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Review Article

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Complications of Excessive Blood Loss and Postpartum Haemorrhage: A Review of Maternal Morbidity, Mortality and Clinical Management

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Abstract

A significant obstetric emergency and a substantial contributor to avoidable maternal morbidity and mortality globally is postpartum haemorrhage (PPH). Hypovolemic shock, severe anaemia, coagulation abnormalities, acute renal injury, respiratory problems, pituitary dysfunction, and even death can result from excessive blood loss after childbirth. The effects go beyond the first few days after giving birth; they have an impact on the mother's recuperation, nursing, mental health, and overall quality of life. Even relatively small blood loss might cause serious difficulties for women with pre-existing anaemia, delayed access to emergency obstetric care, or insufficient physiological reserves. The main consequences of excessive blood loss and PPH are examined in this narrative overview, together with the risk factors that are linked to them, the mechanisms that underlie their development, and preventative and management strategies. Research suggests that decreasing bad outcomes requires early detection, objective measurement of blood loss, regular monitoring of maternal vital signs, and timely application of evidence-based treatment. In resource-constrained situations, such as Nigeria, where delays in recognition, referral, and access to blood transfusion may exacerbate outcomes, the review also emphasises the importance of prompt obstetric care. Reducing avoidable maternal mortality requires strengthening maternity services through staff training, efficient haemorrhage protocols, sufficient blood supply, and thorough postnatal follow-up.

Keywords: *Maternal morbidity, hypovolemic shock, anaemia, postpartum haemorrhage, excessive blood loss, maternal mortality, obstetric emergency.*

Introduction

Although blood loss is a normal part of childbirth, excessive bleeding can quickly become fatal if it is not identified and treated right once. One of the most dangerous side effects of childbirth is postpartum haemorrhage (PPH), which continues to be a significant factor in avoidable mother fatalities. According to the World Health Organization (WHO), PPH is a common obstetric emergency that can be lethal and necessitates timely diagnosis, coordinated treatment, and suitable supportive care [1]. Since PPH can happen to women without known risk factors, current guidelines emphasise that all women giving birth should be watched for excessive bleeding. The severity of its effects may be further increased by anaemia prior to birth [2].

The amount and pace of bleeding, the woman's baseline haemoglobin concentration, the volume of blood in circulation, any underlying medical disorders, and the promptness of treatment initiation all influence the consequences of excessive blood loss. Severe bleeding can impair the flow of oxygen to essential organs, leading to shock, organ failure, and even death. Long-term exhaustion, diminished physical functioning, psychological discomfort, and challenges with caring for their infants are all possible outcomes for survivors [3].

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In environments with limited access to emergency obstetric services, blood supplies, trained people, and referral mechanisms, the load is especially worrisome. Therefore, enhancing PPH detection and treatment is a crucial part of maternal healthcare in Nigeria. A foundation for early intervention, efficient clinical surveillance, and better maternal outcomes is provided by an understanding of its consequences.

Concept and Classification of Post-Partum Haemorrhage

Postpartum haemorrhage is heavy bleeding following childbirth. Traditionally, primary PPH has been defined as blood loss of 500 mL or more within 24 hours of birth, although definitions and clinical thresholds differ amongst standards. Secondary PPH is referred to as abnormal or excessive bleeding after 24 hours and during postpartum period [4]. WHO's 2025 consolidated guideline proposes identifying women at risk of bad outcomes based on objectively measured blood loss of at least 300 mL with an abnormal haemodynamic sign, or blood loss of at least 500 mL within 24 hours after birth, whichever occurs first. Relevant abnormal symptoms include a pulse rate of >100 beats/min, shock index of >1, systolic blood pressure of <100 mmHg or diastolic blood pressure of <60 mmHg. The first two hours following birth demand special monitoring. These criteria are more in favour of earlier recognition rather than relying on blood volume only [5].

Uterine atony, genital tract trauma, retained placental tissue or coagulation problems may cause primary PPH. These causes are often grouped as the four Ts: tone, trauma, tissue and thrombin. Secondary PPH can occur due to residual products of conception, uterine subinvolution, infection or less prevalent vascular and coagulation issues. Regardless of classification, continuous bleeding can result in increasing circulatory compromise. The development of problems depends on the volume of lost blood, the physiological reserve of the woman and the timing of therapy.

Major complications of excessive blood loss and postpartum haemorrhaage

One of the most acute and fatal outcomes of severe PPH is hypovolaemic shock. It is the reduction in circulating blood volume to the extent that tissue perfusion is no longer properly maintained. Reduced venous return and cardiac output causes impaired oxygen delivery to tissues.

