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**ASSESSMENT OF POST-PARTUM HEMORRHAGE MANAGEMENT
OUTCOME AND ASSOCIATED FACTORS AMONG WOMEN WHO GAVE
BIRTH IN ADDIS ABABA PUBLIC HOSPITALS: A RETROSPECTIVE
STUDY**

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List of abbreviations and acronyms

AOR: Adjusted odd ratio

ANC: Antenatal care

APH: Antepartum hemorrhage

ATSMML: active third stage management of labor

CI: Confidence interval

CS: cesarean sectioning

ETB: Ethiopian birr

FIGO: federation of international obstetrics and gynecology

ICU: Intensive care unit

IRB: Institutional review board

MCH: maternal child health

NASG: Non-pneumatic anti-shock garment

PE: preeclampsia

PPH: post-partum hemorrhage

RR: Relative risk

WHO: world health organization

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Abstract

Background: Four main parts of national guidelines of post-partum hemorrhage management and prevention include risk identification and prevention, active management of third stage of labor, emergency responses protocols and training and implementations Postpartum hemorrhage management remains a significant challenge, with limited studies on outcomes and associated factors. Assessing management outcomes of post-partum hemorrhage among Addis Ababa-selected public hospitals is crucial for guidelines implementation.

Objective: To assess postpartum hemorrhage management outcome and associated factors among women who gave birth in selected Addis Ababa public hospital.

Methods: A hospital-based retrospective study design used to include 315 mothers who develop postpartum hemorrhage during the study period. Simple random sampling method was implemented. Secondary data collected by trained data collectors. The collected data cleaned, entered, and analyzed using SPSS computer software. Bi-variate regression analysis was used to identify independent predictors of the PPH management outcome of mothers. By multiple logistic regression predictors which had $p\text{-value} < 0.05$ were identified the results presented in tables, charts, and text as appropriate.

Result: The study analyzed post-partum hemorrhage management outcome from 315 mothers who developed post-partum hemorrhage from those 62.9% had favorable outcome (recovered with out of developed complications) whereas 37.1% had unfavorable outcomes (recovered cope up of complications or died). Anemia history linked to a lower odds ratio of 0.020(95%CI :0.004-0.060, $p\text{-value} < 0.001$) of unfavorable outcomes. The nonsurgical intervention elevated the likelihood of unfavorable outcomes by AOR of 7.13(95%CI,2.27-19.0, $p\text{-value} < 0.001$). Lack of blood transfusion by AOR 0.27 (95%CI,0.13-0.17, $p\text{-value} < 0.001$). and lack of fluid resuscitation (AOR = 2.481(95% CI: 1.238-4.972, $p\text{-value} = 0.02$)) with unfavorable outcomes.

Conclusion and recommendations: The study suggests that risk identification, emergency response, and effective implementation of guidelines can improve post-partum hemorrhage outcomes, despite the high number of complications and deaths.

Key words: favorable, maternal, management outcome, postpartum hemorrhage, unfavorable

1.INTRODUCTION

1.1. Background

According to world health organization (WHO), Postpartum hemorrhage (PPH) is defined as blood loss exceeding 500mm or 1000mm following vaginal delivery or cesarean section, causing vital sign derangement or 10% hemoglobin loss. It can be Primary PPH occurs within 24 hours of delivery, while late or secondary PPH occurs after 24 hours to 6 weeks(1, 2).

PPH is a sudden and erratic obstetrics disorder mostly caused by uterine atony. It happens when the uterus is unable to contract properly after giving birth, which results in postpartum hemorrhage and profuse bleeding. This happens when regular contractions are either nonexistent or very weak, leading to ongoing bleeding. Eighty percent of cases are caused by the above listed mechanism. Alongside uterine atony, other prominent causes include coagulopathy issues, retained placentas, and birth canal tears (3, 4).

Globally approximately 140 million pregnancies occur each year. Six up to eight million pregnant women from north America, 10-15 million of Europe, 15-20 million pregnant women of Latin America and Caribbean, 60–70 million pregnancies of Asia, 30–40 million pregnancies of Africa annually(5). Ethiopia has high fertility rate which is 4.0 birth per women(6). The overall prevalences of PPH worldwide is 6 % to 11% of deliveries (7). Post partum hemorrhage contributes for 20% of maternal death globally and 80% of death in sub Saharan Africa and south Asia(8). Pooled prevalence of PPH in Ethiopia is 11.4% of all deliveries (9).

The risk factors associated with post-partum hemorrhage varies across regions, but previous PPH, multiple pregnancies, prolonged labor and placental complications considered global contributors for it(10). Key indicators for PPH in Ethiopia are being multipara, lack of antenatal care and previous PPH(9).

The International Federation of Gynecology and Obstetrics (FIGO) recommends treating PPH with intravenous oxytocin, intramuscular ergometrine, prostaglandin drugs, and isotonic crystalloids, and surgical interventions if bleeding persists(11). The Ethiopian Ministry of Health has developed guidelines for the prevention and treatment of postpartum hemorrhage (PPH), which include blood transfusions, surgical interventions, utero-tonics, general management of the third stage of labor,

and cause-specific management, such as uterine atony with utero-tonics like oxytocin if it is not available use misoprostol methylergonovine or carboprost and uterine massage ; retained placenta by manual or surgical intervention; trauma such as tears and lacerations require surgical repair and blood transfusions and coagulopathies by means of blood products such as fresh frozen plasma or platelet. Those are encompassed in four main parts of guide line risk identification and preventions, active management of third stage of labor ,emergency responses protocols and training and implementations (12). It has also implemented guidelines to enhance maternal health outcomes, including 24-hour postnatal care, training healthcare providers, standardized protocols, and mobile health interventions.(13).

Preventing postpartum hemorrhage involves early risk identification, correcting anemia, eliminating routine episiotomy, monitoring vital signs, active management of third stage labor, and using Non-pneumatic Anti-shock Garment(14-17).Therefore the aim of this study is to assess current management outcome of PPH.

1.2. Statement of the problem

The World Health Organization (WHO) estimates that approximately 14 million women experience PPH annually. PPH is the leading cause of maternal mortality, accounting for over 25% of deaths annually, with 60% of maternal deaths in developing countries(18, 19). When compare management options of post-partum hemorrhage of affluent countries to low-income countries like Ethiopia. Postpartum hemorrhage is a major cause of maternal death and untreated due to long transfers, lack of experienced clinicians, insufficient intravenous fluids and inadequate and untimely blood supplies(20).

Postpartum hemorrhage can cause complications like orthostatic hypotension, hypovolemic shock and anemia. Delayed management of PPH leads to long term complications like post-natal depression and difficulty in baby care, postpartum pituitary necrosis, occult myocardial ischemia, and death. Studies shown that PPH is linked to 27% of immediate postpartum anemia, and 2.2% of hypovolemic shock during post-partum period (14).

The consequences of postpartum hemorrhage (PPH) affect the psychosocial health of families, with 15% of husbands whose wives experience PPH and receive treatment through uterine artery embolization and blood transfusion, developing depression and post-traumatic stress (21-23).

Socioeconomic concerns on untreated or undertreated PPH are substantial in low economic countries. One integrated literature review shows PPH often leads to extended hospital stays, intensive care, and blood transfusions, which significantly increase healthcare costs. In the United States, PPH-related readmissions alone cost around \$180 million. In the United Kingdom and India, the cost of intensive care unit (ICU) admission per patient by PPH was \$167.89 and \$167.89, respectively. The review also shows the total cost of PPH management in Austria was \$2,940.92 per patient. In Kenya and Mali, 30% of PPH patients need blood transfusion. Severe PPH cases strain healthcare systems, especially in resource-limited settings, requiring specialized care and extended hospital stays. This socioeconomic burden can lead to financial hardship, long-term economic instability, and reduced quality of life(24, 25).

Studies indicates the importance of understanding post-partum hemorrhage management outcomes to correct misconceptions about its causes, such as supernatural powers or evil spirits, which negatively impact the management.(26). PPH is most prevalent and major cause of maternal death worldwide and in low-income outcome countries including Ethiopia. Although the national management protocol of PPH is being applied and training on PPH management are being provided, PPH management outcome is still a big concern. Even if there are a lot of studies conducted on prevalence and risk factor of PPH, studies on management outcome and associated factors of PPH in Ethiopia are limited. When mothers develop post-partum hemorrhage during delivery their outcome is affected by different variables and depends on the types and availability and applicable of recommended management procedures according to national guideline that is they joined at the end of treatment which may be recovery without developing complications or developing comorbidities and losing their life. So, this study helps to predict factors and interventions which affect post-partum hemorrhage management output and explore national PPH guidelines. To fill this gap, this study assessed post-partum hemorrhage management outcome and associated factors of selected public hospitals of Addis Ababa.

1.3. Significance of the study

The aim of this study is to find out management results of post-partum hemorrhage and factors associated with it. Finding of study was contributed for the following stake holders:

- Ethiopia's health minister and Addis Ababa health Bureau who seek information on how much women with postpartum hemorrhage had been properly managed to improve women's health.
- For policy makers and health care administrations informs about necessary resources and materials for management of PPH.
- Community awareness on outcome and risk factors of PPH encourage pregnant women to timely visit and reducing risk of complications.
- For the health professionals to fill their gap on management of PPH
- For mothers, create awareness what leads to undesired outcome of post-partum hemorrhage management.
- Other researchers could gain baseline information to further explore on the topic.

2. LITERATURE REVIEW

2.1. Introduction of literature review on postpartum hemorrhage management outcome and associated factors

This review is organized in a way that provide over view for the outcome of the study like management outcome of postpartum hemorrhage is the dependent variable in this study's literature reviews, while the independent variables are medically related factors like diabetic mallets, anemia, and coagulopathy issues, obstetrics factors like parity, placental disorders, hypertensive disorders during pregnancy, mode of delivery, cause of PPH, and antepartum hemorrhage, sociodemographic factors like age, residency, marital and socioeconomic status and managements of post-partum hemorrhage . In the upcoming sessions, the variables are presented along with relevant research from both local and global sources.

2.2. Management Outcome of Post-Partum Hemorrhage

After receiving treatment for postpartum hemorrhage, mothers may either recover without comorbidity or experience problems that lead to complications or death from PPH. The results of managing postpartum hemorrhage are demonstrated in several pieces of literature. One systematic review in South Korea reveals that 4.4% women died from all managed PPH cases. This study also declares that from all women who are managed for PPH 51% developed deep intravascular coagulopathy, 6.7% developed acute renal failure and 26.9% developed pulmonary complications, 5% developed deep vein thrombosis, 5.7% developed cardiac complications, and 6.7% developed pituitary necrosis. Study conducted in United States of America which states that from 195 women who experienced post-partum hemorrhage 3.2% developed severe comorbidities (27, 28).

