to pay particular attention to this pathology in order to limit perinatal and maternal mortality.

## Conflicts of Interest

The authors declare no conflicts of interest.

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