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ANALYSIS OF ANTEPARTUM HEMORRHAGE AND ASSOCIATED RISK FACTORS FOR MATERNAL AND NEONATAL OUTCOMES

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Abstract

This study, involving investigates the prenatal, maternal, and neonatal features associated with Antepartum Haemorrhage (APH). The study reveals significant findings related to maternal age, educational levels, parity, obesity, and pregnancy outcomes. Age-related risks were highlighted, with 36% of participants being under 20 years of age and 33% over 35. Maternal education levels varied, with 24% having a college education and 15% being illiterate. Obesity was prevalent in 57% of participants, and 35% of pregnancies were preterm, emphasizing the need for better prenatal care. Medical conditions such as diabetes and hypertension were common, with 55% of participants having diabetes and 47% experiencing hypertension. Surgical histories were also notable, with 38% of participants having had prior surgeries. Risk factors such as previous uterine scars, gestational hypertension, multiparity, and advanced maternal age (over 35) were found to be prevalent among the cohort, highlighting the complexity of APH. The study also identifies significant placental complications such as placenta previa, accreta, and abruption, which posed substantial risks for both maternal and neonatal health. A large portion of maternal outcomes involved caesarean sections, hysterectomies, and postpartum anemia. Neonatal outcomes revealed high rates of low birth weight, stillbirth, and birth asphyxia, indicating severe health challenges. The study stresses the need for targeted antenatal monitoring, early intervention, and improved neonatal care to mitigate these risks.

INTRODUCTION

Antepartum hemorrhage (APH) is defined as bleeding from or into the genital tract, occurring from 24 weeks of gestation until the onset of labor [1]. The principal causes of APH include placenta previa and placental abruption, with less frequent etiologies such as vasa previa, succenturiate lobe, and placental infections. APH complicates approximately 3–5% of pregnancies and remains a leading cause of perinatal and neonatal mortality [2]. In developed nations, perinatal mortality rates are generally below 10 per 1,000 live births. However, in countries like India, these rates are significantly higher, reaching 60 per 1,000 total births. Placenta previa (PP) refers to the abnormal implantation of the placenta over or near the internal os, obstructing the lower uterine segment. Placental abruption refers to the premature separation of the placenta from its normal position before birth, resulting in hemorrhage. Non-obstetric causes of APH include cervical polyps, cervical cancer, varicose veins, localized trauma, and cervical erosion [4]. Several obstetric conditions are associated with an increased risk of APH, including multifetal gestation, atypical fetal presentation, preterm labor, preeclampsia, eclampsia, polyhydramnios, and chorioamnionitis. Maternal complications due to APH include postpartum

hemorrhage (PPH), shock, sepsis, and disseminated intravascular coagulation (DIC). Fetal complications can include preterm birth, low birth weight, intrauterine fetal demise, congenital defects, and birth asphyxia. This study aims to evaluate the incidence, causes, and maternal and fetal outcomes associated with APH.

METHODOLOGY:

