AJOMN-American Journal of Obstetric and Maternal Nursing
Volume 2, Issue 1 | April-2025
e-ISSN: 3065-8144 Print ISSN: 3065-8136

Developments in Postpartum Hemorrhage Prevention and Treatment

Emily Smith
Research Scholar, Department of Pharmacology, University of Toronto, Canada

Received: 17-02-2025; Revised: 04-03-2025; Accepted: 18-03-2025; Published: 14-04-2025

Abstract

Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide. Recent advancements in its prevention and management have significantly improved outcomes. This review explores novel pharmacological interventions, surgical techniques, and non-invasive strategies that have enhanced early detection and treatment. The role of tranexamic acid, uterotonics, and balloon tamponade has been increasingly emphasized, alongside emerging technologies such as AI-driven monitoring and predictive analytics. Additionally, global initiatives to standardize PPH protocols have strengthened healthcare responses. These developments highlight a paradigm shift towards more proactive and effective management strategies, ultimately improving maternal survival and well-being.

Keywords: ***Postpartum hemorrhage, maternal health, uterotonics, tranexamic acid, balloon tamponade, AI in obstetrics, PPH prevention, emergency obstetric care, maternal mortality reduction, obstetric innovations.***

1.Introduction

Postpartum hemorrhage (PPH) exists as one of the biggest killers of maternal health worldwide because it happens in both advanced healthcare areas and underdeveloped healthcare nations. The existing definition of PPH describes it as uncontrolled bleeding which arises after birth delivering a newborn baby and remains a crucial emergency for obstetric care. PPH remains a major healthcare challenge in developing countries because these nations lack sufficient access to timely healthcare services despite improvements in obstetric care and availability of skilled birth attendants and medical advancements in treatment. The percentage of maternal deaths from PPH in United States and high-income nations stands at 11.5% yet this condition leads to almost 60% of maternal deaths in low-income areas including sub-Saharan Africa and South Asia. The high number of PPH cases in resource-poor regions results from delayed medical diagnosis combined with poor healthcare facilities and restricted medication availability and insufficient maternity care staff(1).

PPH exists as two distinctive forms which medical professionals categorize as primary and secondary types. Transfuse these pregnant women to prevent persistent bleeding from various causes like uterine atony, retained placental tissue, birth canal traumas or blood clotting issues during the first day after delivery. Between 24 hours and 12 weeks postpartum Secondary PPH becomes evident because infection along with subinvolution of the placental site and retained products of conception frequently cause this condition. Medical progress and clinical developments have not reduced the significance of early PPH diagnosis and treatment in minimizing maternal deaths and enhancing treatment results. Standardized obstetric procedures including active management of the third stage of labor (AMTSL) plus timely uterotonic agent administration and intensified monitoring of at-risk pregnancies have decreased the occurrence of severe maternal difficulties(2).

Accurate blood loss assessment represents a major clinical obstacle when dealing with PPH throughout childbirth. Research findings demonstrate healthcare providers tend to underpredict the amount of blood loss in patients leading to delayed medical intervention together with increased chances of substantial maternal health complications. Studies show that medical professionals often make incorrect readings of blood loss through visual assessment since their estimates fall short by 30-50%. Obstetric guidelines now urge healthcare providers to employ quantitative blood loss assessment technologies which entail measuring the weight of blood-soaked materials and using calibrated collection drapes because these methods increase accuracy and prompt appropriate interventions.

PPH develops through multiple causes that merge vascular elements and hematologic elements and uterine elements when manifesting pathophysiological symptoms. Uterine atony stands as the primary reason for PPH because it causes an impaired uterus to experience uncontrolled excessive bleeding after childbirth. PPH may also occur due to placental abnormalities and birth canal traumas and coagulopathy conditions such as disseminated intravascular coagulation and thrombocytopenia. The wide range of PPH causes requires healthcare providers to establish a structured assessment

method and intervention process in order to achieve good maternal outcomes. The mnemonic "4 Ts" provides clinical providers with a standardized way to diagnose and respond to PPH by evaluating Tone, Tissue, Trauma and Thrombin issues.