From studies conducted in Africa on management outcome of PPH, study in Senegal and Mali found that 4.5% of women experience death before hospital discharge. From women who are diagnosed as post-partum hemorrhage 27.7%, 1.1%, 1.1% had blood transfusion, hysterectomy done and transferred to another hospital respectively. The transfusion, hysterectomy and transferred to other hospital has case fatality rate of 9%, 17.1% and 50% respectively(29). A retrospective study in Nigeria on management and outcome of PPH, founded that bleeding of 70.6%, 100% and 33.3 % of mothers bleeding was arrested without complication in tertiary,

secondary and primary health facilities respectively(30).study conducted in Sierra Leone shows 31% (68) of the 217 postpartum hemorrhage cases that were reported dead (31).

A study conducted in Ethiopia on management outcome of postpartum hemorrhage before the development of recent guideline on prevention and management of PPH, 2022, found that 3.8% of postpartum hemorrhage mothers had died and 96.2% had improved from management of it. The other case control study also review that 86 % of managed women from PPH has improved out of any complications and 14 % of managed women with PPH has undesired outcome (died and developed complications)(32, 33).

2.3. Association of post-partum hemorrhage managements with post-partum hemorrhage management outcome

PPH can be controlled generally and cause specifically with the right time, medications, and various procedures, according to national and international recommendations. Numerous research on postpartum hemorrhage therapy has demonstrated its direct impact outcome.

WHO survey on types of management of PPH and its outcome for the utilization of uterotonic drugs in improved cases of postpartum hemorrhage is 1.76times than not utilizing respectively. This indicates a strong association between blood product utilization, uterotonic treatment and improved outcomes in PPH cases. But balloon tamponade, removal of retained conception, therapeutic intravenous antibiotics, manual placenta removal, and arterial ligation are protected for improved PPH case respectively; those are less likely to be linked to better postpartum hemorrhage outcomes. Studies on 40 countries reveal utilization of blood products associated with improved outcome of postpartum hemorrhage by 1.30 times (34, 35).

According to a study conducted in the California Obstetrics Center in the United States, out of 159 women who had spontaneous deliveries and experienced postpartum hemorrhages, 95.1% were treated with uterotonics (47.2% methylergonovine, 12% carboprost, and 35.9% misoprostol) and 0.6% underwent uterine artery catheterization. Five (3.2%) of these women experienced undesired management outcome(28). A study in the Netherlands found that fluid resuscitation volumes significantly influenced maternal outcomes in women with persistent postpartum hemorrhage. Median blood loss was 2.9 liters, with adjusted mean differences varying for different fluid volumes. Adverse maternal outcomes were 1.0 for 2-3 liters, 1.2 for 3-4 liters, 1.8 for 4-5 liters, and 4.4 for 5-7 liters(36). Another systematic review in two south Korea National University hospitals reveals that 4.4 % died from all surgically managed PPH cases whereas no one did not die by non-surgical intervened PPH cases. This study also shows that using of tranexamic acid has good improvement on management outcome of PPH(27).

Retrospective study in Sierra Leone shows manage of post-partum hemorrhage was all the patients were initially treated with uterotonics, according to the conclusions of an assessment of postpartum hemorrhage therapy at Princess Christian Maternity Hospital. All of the deaths treated by uterotonics(31). Study from Nigeria also shows manual removal of placenta related by 2.5 for development of endometritis and 6.67 time for massive bleedings means undesired outcome of PPH(37).

One method of managing postpartum hemorrhage that was implemented in low-income nations has improved the outcomes for moms suffering from PPH by reducing blood loss as well as morbidity and death was NASG. NASG helps in postpartum hemorrhage (PPH) treatment. In several countries, including Ethiopia, Nigeria, and Egypt, studies have demonstrated its effectiveness. NASG has been shown to significantly reduce blood loss during PPH. For example, adopting the NASG decreased the median blood loss from 400 mL to 200 mL, lowers maternal mortality from 9% to 3.1%, according to a study conducted in Egypt and Nigeria (38, 39).

According to WHO guidelines, postpartum hemorrhage should be treated within 24 hours of diagnosis; if this window is missing, the delay persisted. It recommends administration of taxemic acid with three hour of birth is decreasing maternal morbidity and mortality without consider of any cause of post-partum hemorrhage, supported by World Maternal Antifibrinolytic Trial(40).The timing of postpartum hemorrhage management has an effect on the outcome of that management. Research backs this up, delays of more than three hours from referral and more than an hour in in-hospital management, according to an Indonesian study, raised the chance of near-miss cases by 8.37 times and maternal death by 25.34 times(41).

2.4. Sociodemographic factors association with management outcome of PPH

From the factors associated with management outcome of PPH, sociodemographic factors like age, marital status, residencies, educational status, and socio-economic factors are discussed in this session.

One qualitative study in East Midlands Nottingham reveals a supportive partner during the management of PPH can improve maternal outcomes by providing emotional support, reducing stress, and facilitating effective communication with healthcare providers. This indicates married women have a good outcome after management of PPH (36).

A study in Brazil found that the mean age of a woman with severe management outcomes (died and developed complications) and improved out of developed complications is 28.2 years and 25.8 years after management of PPH, respectively. A severe management outcome of a woman age less than 19 and greater than 35 is 13.9% and 19.8% respectively. In addition to this, the older women had delayed response time, developed comorbidities, and died (42). This is also supported by systematic review and meta-analysis in Ethiopia, which reveals that age >35 is associated with undesired postpartum hemorrhage management outcome AOR 4.61 (95% CI: 2.81-7.56) (9).

Although the exact odd ratio of association was not stated by the meta-analysis and systematic review of postpartum hemorrhage in Ethiopia, it did show that women with higher educational attainment sought treatment for PPH early and had positive management outcomes, while those with lower socioeconomic status had poorer management outcomes (38).

Postpartum hemorrhage management outcomes are influenced by the residency of the mother. Rural women face challenges due to limited healthcare infrastructure and longer travel time to health institutions. Whereas urban areas have better-equipped facilities, better antenatal care, and more developed transportation and referral systems, leading to better management outcomes. This is supported by WHO multicounty survey of severe maternal outcomes (death and complications by PPH) was 30.1% from another health facility versus 2.6% of the same facility. A significant risk factor for a severe maternal outcome was giving birth somewhere else and then being moved to the obstetric intensive care unit after giving birth (RR = 1.51; 95% CI: 1.71–1.96; p = 0.002) (39).

2.5. Obstetrics factors association with management outcome of PPH

This associated factor encompasses mode of delivery, prolonged third stage of labor, birth canal tears, uterine atony, parity, gestational age, previous PPH, augmentation/induction, ANC (anti natal care) follow-up, antepartum hemorrhage (placenta previa, abruption placenta) and hypertensive disorders during pregnancy. All those factors that are stated in with next paragraphs are alone or in groups.

There are multiple studies conducted on these factors and postpartum hemorrhage management outcomes both globally and locally. According to FIGO, several obstetrics factors affect the management outcome of PPH. These are uterine atony 2.5time, prolonged labor by 1.8-2.2-time, previous PPH by 3.5times, multiple gestations by 2.5times, instrumented delivery by 2.8 times, and cesarean delivery 2.5-3 times related to unfavorable PPH management outcome (5). According to a surveillance study carried out in Ethiopia, out of the 19 mothers who passed away, 15 had uterine atony after 11 had taken oxytocin, 2 had ergometrine, and 2 had a hysterectomy, while two of the 19 moms who died had genital tract trauma after it was repaired(16).

World health survey clarifies gestational age <37 weeks by 0.627 a strong association with gestational age between 37 and 41 weeks and gestational age >41 weeks by 1.83 to favorable outcome. This survey also shows strongly likely hood improved management outcome of PPH association with a mode of delivery for induced spontaneous vaginal by 1.44 (95% cl, 1.22–1.70), but less likely for cesarean section by 0.571(35).

A study done in northwest Brazil revealed that association between parity, ANC follow ups induction and augmentation of labor to PPH management outcome. Both the non-severe management outcome and severe management outcome of postpartum hemorrhage groups had comparable numbers of pregnancies; however, patients with more than two prior deliveries were more likely to experience a severe maternal outcome 1.75 times primiparas .and number of prenatal visits attended <6 times by 1.12; than greater than six visits (42). A protective factor against SMO (near miss and died) was either induction or augmentation of labor 0.49), delivered via current CS by 1.10 and previous CS by 0.95to severe management outcome (near miss and died) (36).

Study in Sierra Leone reveals that association of parity, pre-eclampsia and previous cesarean sectioning to PPH management outcome; PPH management outcome was linked to parity and the existence of obstetric difficulties after controlling for maternal factors evidenced by bad PPH management outcome was 1.3 times higher for women with parity greater than two to less than two. This study also state unfavorable PPH management outcome were two times higher for women who had already had PPH from no prior PPH; unfavorable PPH management outcome of women with pre-eclampsia to out of PE was 2.3 times greater.

Uterine atony is a major cause of postpartum hemorrhage, affecting management outcomes and complicating maternal conditions like hypovolemic shock and organ failure. Despite a decrease in the maternal death rate, PPH accounted for 75% of maternal deaths, according to multi-country prospective cohort studies conducted in low- and middle-income countries. From those seventy five percent of maternal death by PPH, forty one percent of moms was due to uterine atony. In one retrospective study in Cameron of 60 cases of refractory PPH, 24 underwent uterus-preserving surgery and 36 under hysterectomy. From them, 10 (41.7%) and 11 (30.6%) were due to uterine atony, respectively. In Ethiopia, uterine atony affects management of 67.6% of PPH cases (37-39).

Prolonged labor increases the risk of postpartum complications like uterine atony and cesarean sectioning, making management challenging and requiring interventions to address these issues. Prolonged labor complicates management of postpartum hemorrhage by 4 times of non-prolonged labor. This factor has an association with PPH management outcome as evidenced by a study done in Aberdeen Hospital. Unfavorable postpartum hemorrhage management outcome is associated with prolonged labor by 1.95 in null parous women and 2.13 in multiparous women (40, 41). This is also clarified by a study in Oslo: severe postpartum hemorrhage (>1500 mL) linked to prolonged labor >12 hours by 2.44-time lead to decreased hemoglobin <7 mg/dl and was managed by blood transfusion (42).

Postpartum hemorrhage management outcomes for women differ based on previous hemorrhage severity, interventions, and underlying conditions. One study conducted in the Gurage zone of Ethiopia on showed that 16 had previously experienced PPH from those 1 (0.9%) of mother had died (25).

Postpartum hemorrhage (PPH) management in women who have undergone labor induction or augmentation can be complex. This idea is supported by a study in France showing that PPH (blood loss of 500 mL or more) was considerably higher when labor was induced by 1.22 time than not induced (43). According to a prospective study carried out at a tertiary university hospital in Switzerland, explains that compared to non-induced moms, induced women experienced a 1.39-fold increase in blood loss of more than 1500 ml and developing of comorbidities (44).