A cross-sectional observational study was conducted in the Department of Obstetrics and Gynecology at Timergara Teaching Hospital, Khyber Pakhtunkhwa, Pakistan, over one year, from January 1 to December 31, 2024. The study aimed to investigate the risk factors, causes, and maternal and neonatal outcomes related to antepartum hemorrhage (APH). A convenient, non-randomized sample of 100 pregnant women diagnosed with APH was recruited from patients attending the labor and emergency departments. Ethical approval was obtained from the hospital's review board, and informed consent was acquired from each participant or their legal guardian, when applicable. The inclusion criteria involved pregnant women exhibiting vaginal bleeding at or beyond 24 weeks of gestation, as determined by clinical assessment or confirmed through ultrasonography. Cases were included if APH resulted from any placental pathology, including placenta previa, placental abruption, or placenta accreta spectrum. Exclusion criteria included those with postpartum hemorrhage, non-obstetric bleeding sources (such as cervical lesions or trauma), identified coagulopathies, or inadequate clinical documentation. Each patient underwent a standardized triage process that involved the examination of vital signs, fetal well-being assessment using cardiotocography or portable Doppler, estimation of blood loss, and stabilization with intravenous fluids or blood transfusions as needed. A clinical examination was conducted to determine the origin and severity of bleeding, uterine tone, fetal position, and cervical status, while ultrasound imaging was used to examine placental location, signs of abruption, fetal viability, and amniotic fluid volume. Routine laboratory tests, including complete blood count, coagulation profile, blood grouping and cross-matching, and renal and liver function tests, were performed. Data were collected using a systematic proforma, documenting demographic data, obstetric and medical histories, and risk factors such as hypertension, diabetes, prior cesarean sections, parity, gestational age, and clinical outcomes. The study followed the hospital's protocols, including expectant management for stable cases and emergency caesarean delivery for life-threatening hemorrhages. Maternal outcomes (including postpartum anemia, caesarean hysterectomy, transfusion requirements, and mortality) and neonatal outcomes (such as birth weight, asphyxia, stillbirth, and NICU admissions) were recorded and analyzed. Antenatal care metrics, including the number of prenatal visits and fetal monitoring frequency, were also documented. Data entry and statistical analysis were performed using SPSS Version 26.0. Categorical variables were summarized using frequencies and percentages, and associations between risk factors and outcomes were analyzed using the Chi-square test or Fisher's exact test, with a p-value of less than 0.05 considered statistically significant. Results were presented in narrative format, supported by statistical tables.

RESULTS:

This study, involving 100 patients, aimed to investigate the incidence, causes, and maternal and fetal outcomes associated with antepartum hemorrhage (APH). The results highlight several significant findings across multiple aspects of maternal health, prenatal care, and neonatal outcomes. The general characteristics of the participants revealed a diverse sample. A substantial portion of the participants was either under 20 years (36%) or over 35 years of age (33%), both of which are age groups associated with higher pregnancy risks. Educational levels varied: 24% had completed college education, while 15% were illiterate. Parity data indicated that 36% of women had more than five prior births, suggesting multiparity as a common feature. Obesity was prevalent, with 57% of participants having a BMI greater than 30, a known contributor to maternal complications. Additionally, 35% of the pregnancies were delivered before 34 weeks, indicating a high incidence of preterm births (Table 1). In terms of medical history, 47% of the participants reported having a prior medical condition, with 55% having diabetes and 47%

suffering from hypertension. Notably, asthma was absent in all participants. Surgical history was significant, as 38% had undergone previous surgeries. These findings underscore the importance of considering underlying medical and surgical conditions when managing APH cases (Table 2). A large proportion of the participants had several significant risk factors for APH. Fifty-three percent of the women had a prior uterine scar, and 51% had gestational hypertension. Multiparity was seen in 52% of cases, and 47% experienced twin pregnancies, further increasing obstetric risk. Advanced maternal age (>35 years) was a risk factor in 51% of the cases. Additionally, 46% of women had malpresentation, which complicates the delivery process. These multifactorial risk factors highlight the need for targeted obstetric care and vigilant monitoring throughout pregnancy (Table 3).Placental abnormalities were common in this cohort. Complete placenta previa was observed in 36% of the cases, while 22% had partial placenta previa, affecting 58% of patients overall. Placenta accreta was also prevalent, with 72% of participants exhibiting some form of abnormal placental attachment: adherenta (26%), increta (25%), and percreta (21%). Placental abruption was another major complication, with 65% of the cases experiencing either partial or complete abruption. These placental conditions highlight the critical need for early detection and timely intervention to manage these high-risk pregnancies effectively (Tables 4, 5, and 6).The maternal outcomes reflected the high-risk nature of these pregnancies. A caesarean section (CS) was the primary mode of delivery for 54% of the participants. Notably, 42% required a caesarean hysterectomy due to severe complications. Postpartum anemia was observed in 55% of the cases, and blood transfusions were necessary for 37% of the participants, with a significant portion requiring three or more blood units. Fortunately, no maternal fatalities were reported, indicating the effectiveness of critical care interventions. These outcomes emphasize the importance of timely medical interventions to manage the hemorrhagic risks associated with APH (Table 7).Neonatal outcomes revealed concerning statistics. Fifty-five percent of neonates had a birth weight of less than 2500 grams, indicating a high prevalence of low birth weight (LBW) infants. Nearly half (46%) of the neonates were stillborn, and 48% suffered from birth asphyxia. Additionally, 51% of neonates required admission to the neonatal intensive care unit (NICU). The gestational age data further emphasized the risks associated with preterm birth: 30% of neonates were delivered before 34 weeks, and only 36% reached full term. These findings underscore the need for enhanced neonatal care for infants born under high-risk conditions (Table 8).Antenatal care was relatively well-accessed, with 70% of participants attending at least four prenatal visits. However, a concerning 30% had insufficient prenatal care, either attending fewer visits or none at all. Fetal monitoring was regularly conducted in 68% of cases, but 32% experienced sporadic or no monitoring, which increases the risk of undiagnosed fetal distress. These results highlight significant gaps in the consistency of prenatal care and the need for more robust monitoring protocols to improve both maternal and fetal outcomes (Tables 9 and 10)..