Nurses along with midwives play an essential role in PPH treatment through medical as well as surgical interventions. The critical capability of nurses to detect and properly treat early bleeding signs during obstetric emergencies becomes essential for saving maternal life because they serve as primary responders to such events. Nurses can minimize PPH severity by promptly performing fundal massage alongside uterotonic drug administration in combination with continuous monitoring of vital signs alongside strong communication with the obstetric staff(3). A central nursing duty during PPH management includes supplying psychological assistance to both patients and their family members due to the traumatic impact that this condition creates.

The available life-saving procedures still face specific implementation challenges for standardized PPH management protocols. Rural and underserved areas expose disparities in maternal health care so attention must persist for better obstetrical services and provider education and maternal health service funding. The study centers on PPH while delivering an extensive analysis of its risk elements along with assessment methods and treatment choices and evidence-based nursing intervention approaches. The research review combined with clinical guidelines sought to provide healthcare providers with essential knowledge for furnishing efficient, top-quality care to patients who have PPH.

2.Postpartum Hemorrhage Definition

Worldwide PPH remains a notable cause of both severe maternal complications and death because of its existence as a massive post-childbirth hemorrhagic condition. All healthcare organizations concur that postpartum hemorrhage is an emergency that needs immediate medical treatment since their definitions slightly differ. The World Health Organization (WHO) specifies postpartum hemorrhage as exceeding 500 mL blood loss during the first 24 hours after vaginal childbirth but separate severe postpartum hemorrhage occurs when blood loss reaches above 1,000 mL in this period. According to the American College of Obstetricians and Gynecologists (ACOG) severe PPH occurs through either blood loss reaching 1,000 mL or more or presented hypovolemic signs within 24 hours of birth regardless of the delivery method. The definition includes both intrapartum bleeding incidents during any type of delivery including vaginal births or cesarean sections.

The medical presentation of a patient alongside established numerical thresholds determines how severe Post-Partum Hemorrhage (PPH) is. A woman with normal pregnancy blood volume can normally handle blood loss between 500 to 1000 mL without signs of hypovolemia but other women will experience symptoms with modest amounts of bleeding especially those with cardiovascular diseases and blood clotting issues. Symptoms of hypovolemia such as rapid heart rate, low blood pressure, dizziness as well as pale skin, mental status changes and reduced urine output demonstrate that the body faces difficulty maintaining blood volume stability after a blood loss. Blood loss measurements by themselves should never replace the need for medical practitioners to use their professional experience.

The classification of PPH separates it into primary and secondary types which depend on the time period between delivery and its onset. Primary postpartum hemorrhage (PPH) happens during the first 24 hours after delivery through reasons which include uterine atony, birth canal trauma, retained placental tissue or coagulation disorders. Uterine atony stands as the leading cause of primary PPH because it contributes to 75-90% of such cases following childbirth. Placental retention combines with cervical or vaginal lacerations and uterine rupture and inherited or acquired coagulation abnormalities as additional sources that produce postpartum bleeding(4). The occurrence of late PPH that is known as secondary postpartum hemorrhage takes place between 24 hours and 12 weeks postpartum while infection (endometritis) stands as the main reason along with subinvolution of the placental site and retained products of conception. The hazardous aspect of late-onset hemorrhage stems from its ability to hide under the radar as an obstetric emergency because health professionals might fail to recognize the condition right away therefore leading to delayed medical response with elevated potential for severe complications.

Accurate blood loss measurement stands as a major obstacle when attempting to identify PPH along with its appropriate diagnosis. Studies demonstrate visual blood loss estimation to be inaccurate since medical practitioners regularly mistake actual quantities of loss by up to 50%. The delayed medical attention following obscure PPH identification raises the likelihood of maternal health complications which result in adverse mortality rates. Many modern obstetric guidelines endorse quantitative blood loss (QBL) measurement systems to enhance accuracy because

Volume 2, Issue 1 | April-2025
e-ISSN: 3065-8144 Print ISSN: 3065-8136
these methods include weighing blood-soaked materials and using calibrated drapes for blood loss collection. Standardization of measurement techniques improves PPH detection at early stages and helps reduce serious outcomes during management.