The World Health Organization survey reveals improved PPH management outcome strongly associated with null parous by 1.84, no difference with 1 to 2 deliveries by 1.08, and negative association with more than 3 deliveries by 0.43. This indicates that as parity increases, improvement from postpartum hemorrhage has become less likely. Parity status of women affects postpartum hemorrhage management outcome; on other side study done in Tanzania found grand multiparous women are 1.34 fold times develop bad PPH than no multiparous. This idea is clarified by a study in Ethiopia: mothers with multiple pregnancies were six times more likely to die from PPH by 6.41 times (33, 34).

One obstetrical factor that influences PPH management outcome is pre-eclampsia (PE). It can increase uterine atony and render management of postpartum hemorrhage and complicate cases for organ failure and hypovolemic shock. On the contrary, monitoring and controlling blood pressure and patient conditions can enhance a good management outcome of PPH. In severe preeclampsia, the management of PPH needs surgical interventions rather than medical ones(45). Preeclampsia leads to unfavorable postpartum hemorrhage management outcome 1.85 times more frequently than it does without PE, according to a study conducted in Kenya. It causes liver dysfunction, hypertension, and renal failure(46). Systematic review and meta-analysis in Nigeria founded that 6.04 % of died PPH women were preeclamptic. This study also shows the bleeding of a mother with preeclampsia increases by 30% compared to a non-preeclamptic mother (47).

Antenatal care (ANC) significantly reduces the unfavorable management outcome postpartum hemorrhage (PPH) globally. The World Health Organization estimates that improving ANC coverage can reduce maternal mortality by up to 60%. In Ethiopia, women who were not visited ANC period increases the risk for unfavorable management outcome of PPH by 13.84 times whereas adequately followed their ANC period leads to better identification of risk factors and timely interventions, improving management outcomes (33).

PPH management outcome is affected by antepartum hemorrhages that are placenta previa and abruptio placenta. Postpartum hemorrhage (PPH) management in women with placenta previa can be challenging due to the abnormal placental location. One retrospective study in Peking Union Medical College Hospital of China on mothers fetal maternal outcome of postpartum hemorrhage with placenta previa revealed that types and degree of attachment of placenta affect the severity of postpartum hemorrhage. Percreta types of placentae have more association with severe PPH. This study describes 38 severely postpartum bleeding (blood loss greater than 1500ml) of placenta previa mothers with 5.2% mothers managed by uterine artery ligation and 3 mothers by hysterectomy. 21% of mothers have stayed in hospitals for more than 9 days, and 31% of mothers have been admitted to the ICU. Whereas in 163 mothers with non-severe PPH with placenta previa diagnosis, 0.1% are managed by arterial ligation and no hysterectomy was done, and 2.9% of patients have stayed for 4–7 days, and 1.2% of mothers were admitted to the ICU (48). Abruptio placenta is a significant maternal morbidity and mortality issue, requiring uterine artery ligation and balloon tamponade, with a study in Bahria it died 0.24% mothers by PPH (49).

2.6. Medical related factors association with management outcome of PPH

Medical-related factors influence the management outcome of postpartum hemorrhage like anemia, diabetes mellitus, and coagulopathy disorders, as stated in the following evidence.

Prenatal or postnatal anemia affects the management of postpartum hemorrhage. The severity of anemia had a different range of effects on the management outcome of postpartum hemorrhage. From systematic review and meta-analysis Anemia during pregnancy increases the risk of bad PPH management due to reduced blood oxygen-carrying capacity The study also shows PPH mothers who had anemia had different management outcome based on types of management provided during treatment evidenced by women treated with taxemic acid had developed comorbidity whereas treated by intravascular fluid less developed comorbidity. This idea is also supported by study in northern Kalimantan hemorrhage women with anemia had bad outcome by 11.253 times than nonanemic (36-39).

Another medically related factor for the management outcome of postpartum hemorrhage is diabetic mellitus. A 10-year retrospective study in the department of obstetrics and gynecology of Chungnam National University Hospital and Chungnam National University Sejong Hospital Women with diabetes may require more frequent surgical interventions like uterine artery ligation or hysterectomy due to the increased risk and severity of PPH, whereas monitoring diabetics during pregnancy enhances good management of postpartum hemorrhage. A study in Ethiopia reveals that diabetic mothers are at a higher risk of postpartum hemorrhage due to vascular complications and blood clotting disorders, leading to worse outcomes and higher morbidity and mortality rates (20, 40, 41).

Blood clotting disorders increase the risk of severe bleeding after childbirth, A study conducted in two chungnam national university hospitals revealed that troponin-related factors for PPH cover more than 6% for both surgical and non-surgical interventions. At the end of these interventions, from 159 non-surgical interventions and 71 surgical interventions, 8.8% and 42.2% develop disseminated intravascular coagulopathy respectively. This confirms coagulation-related factors contribute to comorbidities of postpartum management outcomes (20, 42).

As summarized associated factors in Ethiopia, obstetrics and medical-related factors affecting postpartum hemorrhage (PPH) management in women include anemia during pregnancy, multiple gestations, pregnancy-induced hypertension, previous cesarean sections, grand multiparity, prolonged labor, and lack of antenatal care visits. Anemia during pregnancy increases the risk for undesired management outcome by 6.84-fold, multiple gestations by 6.41-fold, pregnancy-induced hypertension by 18.58-fold, previous cesarean sections by 19.45-fold, and prolonged labor by 4.054-fold (25, 43).

2.7. Conceptual framework

The conceptual of study is a short figurative explanation of concepts in it. It states s independent factor and dependent factors of study. It constructs the relationship between study variable with its standing or independent variable. The concepts under independent variables such as socio demographic, obstetrics, medical related factors and PPH managements affect postpartum hemorrhage outcome. Finally, through direct or indirect effects of independent variables affect the outcome of postpartum management. This conceptual frame work was adapted from related studies **(33, 50)**

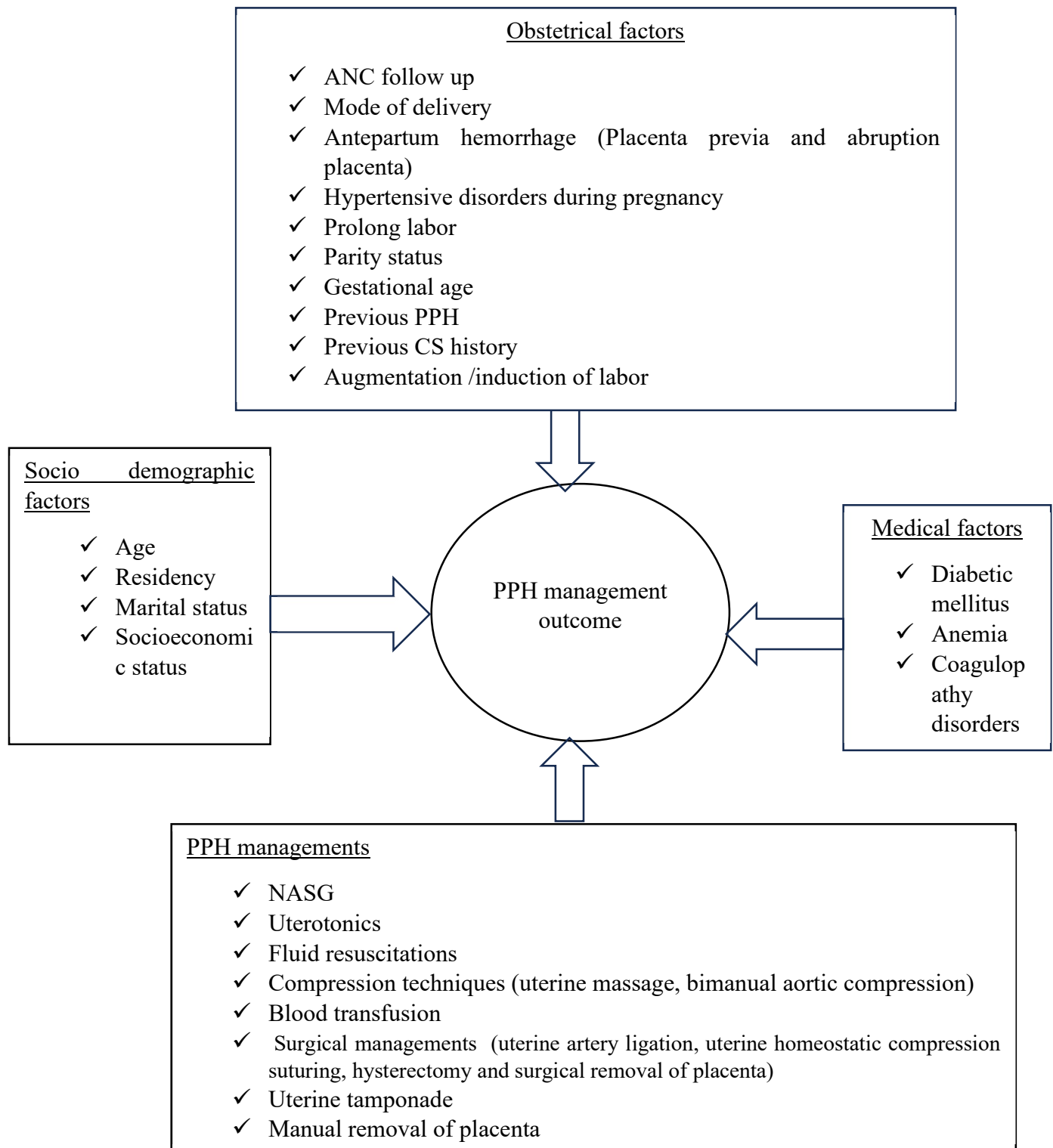


Figure 1 Conceptual framework of post-partum hemorrhage management outcome and associated factors (33, 50).

3. OBJECTIVES

3.1. General objective

-  To assess post-partum hemorrhage management outcome and associated factors among women who gave birth in selected Addis Ababa public hospitals.

3.2. Specific objectives

-  To identify the management outcome of PPH in selected Addis Ababa public hospitals.
-  To identify associated factors to management outcome of PPH in selected Addis Ababa public hospitals.

4. METHODS AND MATERIALS

4.1. Study area and period

The study was conducted in Addis Ababa, Ethiopia hospitals namely: Saint Paulos Hospital, Gandhi memorial Hospital and Yekatit 12 Hospital (Abebech Gobena MCH center). These hospitals, known for their diverse patient populations and comprehensive healthcare services, provide valuable insights into PPH management outcomes. The study ran from January 27 to February 28, 2025, was provided comprehensive data over three years.

St' Paul's Hospital Millennium Medical College (SPHMMC) is one of the governmental hospitals in central Addis Ababa, Addis Kifle Ketema. It has different disciplines in both inpatient and outpatient service. In delivery ward annual average of 4000 mothers are admitted according to the data from health management information system (HMIS) registration. Of total admission about 4.3% of them are treated with diagnosis as PPH.