Table 1: General Characteristics (N = 100)

Category	Subcategory	Frequency
Age	< 20 years	36
	20-34 years	31
	> 35 years	33
Mother education	Illiterate	15
	Read & write	22
	1ry school	17
	2ndry school	22
	College	24
Parity	Nulliparous	27
	1-4 para	37
	>5 para	36
BMI	25-29.9 (over weight)	43
	>30 (Obese)	57
GA (Gestational Age)	<34 week	35
	34-36 week	36
	>37 week	29

The chart highlights that a significant portion of participants were either under 20 or over 35, both age groups associated with higher pregnancy risks. Most mothers had previous births, with high parity and obesity being common—both known contributors to maternal complications. Educational levels varied, but college-educated mothers slightly outnumbered others. Notably, a large share of pregnancies ended before 37 weeks, pointing to a high rate of preterm births, which further emphasizes the need for targeted maternal healthcare interventions.

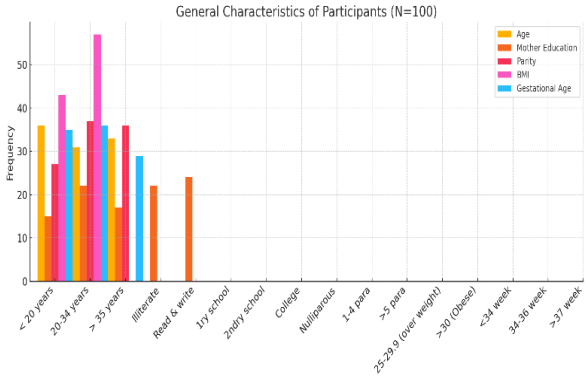
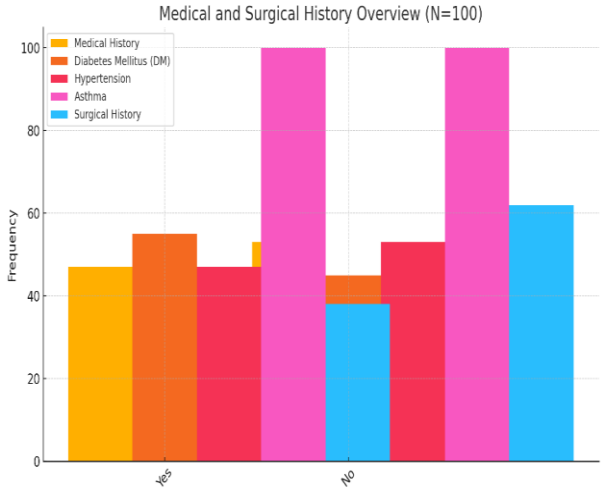


Table 2: Medical and Surgical History (N = 100)