Preventing massive bleeding and patient stabilization constitute the main treatment goals of PPH management while the condition inflicts emotional distress and psychological impact on the affected mothers. The life-threatening situation of severe PPH in women leads to the development of postpartum depression and post-traumatic stress disorder along with anxiety. Complications such as intensive care need and breastfeeding issues together with the potential requirement of hysterectomy create additional stressors that impact the maternal postpartum journey. Postpartum care that provides psychological support alongside patient education remains vital for preserving the health of mothers suffering from PPH because of its numerous associated consequences.

The medical emergency PPH requires rapid medical recognition combined with intervention measures to stop adverse outcomes from developing in pregnant women. Medical organizations use slightly different definitions of severe PPH but the most commonly accepted criteria show 1,000 mL blood loss in 24 hours after birth and any blood loss amount resulting in patient clinical instability. The effective evaluation of blood loss along with responsive medical and nursing strategies must exist for minimizing worldwide maternal fatalities linked to postpartum hemorrhage. Professional caregivers can execute proactive PPH prevention when they grasp different PPH definitions together with its clinical symptoms.

3.Epidemiology of Postpartum Hemorrhage

Postpartum hemorrhage (PPH) ranks as one of the most significant contributors to maternal deaths while causing substantial harm to mothers worldwide since regions show varying rates of incidence and death from this condition. PPH represents a significant preventable cause of maternal death throughout the world particularly in low-resources environments which lack accessible healthcare. The burden of PPH functions as a primary driver of maternal mortality throughout developing countries since detection delays and insufficient skilled practitioners and insufficient preparedness and essential medication supplies continue to afflict these regions(5).

The World Health Organization reports that postpartum hemorrhage causes about 25% of worldwide maternal fatalities thus manifesting as the leading cause of death in birthing women. Maternal death statistics in sub-Saharan Africa and South Asia exceed those of high-income countries and PPH plays a role in as many as 60 percent of maternal fatalities in these regions. Postpartum hemorrhage death rates in the United States Canada and Western European nations are lower yet it remains one of the key causes of major maternal health complications which may necessitate hysterectomy and require intensive hospital care and extended hospitalization.

Maternal mortality rates because of PPH have experienced different patterns of change across time periods. Recent United States maternal death statistics have revealed that per 100,000 live births showed an increase from 7.2 deaths in 1987 to 18 deaths in 2014 while maintaining the same high level of difficulty to minimize maternal morbidity and mortality rates. Medical interventions combined with adequate healthcare facilities have not lowered the rate of 11.5% hemorrhage-related deaths among affected mothers. South African medical statistics show obstetric hemorrhage became responsible for 24.9 maternal deaths per 100,000 live births between 2008 and 2010 thus increasing from 18.8 per 100,000 live births in the previous three-year period. Data demonstrates that both maternal care accessibility and prepared emergency response systems and resource distribution remain inequal between wealthy and poor geographic areas.

The existing healthcare infrastructure determines the probabilities of death and serious ailments that stem from postpartum hemorrhage. Research done across California and other U.S. locations shows care facilities significantly affect the health results experienced by pregnant mothers. Hospitals specializing in tertiary care that maintain expert obstetric teams backed by blood banks and strict guidelines for managing bleeding episodes experience decreased severe maternal complications superior to the outcomes of smaller local medical facilities with limited expert obstetric staff based in rural areas. The successful control of PPH depends on well-prepared medical staff who operate within facilities with proper resources while demonstrating training in PPH management.

The frequency of PPH stands different according to what definition medical specialists choose and what diagnostic criteria they utilize. Research has identified postpartum hemorrhage as an occurrence in one to six deliveries out of 100 but women who experience certain risk factors face an elevated hemorrhage risk. Risk factors include multiple

pregnancies, uterine atony and prolonged labor and a previous history of postpartum hemorrhage. Uterine incisions from cesarean sections and abnormal placental attachment such as placenta accreta together with enhanced blood vessel exposure have elevated PPH cases because surgical deliveries have higher hemorrhage risks. Alongside the increased occurrence of maternal dual medical conditions such as obesity together with hypertension and diabetes two more barriers have emerged which complicate PPH management creating sustained difficulties for modern obstetric care.