Gandhi Memorial Hospital (GMH) is one of those governed by Addis Ababa city administration health bureau and specializes in maternity services. The hospital was established in 1951 E.C. According to HMIS data about 3500 were made for delivery, of which about 2.9 % were treated as PPH.

Abebech Gobena Memorial Hospital is named after Abebech Gobena renowned Ethiopian humanitarian often called Mother Teresa of Africa. It provides specialized maternal and child health services; The average number of mothers admitted for delivery was around 2800 from those 3.3% were treated as PPH

4.2. Study design

Hospital based retrospective study had conducted from December 30,2022 to January 1,2025 among women who gave birth at selected public hospitals in Addis Ababa.

4.3. Source of population

All mothers who gave birth at the selected three hospitals from December 30,2022 to January 1,2025 G.C

4.4. Study population

Mothers from source populations who diagnosed with PPH as post-partum hemorrhage and managed at selected study public hospitals during study period and meets inclusion criteria

4.6. Inclusion and exclusion criteria

4.6.1. Inclusion criteria

Women who diagnosed as postpartum hemorrhage and managed in Saint Paulos Hospital, Gandhi Memorial Hospital, and Yekatit 12 Hospital (Abebech Gobena MCH center) from December 30,2022 to January 1,2025 G.C.

4.6.2. Exclusion criteria

Post partum hemorrhagic women who were not with complete medical record.

4.7. Sample size determination

The sample size for this study was determined by using the following formula.

$$n = (Z_{\alpha/2})^2 \cdot P \cdot (1-P) / d^2$$

$$n = (1.96)^2 \cdot 0.148(1-0.148) / (0.05)^2 = 194$$

n = required sample size

Z = Z-value (standard normal deviate at a 95% confidence level, typically 1.96)

P = 0.148 from previous study done on determinant and PPH Management outcome (27).

d = margin of error (set at 0.05)

for adjusted nonresponse rate increased by 10% the total sample size becomes

adjusted sample size = $n / (1 - \text{no response rate}) = 194 / 0.90 = 214$

It was not enough to mitigate biases raised from sampling and retrospective study due to periodic population. Therefore, it mitigated by design effect sample size calculation.

$n = 194 * 1.5 = 291$,

for adjusted nonresponse rate increased by 10% for compensation of incomplete charts.

adjusted sample size = $n / (1 - \text{no response rate}) = 291 / 0.90 = 324$

So, considering sample size of the study was 324

4.8. Sampling procedure

Systematic random sampling was conducted to select charts of women who diagnosed and managed from December 30, 2022 to January 1, 2025 in selected hospitals. The sampling frame was prepared for total numbers of women who were diagnosed and managed during the study period to each hospital. The proportionate allocation for each hospital calculated based on number of women who developed PPH in those three years. According to calculated number of proportions for each hospital through k^{th} interval from prepared sample frame and chart was brought out from recording class of hospitals. The number of postpartum hemorrhage women in three hospitals from December 30, 2022, to January 1, 2025, was 1100. It was the sum of 520 saint Paulos hospital memorial medical college, 280 of yekakit 12 hospital medical college (Abebech Gobena MCH center), and 300 of Ghandhi Memorial maternity and child health Hospital.

Table 1: schematic presentation of sample size determination of postpartum hemorrhage women from December 30, 2022, to January 1, 2025, from observed and asked institutional data from Addis Ababa selected public hospitals.

Name of hospitals	Total number of mothers with PPH December 30, 2022 to January 1, 2025	Proportion allocation for each hospital	Total sample size
Saint Paulos hospital	520	153	324
Yekakit 12 hospital medical college (Abebech Gobena MCH center)	280	83	
Ghandhi memorial hospital	300	88	

4.9. Study variables

4.9.1. Independent variables

Sociodemographic factors:

- ✓ Age,
- ✓ Residency,
- ✓ Socioeconomic status
- ✓ Marital status.

Obstetrics factors:

- ✓ Mode of delivery
- ✓ ANC follow up
- ✓ Antepartum hemorrhage (Placenta previa, Abruptio placenta)
- ✓ Hypertensive disorders during pregnancy
- ✓ Prolonged labor
- ✓ Previous Cs history
- ✓ Parity
- ✓ Gestational age
- ✓ Previous PPH
- ✓ Augmentation /induction of labor

Medical related factors:

- ✓ Diabetic mellitus,
- ✓ Anemia,
- ✓ Coagulopathy disorders.

Management of post-partum hemorrhage

- ✓ NASG
- ✓ Utero tonic drugs
- ✓ Fluid resuscitation
- ✓ Compression techniques (uterine massage, bimanual aortic compression)
- ✓ Manual removal of placenta
- ✓ Blood transfusion
- ✓ Surgical managements (uterine artery ligation, uterine homeostatic compression suturing, surgical removal of placenta, hysterectomy)
- ✓ Uterine tamponade

4.9.2. Dependent variable

Post partum hemorrhage management outcome

4.10. Data collection tool and procedures

Data collected by prepared check list from chart review and online registrations plat forms. The checklist was adapted from WHO recommendation on PPH prevention and management , national PPH management and prevention guideline, Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) PPH stage and risk assessment and from checklist of literature of similar studies(32, 33, 50, 51). The data collected by three BSc nurses using kobo toolbox. The main parts of the check list are socio-demographic factors, obstetrics factor, medical related factors, management of PPH provided and the outcome of it. The supervisor and data collectors trained for one day about the aim of study, relevance of study, procedures during data collection, confidentiality of data of clients, illegibility criteria and way of approach during collection period. Following training, collectors retrieved the chart code from the sample frame, proceeded to the record class, and hospital record staff brought it. Prior to enrolling data from folders, the verified charts were complete or not based on the data check list. Then collectors start writing on checklist in these main parts: for example, time of admission and discharge, sociodemographic details, obstetrical variables, medical factors, managements provided, time of diagnosis and treatment initiation time are all recorded by collectors upon enrollment. Lastly, they selected PPH management outcomes.

4.11. Data quality assurance

The data collection tool was prepared in English, both supervisor and data collectors were closely following in data collection process. Before the actual data collection procedure pretest was conducted from 17(5%) study population out of the selected study hospital (Ras Desta Damtew memorial hospital), two weeks before the actual data collection to measure the clarity of questionnaires and validity of data collection tool and reactions response to questions. Two fetomaternal specialists revised and recommended and corrected accordingly. Then necessary correction was made based on the feedback. Feed backs of specialists were recommended to add of some variables like previous CS history, length of induction or augmentation, chorioamnionitis with PROM to check list. The maintenance of the confidentiality of patient chart information as well as the good communication skills between the record office and data collector that was gained through training session contributed to data quality assurance. The correctness of data while they collect monitored by principal investigator. Every data that was collected for each day was checked and reviewed at the end of day, any errors were corrected by data collectors with supervisors and stored in coded personal computer for the study.

4.12. Data analysis and processing

The data cleaned manually, coded and entered to kobo toolbox, exported and analyzed by SPSS version 27 statistical software. Bivariate logistic analysis was employed to identify management outcome of post-partum hemorrhage due to sociodemographic, obstetrics, medical and PPH management related factors, after bivariate logistic regression analysis, $p\text{-value} < 0.05$ and expert assumptions were taken as cutoff point to select variables eligible for multiple logistic regression. These were age, mode of delivery, parity status, antepartum hemorrhage, previous history of PPH, previous history of Cs, anemia history, coagulation problems history, blood transfusion, surgeries, manual removal of placenta, compression techniques, and resuscitation of fluid. Which was used to control possible confounding variables. Then 95% confidence interval was used to precise the study variable. Finally, the $p\text{-value}$ of less than 0.05 the statistical association was considered as a significant variable. Anemia history, resuscitation of fluid, blood transfusion and surgical management. Then the result was interpreted and presented using statements, tables, figures, text and pie chart. A Hosmer-Lemeshow test with 315 observations and 10 groups yielded a chi-square statistic of 4.2 ($p = 0.83$), indicating an acceptable model fit.

4.13. operational definitions

- **Post-partum hemorrhage:** case diagnosed by physicians (an authorized health personnel member such as obstetricians, fetal/maternal specialists and senior midwives) as PPH
- **Uterine atony-** lack of effective contraction of the uterus after delivery
- **Maternal mortality-**Death of mother related to PPH and its complication
- **Case fatality:** defined as the percent of maternal death after admitted to hospital with diagnosis of PPH.
- **Severe Complication of postpartum hemorrhage:** hypovolemic shock, severe anemia, acute renal failure, disseminated intravascular coagulopathy, hysterectomy, pituitary necrosis, respiratory distress, impaired kidney function, abnormal blood clotting and bleeding and severe lung conditions(50).
- **Post-partum hemorrhage management outcome-**
- **Favorable outcome:** Maternal condition after PPH which can be improved and discharged without severe complication
- **Unfavorable outcome :**Those who developed complication or near miss which means patient cope up complications after diagnosis of PPH and discharged and those who were died which means ceases of life (42, 52).
- **Surgical management of PPH:** includes uterine artery ligation, surgical bleeding control or laceration repair, surgical placental removal, and hysterectomy(27).
- **Complete chart:** charts which have all data of checklist
- **Incomplete chart:** charts which have no complete information on the checklist

4.14. Ethical considerations

An official letter on ethical clearance for proposed research obtained from institutional review board (IRB) of Addis Ababa University College of health science and School of nursing and midwifery, and Department of midwifery. Then ethical clearance, permission to conduct the study obtained from Saint Paul's Hospital's medical director and obstetric and gynecological departments; for Yekakit 12 Hospital and Ghandi Memorial Hospital from Addis Ababa Health Bureau; and finally, due to the letter of permission, got lists of charts from the case teams of each hospital's obstetrics and gynecology department.

To keep confidentiality after retrieving medical records all records had transported by principal investigator to private room for data collection. All collected data coded and locked in a personal computer. After entering the computer, the data locked up by password and not disclosed to any person other than principal investigator. All information collected from mother's medical records kept strictly confidential and names of patients or mothers were not included in the data abstract checklist.

4.15. Dissemination plan

The result of the study was submitted and presented to Addis Ababa University College of Health Sciences, the school of nursing and midwives and department of midwifery. In addition, the results were provided to the federal minister of health, Addis Ababa city administration health bureau and districts to take effective measures to correct the existing health problem. Efforts were presented at scientific conferences, workshops, seminars and submitted to professional journals for publication to serve the baseline for further studies.

5.RESULT

From the 324 patient charts and registers reviewed, 315 of them were included in this study giving a response rate of 97.1%. The remaining 9(2.9%) medical charts were excluded due to missing data. The findings of the data analysis are presented below under socio- demographics characteristics, obstetrics, medical factors, management of postpartum hemorrhage, postpartum hemorrhage management outcomes and associated factor subheadings.

5.1 sociodemographic characteristics

The study surveyed 315 mothers, with 40% in rural areas. The mean age was 27.7, with most having completed primary education. The majority were married, accounting for 94.3% of the population, with a small percentage of unmarried, widowed, or cohabiting relationships (table two).