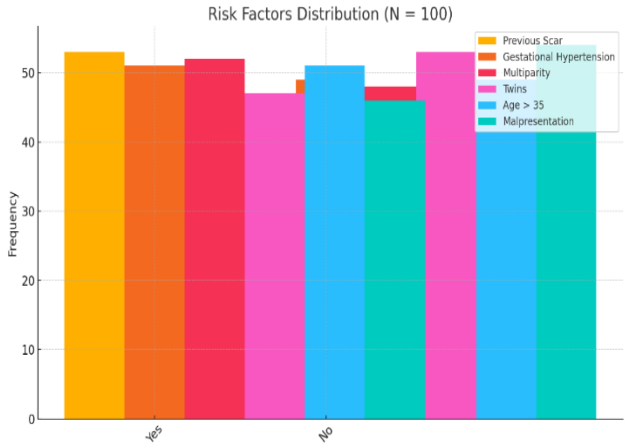
Category	Subcategory	Frequency
Medical history	Yes	47
	No	53
Diabetes Mellitus (DM)	Yes	55
	No	45
Hypertension	Yes	47
	No	53
Asthma	No	100
Surgical history	Yes	38
	No	62



The data reveals that nearly half of the participants reported a medical history, with **Diabetes Mellitus (55%)** and **Hypertension (47%)** being notably prevalent, suggesting these conditions are common among the studied group. **Asthma** was not reported by any participant, indicating it might not be a significant concern in this population. Furthermore, **38%** had undergone prior surgery, underlining the importance of considering surgical backgrounds in maternal care. This snapshot highlights key health factors that may influence pregnancy outcomes and the need for tailored antenatal management

Table 3: Risk Factors (N = 100)

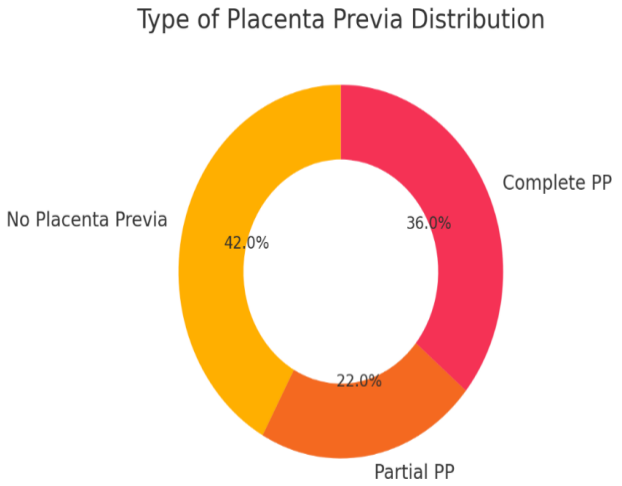
Category	Subcategory	Frequency
Previous scar	Yes	53
	No	47
Gestational Hypertension	Yes	51
	No	49
Multiparity	Yes	52
	No	48
Twins	Yes	47
	No	53
Age > 35	Yes	51
	No	49
Malpresentation	Yes	46
	No	54



The data illustrates that over half of the participants had a **previous uterine scar** (53%), **gestational hypertension** (51%), **multiparity** (52%), and were aged **over 35 years** (51%)—all of which are significant risk factors for pregnancy complications. Additionally, **47**% experienced twin pregnancies, and **46**% had malpresentation, both of which elevate delivery risks. This distribution underscores the multifactorial nature of pregnancy risk and highlights the need for vigilant monitoring and tailored obstetric care for high-risk case

Table 4: APH – Type of Placenta Previa (N = 100)

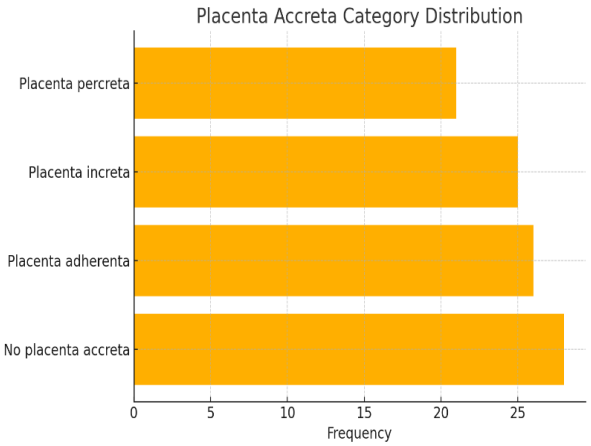
Type of Placenta Previa	Frequency
No Placenta Previa	42
Partial PP	22
Complete PP	36



The chart reveals that **42**% of the cases had no placenta previa, while **36**% experienced complete placenta previa and **22**% had partial. This indicates that nearly **58**% of the patients were affected by some form of placenta previa—a condition with significant implications for delivery planning and maternal-fetal outcomes—highlighting the importance of early detection and tailored clinical management.