The successful management of PPH epidemiology faces its biggest challenge from inadequate data collection and reporting systems. Medical staff in low-income countries often miss reporting maternal deaths from PPH because their healthcare documentation system remains inconsistent. The absence of dependable information about PPH forces healthcare policymakers to struggle with creating targeted solutions and distributing crucial resources towards vulnerable areas. Analysis of PPH-related complications becomes challenging since healthcare systems fail to properly document severe maternal morbidities which stop short of causing patient death(6).

Reducing the international scope of PPH demands diverse intervention approaches that strengthen obstetric care delivery through specialized midwifery staffing and systematic bleeding treatment guidelines along with wider access to medications that stop postpartum bleeding and rigorous training for emergency obstetric care. Health initiatives launched by the WHO through its Safe Motherhood program combined with country-level national hemorrhage response bundles have proven effective in reducing maternal deaths. Maternal early warning systems combined with team-based training and better blood transfusion protocols introduced in the United Kingdom have contributed to reduced PPH-associated deaths throughout the last two decades.

Postpartum hemorrhage presents itself as a significant worldwide maternal health priority because it impacts low-resource communities differently by increasing maternal death rates. Improvements in postpartum hemorrhage prevention and treatment have occurred yet the problem requires additional interventions to eliminate maternal care inequalities while supporting proactive hemorrhage recognition and treatment and providing access to lifesaving care for all women across populations. Improving obstetric preparedness methods and increasing provider knowledge and using evidence-based guidelines will allow the world to successfully decrease the PPH impact on maternal healthcare results globally.

4.Etiology of Postpartum Hemorrhage

The causes of postpartum hemorrhage (PPH) span across physiological elements alongside anatomical factors and conditions pertaining to the blood since childbirth functions as the main risk factor for PPH. The identification and specific treatment of PPH origins remains essential for medical practitioners because it allows rapid detection and intervention which lowers maternal death rates. Postpartum hemorrhage (PPH) gets typically identified with the "4 Ts" mnemonic that describes the main causes as Tone and Tissue and Trauma and Thrombin factors. The specific factors affecting PPH pathophysiology operate separately from one another while their impact depends on maternal conditions and delivery-related aspects and prenatal factors.

1. Tone: Uterine Atony

Uterine atony represents the main determinant of primary postpartum hemorrhage as it arises in 75 to 90 percent of such cases. The uterus contracts normally to press down maternal blood vessels at the placental site following placenta delivery thus preventing abnormal bleeding. Uterine atony represents the main reason behind postpartum hemorrhage when the uterus maintains an improper contraction state which causes extensive uncontrolled bleeding. Uterine atony predisposition occurs primarily because of prolonged labor and rapid labor as well as multiple gestation and polyhydramnios and fetal macrosomia and prior PPH history. The administration of extreme doses of tocolytics and magnesium sulfate together with general anesthesia can harm uterine contractility thus elevating hemorrhage risk.

Uterine atony prevention depends heavily on three key obstetric interventions known as active management of the third stage of labor (AMTSL). IMmediate administration of oxytocin and other uterotonic drugs and specific cord traction techniques along with massaging the uterus constitute AMTSL treatment to expedite contractions and decrease hemorrhagic risks. Uterine atony requires appropriate medical treatment when initial steps fail to control the bleeding. Physicians should consider using both pharmacological medications such as additional uterotonics and surgical procedures including uterine balloon tamponade and compression sutures and even hysterectomy if needed(7).

2. Tissue: Retained Placental Tissue

The occurrence of placental tissue retention after delivery becomes the second principal reason for postpartum hemorrhage as it blocks the uterus from contracting properly and healing. When items such as placental debris remain

Volume 2, Issue 1 | April-2025
e-ISSN: 3065-8144 Print ISSN: 3065-8136
after childbirth they impede normal uterine closure and healing and this will cause ongoing bleeding which may result in postpartum hemorrhage from either infection or delayed blood clotting.

Retained placental tissue becomes more likely when placental previa and placenta accreta spectrum disorders exist along with previous uterine surgeries such as cesarean sections and myomectomies because these conditions disrupt normal placental attachment. The delay of placenta delivery beyond thirty minutes postpartum leads to retained placenta diagnosis which requires manual extraction or surgical procedures including dilation and curettage or hysteroscopy to remove the tissue and avoid dangerous bleeding.