Table 2: Sociology-demographic characteristic of mothers with postpartum hemorrhage in selected three public hospitals, Addis Ababa, Ethiopia 2025 (N=315)

Sociodemographic characteristics	Categories	Frequencies	Percent (%)
Residency	Urban	189	60
	Rural	126	40
Age	<20	31	9.8
	20-35	237	75.2
	>35	47	15.9
Marital status	Married	297	94.3
	Unmarried	11	3.5
	Cohabited	2	0.6
	Windowed	5	1.6
Educational status	No formal	59	18.7
	Primary	135	43.8
	Secondary	95	30.2
	College and above	23	7.3

5.2. Obstetrical factors

From the total of 315 mothers, it was found that the majority (54.9%) delivered 2-4 babies, with 69.2% being -term pregnancies. Most attended antenatal visits, that was 52.1% of mothers attending three to six visits. More than half (68.9%) of the mothers had spontaneous vaginal delivery, while 3.5% required instrumental assistance and 27.6% were delivered by CS. 15.9%,8.9%,31.1% and 24.4% of 315 mothers treated with PPH had a history of cesarean sectioning, postpartum hemorrhage, pre-eclampsia, and ante partum hemorrhage. Labor induction/augmentation was done for 33.7% of 315 PPH treated mothers, and postpartum hemorrhage due to uterine atony was 76.4%. Those are described in the following table (table three).

Table 3:obstetric history distributions of mother who had postpartum hemorrhage in Addis Ababa selected three public hospital for the past three years,2025(N=315)

Obstetrical characteristics	Categories	Responses	
		Frequency	Percent (%)
Parity	Primipara	17	5.4
	Multipara	173	54.9
	Grand multipara	125	39.7
Gestational age (GA)	<37wks	85	27
	37-42 weeks	218	69.2
	>42 wks.	12	3.8
Number of antenatal cares follow up	No antenatal follow up	16	5.1
	1-2	5	1.6
	3-6	164	52.1
	>6	130	41.3
Mode of delivery	Spontaneous vaginal delivery	217	68.9
	Instrumental delivery	11	3.5
	Cesarean sectioning	87	27.6

Previous cesarean sectioning	Yes	50	15.9
	No	265	84.1
Previous PPH	Yes	28	8.9
	No	287	91.1
Induction or augmentation labor	Yes	106	33.7
	No	209	67.3
Duration of induction or augmentation	<10hr	61	19.4
	10-20hr	34	10.8
	>20hr	11	3.5
Prolonged labor	Yes	110	34.9
	No	215	66.1
Chorioamnionitis with PROM	Yes	26	8.3
	No	289	91.7
Status of fetus	Alive	288	91.4
	IUFD	14	4.4
	Still birth	13	4.1
Preeclampsia /eclampsia	Yes	98	31.1
	No	207	69.9
Ante part hemorrhage	Yes	77	24.4
	No	238	75.6
Causes of post-partum hemorrhage (multiple responses)	Uterine atony	240	59.3
	Retained placenta or tissue	45	11.1
	Coagulation problems	16	4.0
	Genital tear or trauma	104	25.7
Total		405	100

5.3. Medical factors

The study revealed 17.5% of studied mothers had anemia history, 4.4% had coagulopathy problem history and 4.1 % had diabetic history. The study found that 81.9% of individuals had hemoglobin levels above 11 mg/dl, 8.9% had levels between 10 and 10.9 mg/dl, 7.6% ranged between 7 and 9.9 mg/dl, and 0.3% had levels below 7 mg/dl. The mean hemoglobin level was 12.66, with a median of 12.90 (figure two).

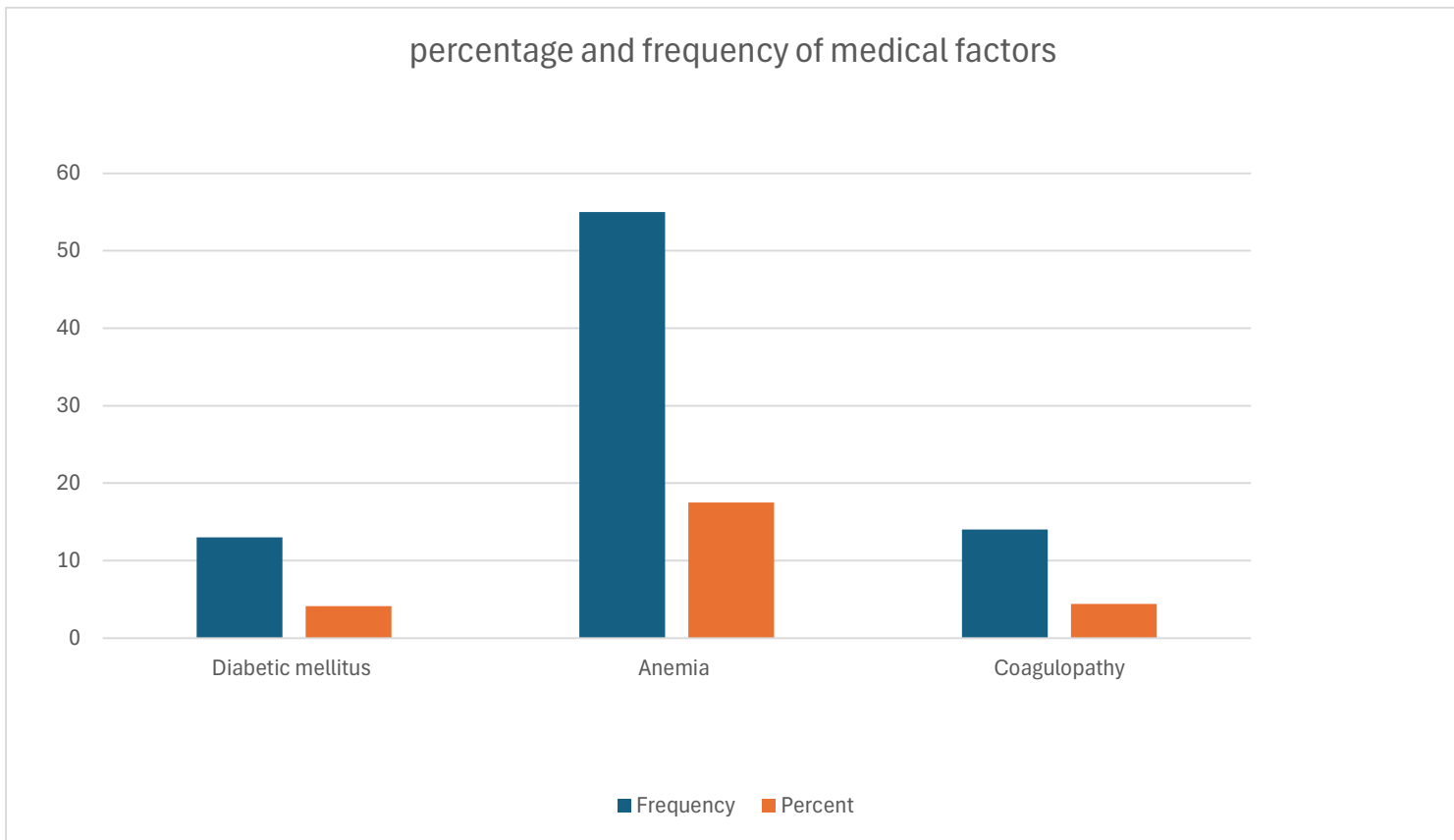


Figure 2: Medical factors

5.4. Managements of postpartum hemorrhage

The study analyzed 315 mothers' blood pressure during diagnosis, with 32.4% having read below 90/60 mm Hg, 66.3% having read above 90/60 mm-Hg, and 1.3% having unrecorded reading. The study found a mean blood loss of 1108.13 ml. Treatment for postpartum hemorrhage (PPH) was initiated within one hour for 61.0% of cases, while the remaining 39% received treatment after one hour following the diagnosis. The study analyzed 315 cases, with 92.4% of them receiving active management of the third stage of labor. Tranexamic acid was administered for 184 (58.4%) of mothers. In 159 (50.5%) cases were administered within three hours of birth and 7.9% after 3 hours.

The most common intervention was resuscitation with fluid for 242(76.8%), compression techniques for 266(84.4%), and uterotonics for 302(95.9%) of treated mothers. The study analyzed the use of different utero-tonics, compression techniques, and surgical methods in managing cases. Misoprostol was used in 47.6% of cases, while oxytocin was used in 320(99.7%) cases. External uterine massage was the most common compression technique, followed by manual compression and aortic compression. Uterine artery ligation, homeostatic compression suturing, hysterectomy, and surgical removal of the placenta were performed in total for 52(16.5%) PPH treated mothers. Manual removal of placenta was performed for 10(3.2%) of 315 treated mothers. Blood transfusions were administered in 11.4% of 1460 interventions (table four).

Table 4: Distribution of post postpartum hemorrhage management among 315 mothers in the past three years in three selected public hospitals of Addis Ababa,2025

Managements of post-partum hemorrhage	Category	Responses	
		Frequency	Percent
Blood pressure (mm hg)	<90/60	102	32.4
	>90/60	209	66.3
	Nonrecordable	4	1.3
Blood loses(ml)	500-1000	203	64.4
	1000-1500	46	14.6
	>1500	66	21
Time for treatment starts after diagnosis of post-partum hemorrhage	Less than one hour	192	61
	Greater than one hour	123	39
Tranexamic acid	Yes	184	58.4
	No	131	41.6
Time for the initial dosage of Tranexamic acid administration	Within three hours of birth	25	7.9
	Greater than three hours of birth	159	50.5
Interventions (multiple responses)	Resuscitation of fluids	242	16.6
	Tear and extension repaired	102	7
	Compression	266	18.2
	Manual evacuation of tissue or clot	45	3.1
	Pneumatic anti-shock garment	1	0.1
	Uterine tamponade	6	0.4
	Manual removal of placenta	10	0.7
	Surgeries	52	3.6
	Blood transfusion	167	11.4
	Uterotonics	302	20.3
Total		1460	100

5.5. Postpartum hemorrhage management outcomes

In this study postpartum hemorrhage management outcome is grouped in two which are favorable and unfavorable management outcomes (figure 3).