The body at first adjusts by increasing the heart rate and constricting the peripheral vessels. If blood loss continues, these processes are inadequate and hypotension, oliguria, impaired mental status, and tissue hypoxia occur. Severe and persistent shock can lead to irreparable organ damage and death.

Clinical recognition may be challenging, as pregnant women can tolerate significant blood loss before becoming hypotensive. So normal blood pressure does not exclude serious bleeding. It is crucial to monitor the pulse, blood pressure, respiration rate, mental condition, urine output, and estimated blood loss continuously.

Management includes rapid resuscitation, management of cause of bleeding, adequate intravenous fluids, blood products as necessary and escalation to definitive obstetric procedures. WHO advice recommends a coordinated approach and timely treatment to prevent worsening [6]

Severe anaemia is a typical result of large postpartum blood loss, especially in women who start labour with low haemoglobin concentrations. Anaemia means that there is less oxygen in the blood and therefore less oxygen is available to the tissues and hence recovery is slower.

Affected women may suffer from persistent fatigue, dizziness, headache, palpitations, shortness of breath and impaired exercise tolerance. Severe anaemia may impact on movement, hinder with care of the newborn and make nursing and other activities more difficult. In extreme circumstances, especially in combination with persistent bleeding or cardiovascular illness, it may contribute to cardiac decompensation.

The implications may be worse in environments where iron deficiency, malaria, dietary deficits or insufficient prenatal screening are common. A woman with pre-existing anaemia will have less reserve to endure acute blood loss than one with normal haemoglobin concentration.

Assessment should include clinical state, estimated or measured blood loss, haemoglobin level and evidence of continued bleeding. Depending on the severity of anaemia, symptoms, haemodynamic state and clinical circumstances, treatment may include oral iron supplements, dietary advice or blood transfusion. [7] Postnatal follow-up is important to establish recovery and identify persisting anaemia.

Severe haemorrhage may create or exacerbate coagulation problems, thereby impairing the body's capacity to stop bleeding. Disseminated intravascular coagulation (DIC) is a dangerous disorder in which coagulation is activated throughout the body, leading to consumption of platelets and clotting components and bleeding.

Obstetric DIC can be related with severe bleeding, placental abruption, amniotic fluid embolism, severe infection and other obstetric problems. This can create a vicious cycle where blood loss, poor clotting and blood loss feed off each other.

Clinical signs include chronic bleeding from the vaginal tract, seeping from intravenous puncture sites, bruising and bleeding from various sites. Laboratory studies may show thrombocytopenia, delayed coagulation times, decreased fibrinogen, and other derangements. However, data must be interpreted according to the clinical picture. Management includes prompt correction of the underlying cause, restoration of the circulation volume, and targeted replacement of blood components where necessary. The role of maternal coagulation abnormalities in patients with chronic bleeding or a personal history suggestive of an underlying bleeding predisposition has been highlighted in the published work. [8]

Renal perfusion can be progressively reduced by a massive loss of blood, leading to acute kidney damage. Adequate blood flow is critical to kidneys for filtration and fluid-electrolyte balance. During prolonged shock, the renal tissue can become ischaemic, leading to a decrease in urine flow and impairment of kidney function.

The initial symptoms are oliguria but more severe instances may develop increased serum creatinine, electrolyte imbalances, metabolic acidosis and fluid overload. If the renal injury is severe, temporary or occasionally long-term renal replacement therapy may be necessary.

Prevention consists of prompt treatment of haemorrhage, restoration of sufficient circulation, and close monitoring of urine output and renal function. In extreme circumstances, urinary catheterisation may be used to provide accurate monitoring. Fluid delivery should be tailored to the clinical circumstances to minimise both under-resuscitation and fluid overload. Acute kidney injury is of particular concern if the haemorrhage is protracted or associated with sepsis, disseminated intravascular coagulation or other causes of severe illness [9].

Significant blood loss puts a lot of stress on the cardiovascular system. Decreased circulating volume decreases cardiac preload and cardiac output and compensatory tachycardia increases myocardial workload. Women with established cardiovascular disease or severe anaemia may be more vulnerable.

In severe situations, cardiac involvement, including myocardial ischaemia, arrhythmias and cardiac collapse, may occur. Inappropriate fluid delivery or other transfusion-related problems may also contribute to pulmonary oedema and respiratory worsening after resuscitation.