3. Trauma: Obstetric Lacerations and Uterine Rupture

Healing of the uterus following birth becomes insufficient to control bleeding when physical injuries damage the birth canal or uterus. The most frequent traumatic origins of postpartum hemorrhage include lacerations that affect the cervical area as well as tears of the vaginal or perineal tissue and ruptures of the uterus and bleeding connected to episiotomy procedures. The main causes of trauma-related PPH include forceps or vacuum-assisted deliveries together with fast or lengthy births and large newborns alongside tool-guided cesarean section procedures.

The obstetric emergency of uterine rupture poses a life-threatening danger to women with surgical scars on their uterus such as cesarean sections and myomectomies. Massive maternal hemorrhage and fetal distress from this situation force healthcare staff to perform an emergency hysterectomy as urgent surgical treatment. Delayed PPH can occur because of bleeding from internal injuries sustained by the uterus during cesarean section or poor uterine incision repair.

4. Thrombin: Coagulopathies and Blood Clotting Disorders

The fourth main reason for PPH appears when coagulation disorders prevent blood clot stability which causes uncontrolled bleeding. The conditions that cause delayed postpartum hemorrhage include both maternal disorders from before pregnancy and those developed either naturally during pregnancy or acquired during childbirth. Among the coagulopathy examples are disseminated intravascular coagulation (DIC), thrombocytopenia, von Willebrand disease and amniotic fluid embolism-related coagulopathy which contribute to PPH.

The coagulation cascade of DIC results in fatal microvascular clotting and drainage of clotting factors with severe unmanageable hemorrhage. The occurrence of DIC mainly results from extreme cases of preeclampsia and placental abruption together with massive hemorrhage or amniotic fluid embolism.

Uterotonics combined with surgery do not guarantee appropriate control of bleeding when thrombin causes PPH. These demanding cases need urgent blood product transfusions which include fresh frozen plasma together with platelets and cryoprecipitate with fibrinogen concentrate to rebuild coagulation processes and stop additional bleeding(8).

Conclusion

Early detection and specific interventions for PPH depend on complete knowledge of its causes hence medical professionals must grasp PPH etiology. The "4 Ts" diagnostic tool (Tone, Tissue, Trauma, and Thrombin) serves as a methodical approach for both detecting and handling postpartum hemorrhage causes. Uterine atony emerges as the leading cause of postpartum hemorrhage while retained placenta tissue and birth canal injuries and coagulopathic conditions make up the rest of the cases. Proper obstetric management tactics consist of planned prebirth care combined with on-time uterotonic medication administration and surgical intervention and responsive recognition of dangerous maternal conditions. Healthcare providers must address the core factors leading to PPH alongside evidence-based protocols to minimize maternal risks which will enhance worldwide maternal health results.

5. Methods

A research approach through integrative review evaluated the contemporary evidence on postpartum hemorrhage (PPH) triggers along with risk elements as well as testing and control procedures. A systematic review of scholarly articles implemented databases that combined PubMed with CINAHL alongside the Joanna Briggs Institute database to retrieve studies from 2013 to 2018. The research employed "postpartum hemorrhage" together with "primary postpartum hemorrhage" and "nursing care of postpartum hemorrhage" and "medical management of postpartum hemorrhage" as well as the organizations "World Health Organization (WHO)," "Centers for Disease Control and Prevention (CDC)," "American College of Obstetricians and Gynecologists (ACOG)," and "Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN)" in the search terms. The research analyzed only English language medical articles which focused on PPH nursing practice or medical care.

The researchers collected significant findings from their research publications that summarized current PPH information. The research was grouped according to main subject matter which included epidemiology, etiology, clinical interventions, nursing assessment, and evidence-based treatment strategies. The study extracted information focusing on blood loss measurements in addition to uterotonic agent performance assessment together with surgical treatments and transfusion management and optimal nursing standards of care. The analysis of real-world PPH management approaches included the investigation of relevant case studies. Evidence-based nursing interventions received special attention during the evidence assessment process to determine what procedures and drugs along with clinical techniques would be most beneficial for postpartum hemorrhage prevention and treatment(9).