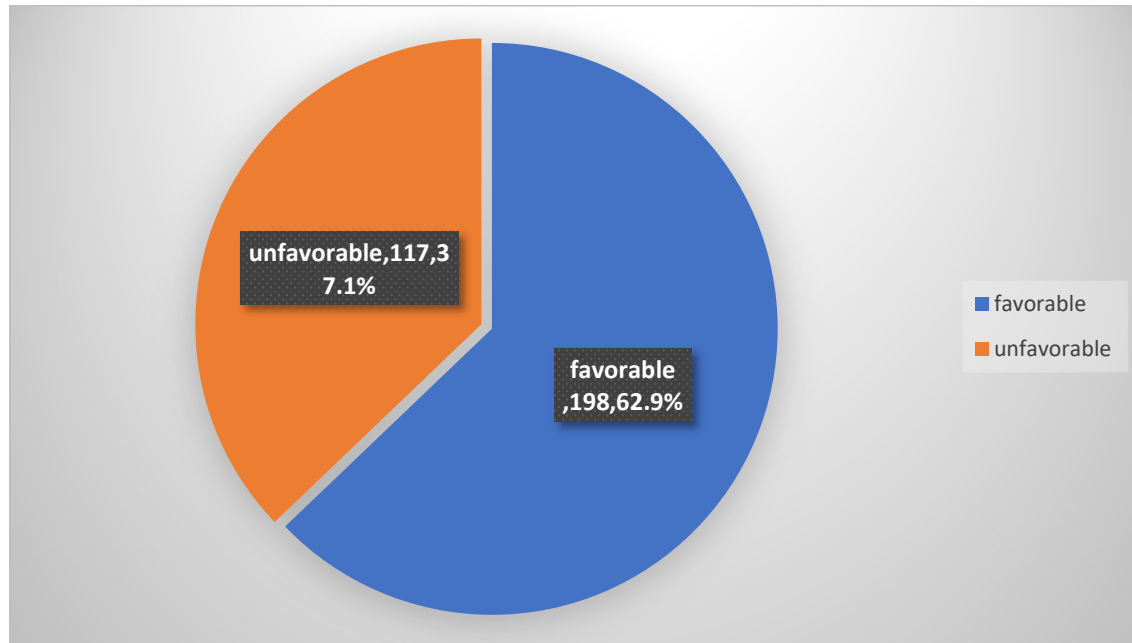


Figure 3: post-partum hemorrhage management outcomes

The study revealed that despite 109 cases (34.6%) showing improvement in postpartum hemorrhage management by coping complications, 2.2% of these cases resulted in death. The analysis of postpartum hemorrhage complications revealed severe anemia as the most common, accounting for 48.7% of cases. Renal failure, respiratory distress, organ failure, and other complications were reported in 18 cases, with a combined percentage of 163.6%, indicating the possibility of multiple complications in individual cases (figure 4).

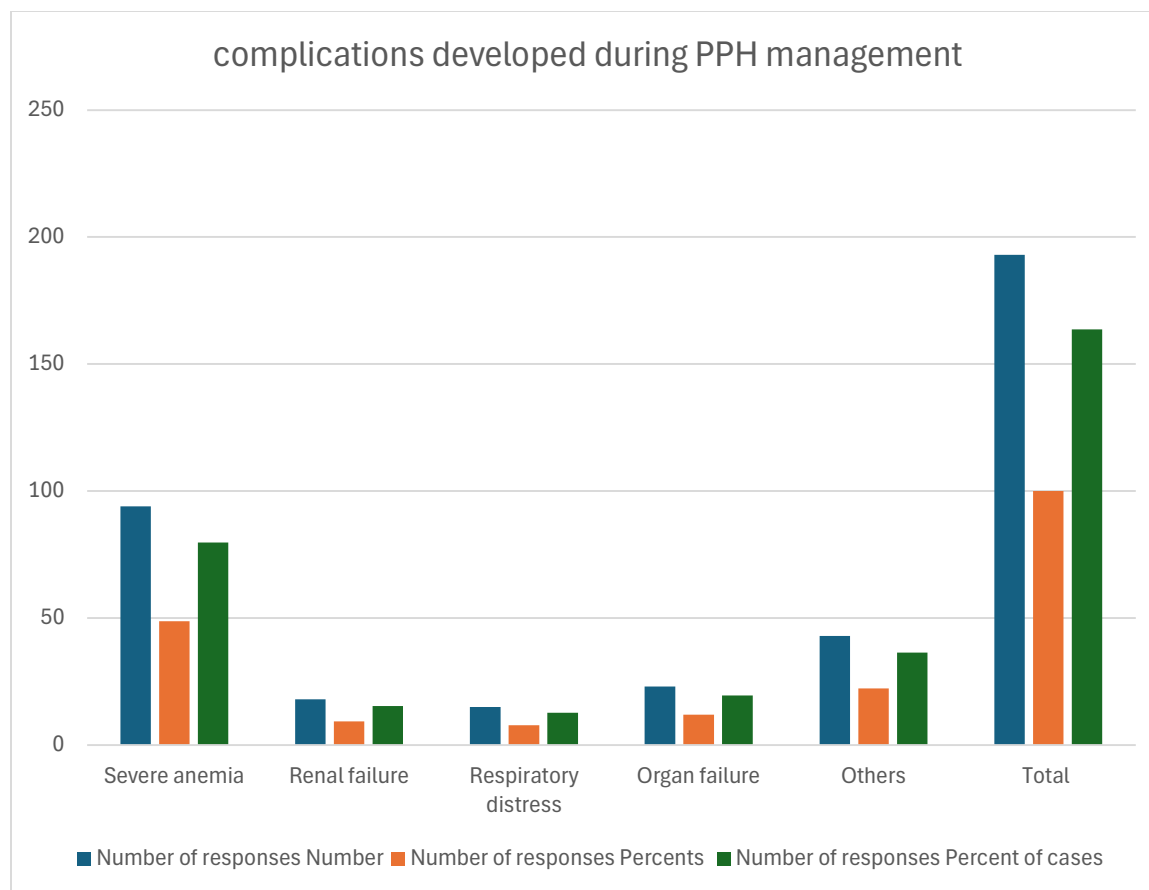


Figure 4 Complications developed during post-partum hemorrhage management

5.6. Predictors of postpartum hemorrhage management outcomes

Using multi-variable logistic regression was fitted to identify variables significantly associated with postpartum hemorrhage management outcome. Accordingly, four variables (anemia, surgical management, blood transfusion, resuscitation with fluid) were identified as significant predictors. The multi-variable binary logistic regression analysis conducted for Key predictors influencing postpartum hemorrhage management outcomes. Women anemic history had a reduced likelihood of unfavorable outcomes by AOR 0.020(95%CI 0.004-0.060, p-value <0.001) than nonanemic women. Mothers with PPH who lack transfusion of blood had lower odds of unfavorable outcome with AOR0.27 (95%CI,0.13-0.17, p-value <0.001) than transfused women. Women undergoing nonsurgical management experienced risk of unfavorable postpartum hemorrhage outcomes compared to those receiving surgical management with AOR of 7.13(95%CI,2.27-19.0, p-value <0.001). Not fluid resuscitated women had to develop unfavorable outcome by 3.30 times resuscitate women with PPH, (AOR = 3.30, 95% CI: (1.195-7.689, p-value =0.02)) (table five).

Table 5: simple and multi-variable binary logistic regression analysis of predictors of postpartum hemorrhage management outcomes among mothers admitted in selected three public hospitals, Addis Ababa, Ethiopia 2025 (simple and multi-variable logistic regress).

Predictors	PPH management outcome		Crud odd ratio (95%) CI	AOR 95% CI	P-value
	Favorable (N (%))	Unfavorable (N (%))			
Anemia					
Yes	65	195	0.02(0.01-0.07)	0.02(0.004-0.060)	<0.001
No	52	3	1	1	
Blood transfusion					---
No	57	91	0.90(0.57-1.141)	0.27(0.13-0.57)	<0.001
Yes	60	107	1	1	
Surgical management					
No	182(53.5)	81(44.5))	5.056(2.654,9.631)	7.13(2.67-19.0)	<0.001
yes	16(30.8)	36(69.20	1	1	
Resuscitation with fluid					
No	59(80.8)	14(19.2)	3.123(1.653,5.898)	3.30(1.195-7.689)	0.020
Yes	139(57.4)	103(42.3)	1	1	---
A Hosmer-Leme show test with 315 observations and 10 groups yielded a chi-square statistic of 4.2 (p = 0.83), indicating an acceptable model fit					

6.DISCUSSION

The aim of this study was to assess postpartum hemorrhage management outcomes and associated factors in the past three years in the selected three public hospitals of Addis -Ababa. More than quarter of (37.1%) of mothers had unfavorable management outcomes from those 2.2 % died and 34.8 % were improved by cope up of different complications. This finding was higher than the study done in United State of America which was 3.2% from 195 treated women with PPH who had unfavorable outcome(28). Similarly, another study done in South Korea revealed that higher death percentage from all treated with PPH which was 4.4%(27). A study from Senegal and Mali shows 4.5% of mothers had died before discharge of hospital which was exceed from this finding(29). Death of mothers in this study also lower than death of mothers from PPH in Sierra Leone which was 31% of 217 PPH cases(31). The percentage of unfavorable outcome (37.1%) of mothers of this study was higher than from previous study done in Ethiopia which had 14% from treated mothers had developed unfavorable or severe outcome(32). Those differences were due to different clinical settings ,populations and study types. There were four variables associated with PPH management outcome; these were anemic history, lack of blood transfusion, nonsurgical management and lack of fluid resuscitation.

Anemia was significantly linked to an unfavorable outcome of post-partum hemorrhage management outcome with AOR 0.020(95%CI :0.004-0.060, p value <0.001). It indicates that mothers who had anemic history treated well during ANC follow up had favorable outcome of post-partum hemorrhage management. It described by early interventions for anemic women like iron supplements reduce worsen outcome of PPH managements. This finding was supported by study done in Nigeria revealed that removing of factors aggravating for severe outcome of PPH like uterine fibroid and mode of deliveries anemic women were not risk for unfavorable PPH management outcome(53). Finding of this study contradicts anemic women could not tolerate blood loss and oxygen caring lead to complication when they developed PPH(54). This is due to variation of study design that was clinical trial and this study was retrospective.

In this study women who was not **transfused blood** had less likely association to be unfavorable PPH management outcome with AOR 0.27(0.13-0.57, p value <0.001) than transfused mothers with PPH. This indicates not transfuse women with PPH had to be linked to better recovery because those women had better initial health or complicated due to prolonged transfusion

alterations in hematological parameters, immune modulation, iron metabolism, and potential complications were developed based on long term exposure as evidenced by study done in kabala Uganda(55).This finding inline the barrier to access blood transfusion like delayed in hospital protocol and limited access to in blood bank founded as barrier for timely blood transfusion and leads to unfavorable outcome even if world health survey stated utilization of blood products improve mothers outcome by 1.3 time than non-utilizing of it (35, 56).