Table 5: APH – Placenta Accreta (N = 100)

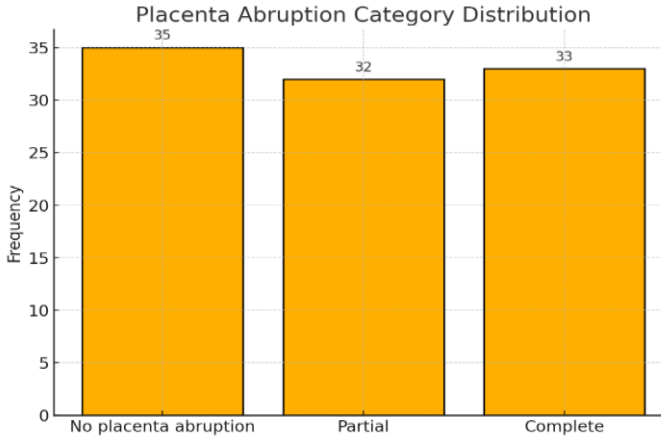
Placenta Accreta Category	Frequency
No placenta accreta	28
Placenta adherenta	26
Placenta increta	25
Placenta percreta	21



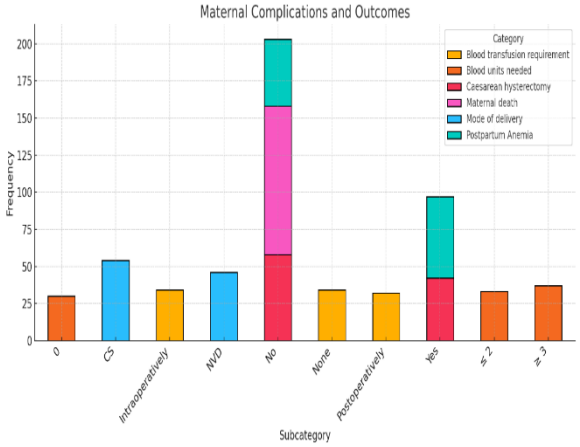
This horizontal bar chart shows a fairly even distribution among the types of placenta accreta. While **28**% had no accreta, the remaining **72**% exhibited abnormal placental attachment—**placenta adherenta** (26%), **increta** (25%), and **percreta** (21%)—all of which pose serious risks during delivery. The data underscores the critical need for antenatal imaging and multidisciplinary planning to manage these complex obstetric conditions effectively

Table 6: APH – Placenta Abruption (N = 100)

Placenta Abruption Category	Frequency
No placenta abruption	35
Partial	32
Complete	33



This bar chart shows that **65%** of participants experienced some form of placental abruption, with **partial (32%)** and **complete (33%)** cases occurring almost equally. Only **35%** had no abruption, indicating a high prevalence of this complication in the study group. These findings stress the importance of timely diagnosis and emergency preparedness in managing pregnancies with suspected placental separation



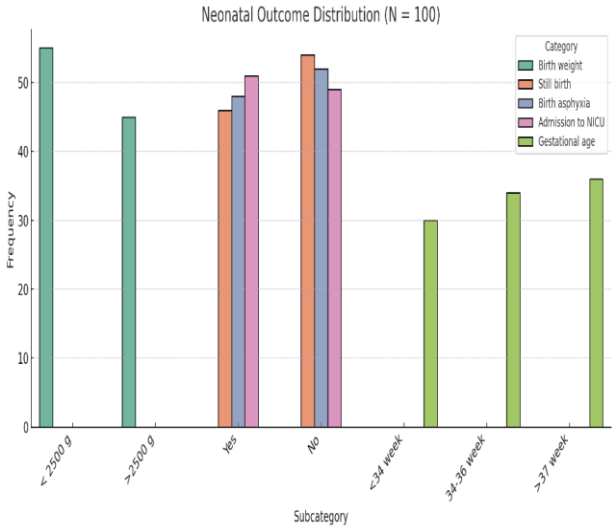
The stacked bar chart showcases key maternal outcomes and complications. **Caesarean section (54%)** was the predominant delivery mode, with **42%** requiring a caesarean hysterectomy. **Postpartum anemia** affected over half of the cases (55%), and **blood transfusions** were fairly distributed between no transfusion, intraoperative, and postoperative needs. Alarmingly, **37%** needed three or more blood units, indicating significant hemorrhagic risk. Importantly, **no maternal deaths** were reported, highlighting effective critical care despite the complications.