The review examined different quality improvement programs which work to improve both PPH identification methods and emergency response strategies. Two types of studies were included in this assessment: first ones explored multidisciplinary team training along with simulation-based education as well as second ones investigated postpartum hemorrhage management protocol implementation. These studies measured their impact on patient outcomes. Research examined how well active management of the third stage of labor (AMTSL) functioned alongside early tranexamic acid (TXA) giving and rapid response team procedures in practice.

This research developed methods to detect essential weaknesses in contemporary PPH care approaches while developing useful recommendations for nursing practitioners. Researchers reviewed collected data through qualitative analysis where they identified typical trends and conflicting information from past research studies. The researchers structured the gathered data under significant categories to develop a comprehensive evidence-based discussion about PPH prevention and management.

6.Results

Research of selected clinical guidelines together with studies produced essential findings about the prevalence of postpartum hemorrhage as well as its risk factors and current management strategies. The world-wide rate of PPH reported at 2-6% but low-resource settings showed higher numbers because their patients lack access to obstetric care. Research results validated uterine atony as the primary cause of PPH by affecting 75-90 percent of cases. Second to this came retained placental tissue, trauma, and coagulopathies as reported PPH causes(10).

Vital findings highlighted the visual estimation errors of blood loss because medical practitioners usually underestimate this amount by between 30-50% which leads to delayed PPH treatment. Academic research highlighted the significance of using blood-soaked material weights and calibrated drapes for more precise quantitative blood loss (QBL) evaluation. Healthcare facilities that adopted standardized blood loss assessment methods reduced their severe PPH occurrences while enhancing their ability to make early interventions.

The review proved that starting uterotonic medications including oxytocin and misoprostol and tranexamic acid significantly cuts down severe hemorrhage risks. Multiple clinical trials showed that the World Health Organization's 2017 recommendation allowing TXA delivery within three hours of birth resulted in a 30% decline of bleeding-related maternal deaths. The combination treatment of AMTSL yielded controlled cord traction coupled with uterine massage while giving prophylactic oxytocin leading to about 60% decrease in severe PPH occurrences.

The reviewed studies showed that uterine balloon tamponade and B-Lynch sutures and uterine artery embolization demonstrate effectiveness in stopping severe PPH not controlled by medical interventions. When facing high-risk situations a last-choice procedure called emergency hysterectomy may need to be performed after delivery at a rate of between 0.2-0.6% of all cases. Healthcare facilities that implemented PPH management protocols together with emergency team preparedness achieved better patient results by decreasing hysterectomy procedures as well as requiring less blood transfusions.

Nurses and midwives showcased significant importance in the leadership of PPH management tasks. Medical research revealed that staff members who completed hemorrhage protocol education became better at detecting warning indicators and starting correct medical actions and doing effective team communication with maternity teams. Structured program training that included simulation-based drills for obstetric emergencies effectively enhanced team performance while shortening reaction times and lowering mortality results. Healthcare organizations that combined different medical staff under one team saw better results in patient survival statistics and maternal health benefits(11).

A critical discovery emerged regarding transfusion guidelines which help manage severe PPH conditions effectively. Studies have shown that using Massive Transfusion Protocols (MTPs) with red blood cells receiving equal portions to plasma and platelets reduces death rates in patients suffering from hemorrhagic shock. The hospitals that had blood

Volume 2, Issue 1 | April-2025
e-ISSN: 3065-8144 Print ISSN: 3065-8136
products on-site and point-of-care coagulation tests could stop hemorrhagic conditions from worsening while decreasing ICU requirements.

This analysis included assessments of quality improvement projects designed to raise health care provider understanding and emergency readiness related to PPH situations. Time-intensive programs that combined scheduled team reviews with instant blood loss recording systems with steady provider education effectively decreased numbers of negative maternal health outcomes. Standards-based care bundles used for PPH management decreased the occurrence of maternal morbidities from hemorrhage by 30-50%.

This review results show major progress in PPH prevention alongside management that highlights the value of quick response besides structured educational programs for early intervention detection. Evidence-based guidelines coupled with quantitative blood loss measurement through rapid response teams under multidisciplinary care proves effective in lowering PPH-related morbidity and mortality. More progress is needed to improve worldwide availability of life-saving treatments particularly within resource-constrained environments until both maternal healthcare services and emergency preparedness are strengthened.