In this study **non-Surgical management** of post-partum hemorrhage had significant association with unfavorable PPH management outcome by AOR of 7.13(95%CI,2.61-19). Non-surgical management leads to severe outcome of mothers depending on severity of bleeding. According to WHO and national guidelines on PPH management early and accessed medical managements like uterotonics can improve outcome and reduces morbidity , however there was study revealed fails of these managements lead to prolonged bleedings and anemia and organ dysfunctions then lead to increases the risk of poor recovery rate or unfavorable outcome of PPH management(57). This finding did not in line with the weak association of arterial ligation to improved post-partum hemorrhage management outcome of WHO survey which analyzed arterial ligation had AOR of 0.19(95%cl,0.134-0.279).This difference was due to this study surgical management includes more and the survey was only with arterial ligation alone (58). It contraindicates the study done in south Korea which stated that no one had died with none surgically management of PPH. Because of this finding nonsurgical management had increased odds for unfavorable management outcome of PPH This difference is due to variation of population studies and clinical setting of countries(27).

Findings of this study indicate that **lack of fluid Resuscitation** had higher odds of unfavorable PPH management outcome than those who resuscitated. The AOR 3.30(95%CI,1.20-7.69, p value =0.020), indicating statistical significance, lack of fluid resuscitation appears to be associated with increased odds of an unfavorable PPH outcome. WHO and national guideline of PPH management emphasis on fluid resuscitation as key intervention for mothers with PPH. Research indicates fluid administration maintains blood pressure, improve circulation, and prevent organ failure, ultimately reducing maternal mortality(59). This finding contraindicates the study done in Netherlands fluid adverse maternal outcomes were 1.0 for 2-3 liters, 1.2 for 3-4 liters, 1.8 for 4-5 liters, and 4.4 for 5-7 liters of blood loss(36).This difference was due to variation of administration of fluid volume.

7. CONCLUSION

In this retrospective study findings on post-partum hemorrhage management outcome, although favorable management outcome was most, there was 37.1% of PPH mothers had unfavorable which means 34.9 mothers had improved or cured after coping up of complications and 2.2 % of PPH diagnosed mothers had died. There were important factors associated with this were anemia history and lack of blood transfusion had lower odds of unfavorable outcome whereas lack of fluid resuscitation and nonsurgical management had increased odds for unfavorable PPH management outcome. Those predictors indicate surgical management and resuscitation of fluid had improved the outcome of mothers with PPH whereas anemia history and not transfusion of blood protect mothers to be unfavorable.

7.1. Strength of the study

This study tried to identify independent predictors (using a multi-variable analysis) by controlling confounding effects.

7.2. Limitation of the study

The study was limited to merely on secondary data. So, analysis of associated factors for management outcome of PPH was based on only information that could be obtained from charts due to limited scope and accuracy of information. In addition, it didn't include information's related to mothers' economic status and occupation which are important for facilitation of PPH management. On the other hand, diagnosis of PPH was based on the diagnosis obtained from the charts that might be misdiagnosed.

8. RECOMMENDATIONS

Based on the findings of this study the followings recommendations could be mentioned for different sectors

For health professionals

-  Heath professionals should emphasize on national guideline post-partum hemorrhage management
-  Health professionals should be doing nonsurgical managements like uterotonics, fluid administration early and in adequate way according to severity of bleeding and exposures of women

For Hospitals

-  Hospitals should be all components of post-partum hemorrhage management, furthermore according to guidelines of post-partum hemorrhage management and prevention developed early in 2022.

For Health Bureaus

-  Health Bureaus should monitor health institutions on the effective implementations of guideline accordingly.

For researchers

-  Researchers should do other designs for conducting a study in this topic of like prospective or follow up and quality study on this problem for evaluation of developed guidelines and provided training.

9. REFERENCES

1. Organization WH. WHO recommendations uterotonics for the prevention of postpartum haemorrhage: web annex 7: choice of uterotonic agents. World Health Organization; 2018.
2. El-Refaey H, Rodeck C. Post-partum haemorrhage: definitions, medical and surgical management. A time for change. *British medical bulletin*. 2003;67(1):205-17.
3. Muluye G, Gashaw A, Woretaw L, Girma B, Tumebo T. Risk factors of primary postpartum hemorrhage among postnatal mothers in the public hospital of southern Tigray, Ethiopia, 2019: a case-control study. *Frontiers in Global Women's Health*. 2023;4:1039749.
4. Acho C, Dumas SD, Sadana N, Stein DJ, Younger J. Postpartum hemorrhage. *ASA Monitor*. 2019;83(4):16-9.
5. SR. W. Global burden of preterm birth. *International Journal of Gynecology & Obstetrics*. . Jul;2020;150(1)31-3.
6. KC S, Dhakad M, Potančoková M, Adhikari S, Yildiz D, Mamolo M, Sobotka T, Zeman K, Abel G, Lutz W, Goujon A. Updating the shared socioeconomic pathways (SSPs) global population and human capital projections.
7. Swetha Lakshmi Allu RN, Hema HR, Dwarakanath L, Rajanna SP. Postpartum hemorrhage:. A review of evidence based guidelines for prevention and management. . 2025;9(2)(1590):18-25.
8. WHO. Second global call for data on postpartum haemorrhage. 2024.
9. Tolossa T, Fetensa G, Zewde EA, Besho M, Jidha TD. Magnitude of postpartum hemorrhage and associated factors among women who gave birth in Ethiopia: a systematic review and meta-analysis. *Reproductive Health*. 2022;19(1):194.
10. {Stachetti TaS, Michel and Winer, Arnaud and Boukerrou, Malik and Jesson, Julie and G{'e}rardin, Patrick},, . Factors associated with severe postpartum haemorrhage: systematic review using {Bradford} {Hill}\textquoteright{s} causality framework. *Journal of Global Health Reports*. 2019;3: {e2019085},

11. Escobar MF, Nassar AH, Theron G, Barnea ER, Nicholson W, Ramasauskaite D, et al. FIGO recommendations on the management of postpartum hemorrhage 2022. *International Journal of Gynecology & Obstetrics*. 2022;157:3-50.
12. Fissahaye B, Dheresa M, Assefa N, Tesfaye D, Eyeberu A, Balis B, et al. Active management of the third stage of labor and associated factors among maternity care providers in public health facilities in Eastern Ethiopia: a multi-center study. *BMC Pregnancy and Childbirth*. 2023;23(1):701.
13. Christiansen A-MH, Sørensen BL, Boas IM, Bedesa T, Fekede W, Nielsen HS, et al. The impact of the Safe Delivery Application on knowledge and skills managing postpartum haemorrhage in a low resource setting: a cluster randomized controlled trial in West Wollega region, Ethiopia. *Reproductive Health*. 2023;20(1):91.
14. Anderson JM, Etches D. Prevention and management of postpartum hemorrhage. *American family physician*. 2007;75(6):875-82.
15. Magann EF, Evans S, Chauhan SP, Lanneau G, Fisk AD, Morrison JC. The length of the third stage of labor and the risk of postpartum hemorrhage. *Obstetrics & Gynecology*. 2005;105(2):290-3.
16. Girma S, Tura AK, Ahmed R, Knight M, van den Akker T. Incidence, Causes and Outcomes of Postpartum Hemorrhage in Eastern Ethiopia: A Multicenter Surveillance Study. *Maternal and Child Health Journal*. 2024;28(12):2106-14.
17. Mourad-Youssif M, Ojengbede OA, Meyer CD, Fathalla M, Morhason-Bello IO, Galadanci H, et al. Can the Non-pneumatic Anti-Shock Garment (NASG) reduce adverse maternal outcomes from postpartum hemorrhage? Evidence from Egypt and Nigeria. *Reproductive Health*. 2010;7(1):24.
18. Ford JB, Patterson JA, Seeho SK, Roberts CL. Trends and outcomes of postpartum haemorrhage, 2003-2011. *BMC pregnancy and childbirth*. 2015;15:1-10.
19. (<https://iris.who.int/handle/10665/373221>) WHO. A roadmap to combat postpartum haemorrhage between 2023 and 2030. Geneva. 2023.
20. Umashankar K, Dharmavijaya M, Sudha R, Datti SN, Kavitha G. Effect of a primary postpartum haemorrhage on the “near-miss” morbidity and mortality at a Tertiary Care Hospital in Rural Bangalore, India. *Journal of clinical and diagnostic research: JCDR*. 2013;7(6):1114.

21. Abneh AA, Kassie TD, Gelaw SS. The magnitude and associated factors of immediate postpartum anemia among women who gave birth in Ethiopia: systematic review and meta-analysis, 2023. *BMC Pregnancy and Childbirth*. 2024;24(1):317.
22. Delie AM, Melese M, Limenh LW, Esubalew D, Worku NK, Fenta ET, et al. Magnitude and predictors of obstetric complications during delivery among postpartum women in Ethiopia: evidence from PMA Ethiopia longitudinal survey. *BMC Pregnancy and Childbirth*. 2024;24(1):703.
23. Eggel B, Bernasconi M, Quibel T, Horsch A, Vial Y, Denys A, et al. Gynecological, reproductive and sexual outcomes after uterine artery embolization for post-partum haemorrhage. *Scientific reports*. 2021;11(1):833.
24. Bautista K, Lee Y-F, Higgins CR, Procter P, Rushwan S, Baidoo A, et al. Modeling the economic burden of postpartum hemorrhage due to substandard uterotonics in Ghana. *PLOS Global Public Health*. 2024;4(6):e0003181.
25. Valizadeh F, Heshmat F, Motaghi Z. The Parturient Women's Privacy Preservation in the Delivery Rooms: A Qualitative Study. *Journal of Caring Sciences*. 2022;12(1):33.
26. Akter S, Forbes G, Corona MV, Miller S, Althabe F, Coomarasamy A, et al. Perceptions and experiences of the prevention, detection, and management of postpartum haemorrhage: a qualitative evidence synthesis. *Cochrane Database of Systematic Reviews*. 2023(11).
27. Jung YW, Kim J, Shin WK, Song SY, Choi JS, Hyun SH, et al. Outcomes and prognosis of postpartum hemorrhage according to management protocol: an 11-year retrospective study from two referral centers. *World Journal of Emergency Surgery*. 2024;19(1):27.
28. Miller CM, Cohn S, Akdagli S, Carvalho B, Blumenfeld YJ, Butwick AJ. Postpartum hemorrhage following vaginal delivery: risk factors and maternal outcomes. *Journal of Perinatology*. 2017;37(3):243-8.
29. Tort J, Rozenberg P, Traoré M, Fournier P, Dumont A. Factors associated with postpartum hemorrhage maternal death in referral hospitals in Senegal and Mali: a cross-sectional epidemiological survey. *BMC Pregnancy and Childbirth*. 2015;15(1):235.
30. Olowokere A, Adekeye O, Ogunfowokan A, Olagunju O, Irinoye O. The prevalence, management and outcome of primary postpartum haemorrhage in selected health care facilities in Nigeria. *International Journal of Nursing and Midwifery*. 2013;5(3):28-34.