Table 7: Maternal Outcome (N = 100)

Category	Subcategory	Frequency
Caesarean hysterectomy	Yes	42
	No	58
Postpartum Anemia	Yes	55
	No	45
Blood transfusion requirement	None	34
	Intraoperatively	34
	Postoperatively	32
Blood units needed	0	30
	≤ 2	33
	≥ 3	37
Mode of delivery	CS	54
	NVD	46
Maternal death	No	100

Table 8: Neonatal Outcome (N = 100)

Category	Subcategory	Frequency
Birth weight	< 2500 g	55
	>2500 g	45
Still birth	Yes	46
	No	54
Birth asphyxia	Yes	48
	No	52
Admission to NICU	Yes	51
	No	49
Gestational age	<34 week	30
	34-36 week	34
	>37 week	36



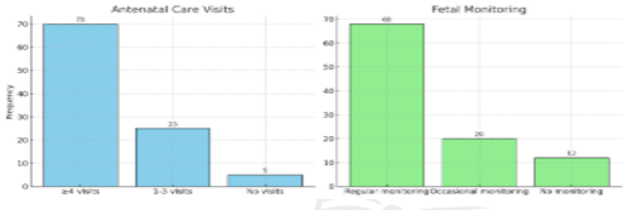
The clustered bar chart reveals that **low birth weight (<2500 g)** was common (55%), and nearly half of the newborns experienced **birth asphyxia (48%)** or were **stillborn (46%)**, indicating significant neonatal health challenges. Additionally, **51%** required **NICU admission**, further reflecting high-risk deliveries. The distribution of **gestational age** shows most births occurred before 37 weeks, with only 36% being full-term, reinforcing the association between preterm births and poor neonatal outcomes

Table 9: Antenatal Care (N = 100)

Antenatal Care Visits	Frequency
≥4 visits	70
1-3 visits	25
No visits	5

Table 10: Fetal Monitoring (N = 100)

Fetal Monitoring	Frequency
Regular monitoring	68
Occasional monitoring	20
No monitoring	12



The images underscore positive trends in antenatal care, with 70% of individuals attending four or more visits, signifying strong maternal involvement. Nevertheless, a troubling 30% had insufficient or no visits. Fetal monitoring was consistently conducted in 68% of patients, while 32% experienced only sporadic or no monitoring, thereby increasing the risk of undiscovered fetal distress. These findings underscore the need of regular prenatal treatment and ongoing fetal evaluation in enhancing mother and newborn outcomes.

Discussion:

Antepartum hemorrhage (APH) remains a significant obstetric complication, with a multifactorial etiology and a high impact on maternal and neonatal outcomes. This study aimed to identify the key risk factors, causes, and maternal and neonatal outcomes associated with APH, providing valuable insights into the challenges faced by women in high-risk pregnancies.Our study highlighted a bimodal distribution of maternal age, with 36% of participants under 20 years and 33% over 35 years. Both these age groups are associated with increased pregnancy risks, including higher incidences of APH. The younger cohort may be at higher risk for preterm birth and fetal growth restriction, while the older cohort faces complications such as placental abnormalities, hypertension, and diabetes, which were notably prevalent in our study. This aligns with findings from other studies, which indicate that advanced maternal age increases the likelihood of placental disorders such as placenta previa and placental abruption [1][2].Obesity was another significant risk factor, with 57% of women in our study classified as obese (BMI > 30). Obesity is a well-documented contributor to various pregnancy complications, including gestational hypertension, diabetes, and increased risk of cesarean delivery [3]. The high prevalence of obesity in our cohort underscores the importance of addressing maternal weight and metabolic health early in pregnancy, as these factors contribute significantly to adverse maternal outcomes.Placenta previa, placenta accreta,