7. Discussion

The research results underline the necessity of swift diagnosis followed by prompt interventions and standard procedures for reducing both the frequency and seriousness of postpartum hemorrhage (PPH). Current research shows PPH is a complex condition which demands multiple professional approaches from staff such as obstetricians together with nurses and midwives alongside anesthesiologists and emergency teams for optimal maternal results. The research review confirms AMTSL coupled with early medication administration through oxytocin and TXA along with measured QBL techniques effectively reduce PPH-associated maternal health issues.

The main challenge in PPH management stems from incorrect visual assessment of blood volume because unreliable visual methods are used for estimates. Research shows that medical professionals usually misjudge blood loss amounts by 30-50% which produces delayed medical interventions and negative maternal results. Healthcare providers using QBL techniques which combine pad weighing with calibrated drapes show better capabilities to identify abnormally high bleeding amounts and trigger immediate treatment measures. Healthcare institutions using a standardized QBL protocol system record fewer cases of severe hemorrhage along with improved blood transfusion requirements and maternal shock prevention rates.

Medical research has thoroughly verified the preventative along with the therapeutic usefulness of uterotonic drugs when managing PPH. Postpartum administration of oxytocin amounts to a 60% decrease in the risk of severe postpartum bleeding but misoprostol works effectively in areas without sustainable oxytocin storage capabilities. The World Health Organization's recent TXA guidelines have improved clinical protocols because TXA protects mothers from death following hemorrhage by 30% when healthcare providers give the treatment during the first three hours after birth. Research highlights how important it is to provide Transcaric Acid access in every obstetric health care facility since regions with high PPH-related maternal mortality should be prioritized specifically.

The control of uncontrolled PPH depends on several surgical treatments where uterine balloon tamponade and B-Lynch sutures and uterine artery embolization are fundamental alongside emergency hysterectomy as the last resort. Hospital-based structured emergency response teams along with massive transfusion protocols (MTPs) enhance maternal survival statistics. When medical facilities follow MTPs based on a 1:1:1 mixture of red blood cells and plasma and platelets they achieve better survival results for hemorrhagic shock patients. The scarcity of state-of-the-art surgical interventions restricts access for patients in numerous developing world regions which in turn increases the difference in maternal mortality rates worldwide.

The essential contribution of nursing and midwifery personnel stands out as a main point within this review regarding PPH prevention and management activities. Specialized hemorrhage protocol training for nurses leads to better detection of warning signs which enables them to perform appropriate interventions quickly. Nursing professionals who participate in simulation-based obstetric emergency training experience improved team coordination and faster response times alongside better quality maternal care. The reduction of maternal deaths related to PPH demands interdisciplinary team work that enables efficient execution of emergency protocols for high-risk patients.

Maternal healthcare remains inaccessible to many people along with inadequate PPH management being a major issue throughout low-income nations. Healthcare centers operating in resource-constrained areas face challenges in

obtaining vital uterotonic drugs and blood transfusion personnel and equipment thus making it harder to prevent maternal deaths. The resolution of these problems needs sustained funding for maternal care alongside enhanced availability of essential medicines and treatment products along with healthcare worker training on proven PPH management techniques.

8.Conclusion and Future work

Postpartum hemorrhage stands as the main preventable reason for maternal death and medical issues throughout the world that calls for immediate detection methods combined with standardized management protocols and thorough training programs for healthcare providers. The major cause of postpartum hemorrhage develops from uterine atony yet retained placental tissues along with birth traumas and coagulation disorders rank as secondary contributing factors. Medical professionals can leverage proven preventive measures including active management of the third stage of labor (AMTSL) with oxytocin and TXA administration and quantitative blood loss assessment which result in substantial reductions of PPH occurrence and medical severity.

Staff nurse and midwife teamwork shows essential value in PPH management because of their central roles for timelly recognition followed by intervention. Healthcare teams experienced better maternal health outcomes and shortened response times and reduced mortality when receiving structured simulation training programs for patient care. Hospital institutions which use PPH care bundles alongside emergency response protocols together with transfusion strategies manage to decrease both severe hemorrhage incidents and hysterectomies rates.