Tissue hypoxia, shock, acute respiratory distress syndrome, or transfusion-related acute lung damage can lead to respiratory problems. Transfusion-related circulatory overload may potentially cause respiratory distress, especially in patients predisposed to this complication. These issues are not unavoidable sequelae of PPH, but can occur in severe cases or during therapy.

Management involves careful monitoring of respiratory state, oxygenation, circulation and response to resuscitation. Women with massive haemorrhage may need intense monitoring, ventilatory support or critical care. Effective communication between obstetricians, anaesthetists, laboratory staff and critical care teams is essential [10]. Sheehan syndrome is an uncommon but significant long-term consequence of severe postpartum haemorrhage. It is due to ischaemic injury to the pituitary gland, which is responsible for various endocrine processes, from severe hypotension or shock.

The ensuing hormone shortages from the pituitary can impact lactation, menstruation, thyroid function, adrenal function and reproductive health. Early signs may include failure to produce breast milk, continued weakness, exhaustion and failure of menstruation to resume. Other symptoms may emerge slowly and include cold intolerance, hypotension, decreased libido, and findings of adrenal insufficiency.

The presentation can be delayed and symptoms may be wrongly attributed to normal postpartum recovery. Women with persisting endocrine symptoms should therefore be suspected to have a history of severe obstetric haemorrhage. Diagnosis is made by clinical evaluation, testing of important pituitary-dependent hormones and professional assessment. The treatment will depend on the inadequacies discovered and sometimes includes life-long hormone replacement therapy and regular follow-up. Preventive measures are mainly directed on prevention of severe shock by early detection and optimal management of haemorrhage [11].

Not all postpartum infections are directly attributable to postpartum haemorrhage however severe bleeding, invasive operations, tissue injury, transfusion and protracted critical illness may enhance clinical risk. Retained placental tissue and related uterine anomalies can potentially cause prolonged bleeding and infection.

Signs of postpartum infection are fever, lower abdomen pain, soreness of the uterus, foul vaginal discharge or general deterioration. If infection proceeds to sepsis, it can lead to circulatory failure, renal injury, respiratory dysfunction and further coagulation problems.

Management needs quick assessment, adequate antibiotic therapy with probable infection, source management where applicable and supportive treatment. In PPH-recovering women, doctors should distinguish between typical postpartum

symptoms and symptoms of infection or continuing haemorrhage [12].

Maternal mortality is the most serious result of unmanaged postpartum haemorrhage. Death may result from hypovolaemic shock, coagulopathy, multiorgan failure or complications of prolonged resuscitation and critical illness.

Failure to recognise bleeding promptly, delay in efficient treatment and lack of emergency resources raise the risk of death. Delays may occur if a woman does not reach a health center in time, if an institution is not able to give decisive treatment or if recognition and treatment are delayed after arrival.

In 2025, WHO recommendations will highlight the objective measurement of postpartum blood loss, routine assessment of the mother status and prompt first-response treatment. Its goal is to detect deterioration early and avoid progression to severe morbidity and death. [13]

In Nigeria, improving referral systems, blood transfusion services, expert attendance at birth and emergency obstetric capability are key to cutting unnecessary deaths. Maternal death evaluations and confidential enquiries can discover needless delays and inform improvements in care.

Long-Term and Psychosocial Effects

Women who survive severe PPH may endure chronic fatigue, weakness, dizziness and a diminished ability to do everyday tasks. Anaemia, organ damage, frequent hospital admissions or necessity for additional treatments may prolong recovery. These consequences may interfere with infant care, family chores and return to work. Access to postnatal screening, anaemia treatment, dietary support and psychotherapy might promote recovery.

Early breastfeeding may be compromised by severe haemorrhage and the physiological stress that accompanies it. Pituitary malfunction can interfere with milk production. Fatigue, separation during rigorous treatment and maternal illness might delay the commencement or establishment of breastfeeding.

Women may need practical lactation support, reassurance, and help with feeding planning. Help should be based on maternal recovery and newborn feeding needs rather than assuming breastfeeding issues signify maternal failure. Severe haemorrhage can be alarming and make women feel afraid, helpless or worried about future pregnancies. Women can develop anxiety, depression or post traumatic stress, especially after emergency surgery, intensive care or a near death experience.