and placental abruption were the predominant placental complications observed in this study. A total of 58% of women had some form of placenta previa, with 36% experiencing complete placenta previa, a condition that poses significant risks to both maternal and fetal health. Placenta accreta, affecting 72% of participants, is particularly concerning due to its association with severe hemorrhage and the need for caesarean hysterectomy, as seen in our study. Similarly, placental abruption, present in 65% of cases, is known to cause fetal distress, preterm labor, and maternal hemorrhage [4].The high prevalence of these placental complications in our cohort emphasizes the need for early diagnosis through routine ultrasound screenings. Given the severe risks posed by these conditions, timely management strategies, including the possibility of early delivery or cesarean section, are crucial to improving maternal and fetal outcomes.: Gestational hypertension (51%) and previous uterine scars (53%) were common among the participants, further contributing to the elevated risk of adverse pregnancy outcomes. Women with previous cesarean deliveries are at increased risk for uterine rupture, placenta accreta, and other complications in subsequent pregnancies [5]. These findings highlight the need for careful monitoring of women with previous cesarean sections, as well as those with hypertension during pregnancy, to prevent potentially life-threatening situations.The study revealed a high incidence of preterm birth, with 35% of pregnancies occurring before 34 weeks of gestation. Preterm birth is a major contributor to neonatal morbidity and mortality, and the associated risks are compounded by placental complications and maternal health conditions such as hypertension and obesity. The neonatal outcomes in our study were concerning, with 55% of neonates having low birth weight, 46% stillborn, and 48% suffering from birth asphyxia. These findings are consistent with other studies that report higher rates of neonatal complications in cases of APH [6].The need for specialized neonatal care was highlighted by the fact that 51% of the neonates required admission to the NICU. Given the high risk of prematurity and complications such as asphyxia and low birth weight, early neonatal interventions, including advanced respiratory support and monitoring, are essential to improving survival and reducing long-term morbidity. Despite the high-risk nature of the pregnancies in this study, 70% of the women attended at least four prenatal visits, which is encouraging. However, 30% had insufficient prenatal visits, and 32% of pregnancies had inadequate fetal monitoring. The lack of consistent monitoring is concerning, as it increases the likelihood of undiagnosed complications, including fetal distress and growth restriction. Studies have shown that inadequate prenatal care is a significant predictor of poor maternal and fetal outcomes, and our findings reinforce the need for better access to regular antenatal care, especially for high-risk pregnancies [7]. hemorrhage episodes resulted from placental abruption, while 58% were linked to placenta previa, with 7.03% of placenta previa cases related with placenta accreta [11]. Tyagi P. (2016) similarly indicated that placenta previa constituted 80% of instancesof antepartum hemorrhage (APH), followed by placental abruption at 19% and unexplained reasons at 1% [12]. Behera R. et al. (2022) identified analogous patterns, with placenta previa accounting for 71% of instances, placental abruption for 27%, and unexplained causes for 2% [13]. Gelan M. et al. (2020) identified placental abruption as the predominant cause of antepartum hemorrhage at Jimma University Medical Center, constituting 74.5% of cases [14]. In South Africa, Heitkamp A. identified placental abruption as the predominant cause of antepartum hemorrhage (APH), representing 37.8% of cases [15]. Kulkarni AR et al. (2021) indicated that 60% of antepartum hemorrhage cases were attributed to placental abruption, 37%to placenta previa, and 3% had undetermined reasons [16]. The prevalence of placenta accreta in this study is 22%, surpassing findings from other places, such as Hamadameen AI (2018) in Iraq, which reported a 7% incidence of placenta accreta [11]. The actual incidence of placenta accreta is difficult to ascertain, however it is considered to be around 1 in 1,000 deliveries, with reported variations from 1in 500 to as high as 1 in 111. of placenta accreta is probably linked to the increase in related risk factors, such as placenta previa, prior caesarean deliveries, the use of assisted reproductive technologies, uterine procedures, and advanced mother age. Uterine conservation and a