31. Kakay O. The Prevalence, Associated Factors, Management and Outcomes of Postpartum Hemorrhage Among Women Admitted to Princess Christian Maternity Hospital in Freetown, Sierra Leone: a Retrospective Study: University of Nairobi; 2022.
32. Derbew T. Prevalence and maternal management outcomes of primary postpartum hemorrhage among mothers delivered at Attat Primary Hospital SNNPR State. Gurage Zone, South-Ethiopia. 2017.
33. dabashe y. DETERMINANTS AND MANAGEMENT OUT COME OF POST PARTUM HEMORRHAGE AMONG MOTHERS DELIVERED IN ATTAT PRIMARY HOSPITAL, GURAGIE ZONE, SOUTHERN ETHIOPIA, 2019. jimma university repostory. 2019.
34. Sheldon W, Blum J, Vogel J, Souza J, Gülmezoglu A, Winikoff B, et al. Postpartum haemorrhage management, risks, and maternal outcomes: findings from the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2014;121:5-13.
35. Kolin DA, Shakur-Still H, Bello A, Chaudhri R, Bates I, Roberts I. Risk factors for blood transfusion in traumatic and postpartum hemorrhage patients: Analysis of the CRASH-2 and WOMAN trials. *PLoS One*. 2020;15(6):e0233274.
36. McLintock C. Prevention and treatment of postpartum hemorrhage: focus on hematological aspects of management. *Hematology 2014, the American Society of Hematology Education Program Book*. 2020;2020(1):542-6.
37. Akinola O, Fabamwo A, Tayo A, Bande A, Rabiou K, Oshodi A. Manual removal of the placenta: Evaluation of some risk factors and management outcome in a tertiary maternity unit. A case controlled study. 2013.
38. Mourad-Youssif M, Ojengbede OA, Meyer CD, Fathalla M, Morhason-Bello IO, Galadanci H, et al. Can the Non-pneumatic Anti-Shock Garment (NASG) reduce adverse maternal outcomes from postpartum hemorrhage? Evidence from Egypt and Nigeria. *Reproductive Health*. 2020;7(1):24.
39. Yeshitila YG, Bante A, Aschalew Z, Afework B, Gebeyehu S. Utilization of non-pneumatic anti-shock garment and associated factors for postpartum hemorrhage management among

obstetric care providers in public health facilities of southern Ethiopia, 2020. PloS one. 2021;16(10):e0258784.

40. Organization WH. Updated WHO recommendation on tranexamic acid for the treatment of postpartum haemorrhage: highlights and key messages from the World Health Organization's 2017 global recommendation. World Health Organization; 2017.

41. Siswosudarmo R. Effect of Delay in Postpartum Hemorrhage Management on the Rate of Near-Miss and Maternal Death Cases. Indonesian Journal of Obstetrics and Gynecology. 2019;177-81.

42. Lanza AV, Amorim MM, Ferreira M, Cavalcante CM, Katz L. Factors associated with severe maternal outcome in patients admitted to an intensive care unit in northeastern Brazil with postpartum hemorrhage: a retrospective cohort study. BMC Pregnancy and Childbirth. 2023;23(1):573.

43. Khireddine I, Le Ray C, Dupont C, Rudigoz R-C, Bouvier-Colle M-H, Deneux-Tharaux C. Induction of labor and risk of postpartum hemorrhage in low risk parturients. PloS one. 2013;8(1):e54858.

44. Brun R, Spoerri E, Schäffer L, Zimmermann R, Haslinger C. Induction of labor and postpartum blood loss. BMC pregnancy and childbirth. 2019;19:1-7.

45. Louis JM, Parchem J, Vaught A, Tesfalul M, Kendle A, Tsigas E, et al. Preeclampsia: a report and recommendations of the workshop of the Society for Maternal-Fetal Medicine and the Preeclampsia Foundation. American journal of obstetrics and gynecology. 2022;227(5):B2-B24.

46. Makumi EM. Incidence of Postpartum Hemorrhage Among Women With Hypertensive Disorders in Pregnancy at Kenyatta National Hospital in 2019: a Prospective Cohort Study: UON; 2021.

47. Kokori E, Aderinto N, Olatunji G, Komolafe R, Babalola EA, Isarinade DT, et al. Prevalence and materno-fetal outcomes of preeclampsia/eclampsia among pregnant women in Nigeria: a systematic review and meta-analysis. European Journal of Medical Research. 2024;29(1):482.

48. Hu H, Wang L, Gao J, Chen Z, Chen X, Tang P, et al. Risk factors of severe postpartum hemorrhage in pregnant women with placenta previa or low-lying placenta: a retrospective cohort study. BMC Pregnancy and Childbirth. 2024;24(1):674.

49. Shazia N, Shoaib M, Haleema Y, Razia K. Foeto-maternal outcome of abruptio placentae at a tertiary care hospital. 2017.
50. Organization WH. WHO recommendations for the prevention and treatment of postpartum haemorrhage: World Health Organization; 2012.
51. health mo. National Guideline on Prevention and Management of Postpartum Hemorrhage. ethiopia 2022.
52. Organization WH. Evaluating the quality of care for severe pregnancy complications: the WHO near-miss approach for maternal health. 2011.
53. Okunade KS, Adejimi AA, Olumodeji AM, Olowe A, Oyedeki OA, Ademuyiwa IY, et al. Prenatal anaemia and risk of postpartum haemorrhage: a cohort analysis of data from the Predict-PPH study. BMC Public Health. 2024;24(1):1028.
54. Brenner A, Roberts I, Balogun E, Bello FA, Chaudhri R, Fleming C, et al. Postpartum haemorrhage in anaemic women: assessing outcome measures for clinical trials. Trials. 2022;23(1):220.
55. Obeagu E, Obeagu G. The effects of prolonged term blood transfusion in Postpartum Hemorrhage. 2024;2:47-58.
56. Eluobaju D, Yeman A, Lee G, Goba G, Cavanaugh E. Barriers to Blood Transfusions During Post-Partum Hemorrhage in Northern Ethiopia: Preliminary Data [04M]. Obstetrics & Gynecology. 2020;135:135S-6S.
57. Alves ÁLL, Francisco AA, Osanan GC, Vieira LB. Postpartum hemorrhage: prevention, diagnosis and non-surgical management. Revista Brasileira de Ginecologia e Obstetrícia. 2020;42:776-84.
58. Erkaya R, Karabulutlu Ö, Çalik KY. Uterine massage to reduce blood loss after vaginal delivery. Health Care for Women International. 2023;44(10-11):1346-62.
59. Henriquez DD, Bloemenkamp KW, Loeff RM, Zwart JJ, van Roosmalen JJ, Zwaginga JJ, et al. Fluid resuscitation during persistent postpartum haemorrhage and maternal outcome: A nationwide cohort study. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2019;235:49-56.

6. ANNEXES

Annex one: checklist

College of health sciences, school of nursing and midwifery, department of midwifery data collection tool for assessment of postpartum hemorrhage management outcome and associated factors in Addis Ababa public hospitals from December 30,2022 to January 1,2025.

1. Card number _____
2. Date of admission_____ date of discharge _____

Part 1: Socio demographic character		Category
1	Age of mothers (years)	----
2	Marital status	1.Married
		2.windowed
		3.cohabited
		4.Unmarried
3	Residency	1.Urban
		2.Rural
4	Educational level	1.no formal
		2.Primary (Grade1-8)
		3.Secondary (Grade 9-12)
		4. College and above

Part 2: obstetrics factors		
1	Parity	1.Primipara 2.Multipara (2-4) 3.Grand multipara (≥ 5)
2	Gestational age(weeks)	----
3	ANC follow up	1.Yes
		2.No
4	If yes, number of ANC visits	-----
5	Mode of delivery	1.Cesarean sectioning
		2.Spontaneous vaginal delivery
		3. Instrumental assisted delivery (Vacuum or Forceps)
6	History of cesarean sectioning	1.Yes
		2.No
7	History of PPH	1.Yes
		2.No
8	Antepartum hemorrhage	1.Yes
		2.No
9	Preeclampsia/eclampsia	1.Yes
		2.No
		2.No
10	Status of fetus	1. Alive
		2. Intra uterine fetal death
		3. still birth

		4. Admitted to Nicu
12	Chorioamnionitis	1.Yes
		2.No
13	Prolonged labor(>=12hour)	1.Yes
		2.No
14	Induction/augmentation of labor	1.Yes
		2.No
Part 3: medical factors		
1	Anemia	1.Yes
		2.No
2	Diabetic mellitus	1.Yes
		2.No
3	Coagulopathy problems	1.Yes
		2.No
Part 4: causes of PPH		
1	Uterine atony	
2	Retained placentas or tissue	
3	Genital tears or trauma	
4	Coagulation problems	
Part 5: blood pressure of mothers(mg/dl) during diagnosis		
1	Unrecordable	
2	<90/60	

3	>=90/60	
Part 6	Estimated blood lose	-----
Part 7	Hemoglobin of mother(mg/dl) before treatment	-----
Part 8: active management of third stage of labor was given?		
1	Yes	
2	No	
Part 9: what are management given? Check all that apply		
1	Uterotonic (oxytocin, misoprostol, ergometrine, etc.)	
2	Resuscitation with fluids	
3	Tear/extension repair	
4	Compression techniques (external uterine massage, bimanual aortic compression)	
5	manual evacuation of clot or tissue	
6	Anti-shock garment	
7	uterine tamponed	
8	Manual removal of placenta	
9	Surgeries (uterine artery ligation, uterine hemostatic compression suturing, hysterectomy and surgical removal of placenta)	
10	Blood transfusion	
11	Duration of time between diagnosis and treatment of PPH	1.>1hour
		2.<1hour
12		1. No

	Was tranexamic acid given?	2. yes	1. With in 3 hours of birth
			2. Greater than three hours of birth
Part10: Was it complicated during management?			
1	Yes (e.g. severe anemia, renal failure, respiratory distress, organ failure...)		
2.	No		
Part 11: postpartum hemorrhage management outcome			
1	favorable (improved without developed sever complications)		
2	Unfavorable	1.improved by cope up of complications	
		2.died	

Date of data collection_____

Name of data collector_____signature _____

Annex two :Declaration sheet

By my signature below, I declare and affirm that this proposal on management outcome and associated factor of post-partum hemorrhage among women gave birth in Addis Ababa public hospital for the past three years is my original work. I will follow all ethical principles of research in preparation, data collection, data analysis, and completion of this paper . All scholarly matter that is included in the proposal paper will be given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this Proposal paper. This proposal will be submitted for a partial fulfilment of the requirement for graduate degree from the Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery, department of midwifery. It has never been presented and submitted in a whole or in part, in this or any other university for the award of degree, diploma or other qualification certificates.

Submitted by:

Masresha kibret

 03/01/2025

Name of student

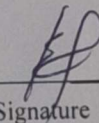
Signature

Date

This proposal work has been submitted for examination with my approval as an advisor.

Approved by:

Haweni Adugna (MSc , Assist. prof, PHD candidate)

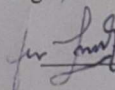
 03/01/2025

Name of primary Advisor

Signature

Date

Hana Lijaemiro (MSc)

 03/01/2025

Name of Co-Advisor

Signature

Date