“Healthcare providers should be open about what happened, explain treatment decisions and provide opportunities for women to discuss their experiences. If symptoms persist or interfere with daily life, then appropriate mental health screening and help should be offered.[14]

Long-term reproductive implications depend on the severity of the haemorrhage, the cause and the therapy required. Damage to the pituitary gland can cause menstruation problems and infertility. Rarely, hysterectomy may be needed to stop bleeding that cannot otherwise be controlled, with the consequence that the capacity to carry a foetus is permanently lost. The physical, emotional and societal repercussions of such outcomes can be significant. Recovery involves sensitive counselling, polite communication and access to appropriate speciality care.

Factors That Increase Severity of Complications

The degree of problems following PPH is affected by various interacting factors. Existing anaemia diminishes tolerance to blood loss and cardiovascular disease and other chronic conditions may impair physiological compensation. The rate and duration of bleeding are also crucial factors. Rapidly increasing haemorrhage may produce shock before a large volume has been measured.

Delayed recognition is another big factor. In cases of considerable bleeding, visual estimate of blood loss may be imprecise and clinical indications may be deceiving in the early stages of worsening. Therefore, the WHO recommends routine objective assessment of postpartum blood loss to facilitate detection and quick treatment. One method that may be employed following vaginal birth is calibrated collection drapes. [15]

Health-system constraints may result in inferior outcomes. These include lack of staff, unavailability of uterotonics, delays in laboratory tests, insufficient blood supplies, limited access to operating theatres and ineffective referral systems. These problems point to the need for improvements in clinical practice and the organization of maternity services.

Complications: Prevention and Treatment

Prevention is based on good antenatal care, detection and treatment of anaemia, assessment of risk factors and readiness for obstetric crises. But because PPH can occur without known risk factors, all births should be appropriately monitored and prepared to respond.

Regular monitoring of vital signs, assessment of uterine tone and routine objective measurement of blood loss are critical for early detection. WHO advice advises an organised first-response approach including uterine massage where necessary, delivery of an appropriate uterotonic, tranexamic acid when indicated, intravenous fluids, assessment for the cause of bleeding and escalation of care. If serious haemorrhage is detected, treatment should not be delayed to await all the diagnostic findings. [16]

Where bleeding continues further therapies may include blood component therapy, uterine tamponade, surgical procedures or other attempts to control the source. The choice relies on the cause of bleeding, the clinical condition, the availability of resources and the response to early therapy.

After the bleeding is stopped, care must include more than just initial stabilisation. Appropriate monitoring, examination for anaemia and organ injury, psychosocial support and postnatal follow up aid in identifying issues that may appear later. In severe cases a multidisciplinary approach may be necessary involving obstetric, anaesthetic, haematology, renal, critical care and mental health professionals [17].

Implications for Maternal Healthcare in Nigeria

The problems of significant blood loss have great ramifications for maternity services in Nigeria. There is a need for consistent protocols in hospitals for measuring blood loss, rapid escalation of care and management of haemorrhagic situations. Regular simulation-based training can increase cooperation, communication and speed of clinical response. Reliable access to uterotonics, tranexamic acid, intravenous supplies, laboratory services and safe blood transfusion is indispensable. Facilities should also have clear referral systems in place for those women whose needs are beyond the capability of the local facility.

At a policy level, maternal death surveillance and response systems should also identify the preventable variables associated with PPH related deaths. Service quality can be evaluated by monitoring parameters such as time to diagnosis, time to treatment, availability of blood products and outcomes following severe haemorrhage [18].

Indeed, careful assessment of blood loss after vaginal delivery may be of particular pertinence to early identification of women at risk. Visual estimates of blood loss compared with objectively measured or properly calculated blood loss may help establish if current practice consistently identifies clinically severe bleeding. This type of research can inform staff education, monitoring activities and local quality improvement efforts.

Conclusion

Excessive blood loss and postpartum haemorrhage can result in a variety of problems ranging from acute hypovolaemic shock and severe anaemia to coagulopathies, renal damage, respiratory dysfunction, pituitary failure and maternal death. Survivors may also face problems with slower physical recovery, difficulties with breastfeeding, psychological discomfort and long-term reproductive repercussions.

The seriousness of these events relies on the baseline health, the rate and duration of bleeding, the accuracy of evaluation of blood loss and the speed of treatment. Early detection, objective assessment, systematic emergency care, and adequate postnatal follow-up are consequently crucial.

In Nigeria and other similar resource-constrained contexts, efforts to increase skilled birth attendance, emergency obstetric services, blood transfusion capacity, referral systems and healthcare worker training will help reduce unnecessary complications. Accurate evaluation of blood loss must be seen as part of safe maternity care and a practical way of enhancing mother outcomes.

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