history of retained placenta orplacenta accreta have been identified as notable risk factors [17]. study detected a prior uterine scar in 72% of patients (36 cases), gestational hypertension in 26% (13 cases), multiparity in 16% (8 cases), twin pregnancy in 4% (2 instances), advanced maternal age (>35 years) in 22% (11 cases), and malpresentation in 16% (8 cases). findings align with Dibaba B. [18], who determined that women with a prior caesarean section were 4.7 times more susceptible to experiencing APH compared to those without a caesarean history. that 7.1% of instances of APH had twin pregnancies, in contrast to 5.7% in the control group [18]. study reported maternal outcomes of caesarean hysterectomy in 4% of cases (2 instances), postpartum anemia in 54% (27 cases), and blood transfusions in 72% (36 cases), with 18% of transfusions occurring intraoperatively (9 cases) and 54% postoperatively (27 cases). majority of patients received two or fewer units of blood (58%, 29 cases), whereas 14% received three or more units (7 cases). section constituted 88% of deliveries (44 instances), whereas vaginal delivery accounted for 12% (6 occurrences). No maternal fatalities were documented. results correspond with the research conducted by Hamadameen AI (2018) in Iraq, which indicated that blood transfusions of ≥5 units occurred in 5% of cases, caesarean sections 78.4% hysterectomies 0.9%, and a maternal mortality rate of 0.3% [11]. Choudhary J et al. (2018) noted elevated rates of unfavorable pregnancy outcomes in women with APH (83.3% vs. 49.2%, P = .0001) [10], whereas Agarwal S. et al. (2023) documented blood transfusion in 70% of instances, peripartum hysterectomy in 17.1%, and maternal mortality in 2.63% of cases [4]. This study reported neonatal outcomes of low birth weight in 30% of cases (15 newborns), stillbirth in 2% (1 newborn), birth asphyxia in 6% (3 newborns), and NICU hospitalization in 46% (23 newborns). Prematurity occurred in 54% of instances (27 babies), with 24% (12 newborns) delivered prior to 34 weeks of gestation and 30% (15 newborns) delivered between 34-36 weeks. The results align with the research conducted by Choudhary J. et al. (2018), which reported poorer newborn outcomes for infants born to mothers with APH (59.1% vs. 23.9%, P = .0001) [10]. Hamadameen AI (2018) found neonatal outcomes of 39.9% low birth weight, 47.8% preterm, 42.9% NICU admission, and 24.2% perinatal mortality [11]. Agarwal S et al. (2023) indicated that 34% of neonates were either preterm or of low birth weight, with stillbirth occurring in 12%, neonatal mortality in 9%, and NICU hospitalization in 45% [4]. Khandasu S. et al. [19] also reported a perinatal and stillbirth rate of 21% among patients with antepartum hemorrhage (APH). Institutions must provide extensive services at their labor and delivery facilities to mitigate adverse outcomes for women and infants. Final Assessment provide extensive services at their labor and delivery facilities to mitigate adverse outcomes for women and infants. This involves ensuring that the facility is equipped with organized apparatus and staff who offer polite help. Furthermore, it is essential to swiftly recognize any possible complications, prepare families for blood donation in anticipation of a transfusion, have proficient anesthesia staff on hand, and guarantee that all requisite human resources are available to efficiently address cases of antepartum hemorrhage.

Conclusion: This study illustrates the complex nature of antepartum hemorrhage and the multitude of factors that contribute to maternal and neonatal complications. The high prevalence of placental abnormalities, advanced maternal age, multiparity, obesity, and preterm births in this cohort underscores the need for targeted interventions. Adequate antenatal care, early detection of placental complications, and timely clinical management are essential to improving both maternal and neonatal outcomes. Regular fetal monitoring and improved prenatal care can significantly reduce the risks associated with APH, ultimately leading to better pregnancy outcomes.

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