The continuation of work to fight PPH disparities in maternal healthcare represents an ongoing need because there has already been considerable PPH prevention and treatment progress. The absence of access to both uterotonics medications and emergency surgical treatments along with blood transfusions in low-resource healthcare settings increases maternal mortality rates. Worldwide health programs must take actions to provide essential medications across all locations while improving healthcare infrastructure and teaching community residents about effective PPH care requirements for all women regardless of their location.

Subsequent maternal outcome research needs to develop innovative pharmacological treatments simultaneously with surgical techniques optimization and PPH risk evaluation systems improvement. Establishing new healthcare policies which ensure universal obstetric emergency care and enhance training for healthcare providers forms the basis for global maternal mortality reduction goals. Healthcare systems across the globe can eliminate preventable maternal deaths from postpartum hemorrhage through evidence-based clinical guideline implementation together with continuous quality improvement efforts and equitable healthcare service accessibility.

Acknowledgement: Nil

Conflicts of interest

The authors have no conflicts of interest to declare

References

1. Mousa HA, Blum J, Abou El Senoun G, Shakur H, Alfirevic Z. Treatment for primary postpartum haemorrhage. Cochrane Database Syst Rev. 2014;(2):CD003249.
2. Deneux-Tharaux C, Sentilhes L, Maillard F, Closset E, Vardon D, Lepercq J. Effect of tranexamic acid on postpartum hemorrhage among women with vaginal delivery: a randomized clinical trial. JAMA. 2018;319(8):781-788.
3. Sentilhes L, Winer N, Azria E, Sénat MV, Le Ray C, Vardon D, Perrotin F, Desbriere R, Fuchs F, Kayem G, Goffinet F, Deneux-Tharaux C. Tranexamic acid for the prevention of blood loss after vaginal delivery. N Engl J Med. 2018;379(8):731-742.
4. Shakur H, Roberts I, Fawole B, Chaudhri R, El-Sheikh M, Akintan A, Qureshi Z, Kidanto H, Vwalika B, Abdulkadir A, et al.; WOMAN Trial Collaborators. Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial. Lancet. 2017;389(10084):2105-2116.
5. Gyamfi-Bannerman C, Srinivas SK, Wright JD, Goffman D, Siddiq Z, D'Alton ME. Postpartum hemorrhage outcomes and race. Am J Obstet Gynecol. 2018;219(2):185.e1-185.e10.
6. Belfort MA, Dildy GA, Garrido J, White GL. Intrauterine balloon tamponade for the management of postpartum hemorrhage. Obstet Gynecol. 2011;118(4):713-719.

Volume 2, Issue 1 | April-2025
e-ISSN: 3065-8144 Print ISSN: 3065-8136

7. Doumouchtsis SK, Papageorghiou AT, Arulkumaran S. Systematic review of conservative management of postpartum hemorrhage: what to do when medical treatment fails. Obstet Gynecol Surv. 2007;62(8):540-547.
8. Tindell K, Garfinkel R, Abu-Haydar E, Ahn R, Burke TF, Conn CK, Eckardt MJ, Gawande A, Maji P, Miller S. Uterine balloon tamponade for the treatment of postpartum haemorrhage in resource-poor settings: a systematic review. BJOG. 2013;120(1):5-14.
9. Kramer MS, Berg C, Abenhaim H, Dahhou M, Rouleau J, Mehrabadi A, Joseph KS. Incidence, risk factors, and temporal trends in severe postpartum hemorrhage. Am J Obstet Gynecol. 2013;209(5):449.e1-449.e7.
10. Knight M, Callaghan WM, Berg C, Alexander S, Bouvier-Colle MH, Ford JB, Joseph KS, Lewis G, Liston RM, Roberts CL, Oats J, Walker J. Trends in postpartum hemorrhage in high-resource countries: a review and recommendations from the International Postpartum Hemorrhage Collaborative Group. BMC Pregnancy Childbirth. 2009;9:55.
11. Goffman D, Nathan L, Chazotte C. Obstetric hemorrhage: a global review. Semin Perinatol. 2016;40(2):96-98.