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Brief Communication

Stepping Up Efforts in Preventing Maternal Deaths Due to Postpartum Hemorrhage in Nepal: A Critical Review of Nepal's National Medical Standards

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ABSTRACT

Postpartum hemorrhage (PPH) is the leading cause of maternal death in low and middle income countries. In Nepal, PPH accounts for 26% of all maternal deaths. Nepal's National Medical Standards (NMS) document serves as the Nepal-specific reference for essential clinical materials and tools that support patient care and service provision. This commentary focuses on a review of the most-recent (2020) version of the NMS pertaining to PPH and points out opportunities for improvement. While the 2020 edition includes secondary PPH for the first time, there remain gaps that cut across the antenatal, delivery, and postpartum periods. Birth preparedness and a complication readiness package must be tailored to individual needs, depending on a woman's previous obstetrical history. Visual estimation of blood loss, which is widely recognized to be inaccurate and underestimates blood loss, is still mentioned in the NMS; this element should be updated. Special emphasis on post-delivery monitoring and early diagnosis and management of PPH is crucial to decrease maternal morbidity and mortality. A supplementary set of standards focused on PPH could address these missing opportunities towards combating PPH in Nepal.

Keywords: postpartum hemorrhage, National Medical Standards, antenatal, delivery, postpartum

INTRODUCTION

Postpartum hemorrhage (PPH) is defined as blood loss of at least 500 ml within 24 hours after vaginal delivery or 1,000 ml blood loss during cesarean section.[1] Women who survive life-threatening PPH are likely to have undergone emergency surgical interventions to control bleeding, and may suffer from long-term consequences, both emotionally (e.g., post-traumatic stress disorder PSTD) and physically (e.g., postpartum infection, anemia, bladder injury, shock, organ failure, disseminated intravascular coagulation, Sheehan's syndrome, lifelong reproductive disability, prolonged hospitalization).[2]

PPH remains the leading cause of maternal death, accounting for 27% of worldwide maternal deaths. The majority of deaths from PPH occur in low- and middle-income countries (LMICs), mostly in Sub-Saharan Africa and South Asia.[3,4,5] Death on account of PPH is largely preventable, if the diagnosis can be made and life-saving treatments started in a timely manner.[2] Yet, patients often don't receive such care. The diagnosis can be missed due to lack of monitoring post-delivery and, by the time it is detected, patients may already be in shock. In view of this situation, in December 2023, the World Health Organization (WHO) called on governments, and health sectors in particular, to invigorate their efforts in combating preventable deaths due to PPH. The WHO issued a global roadmap until 2030 focusing specifically on PPH.[2]

According to a recent study on maternal mortality, in Nepal, 26% of maternal deaths were due to PPH,[6] making that the leading cause of maternal death. In 2020, Nepal's Ministry of Health and Population (MoHP) released its guidance for maternal and newborn care in the "National Medical Standards (NMS) for Maternal and Newborn Care."[7] This commentary focuses on the Standards' section related to PPH, highlight gaps in the document, and suggests updates.

MATERNAL AND NEWBORN CARE IN THE NEPAL MEDICAL STANDARDS DOCUMENT

In Nepal, the standards for reproductive health care are defined and delivered within the framework of the three volumes of NMS. The first volume focuses on contraception, the second on other reproductive health issues, and the third on maternal and newborn care. The third volume was first developed in 2007 and updated in 2009; the latest version is from 2020, reflecting changing international, regional, and national legislative and policy and evidence. It aims to serve as a country-specific reference document for essential clinical materials and tools that support patient care and service provision. It builds upon the national health policy, safe-motherhood, and reproductive health rights and public health acts, and draws upon relevant national and international scientific evidence. The Family Welfare Division (FWD) of the MoHP took the coordinating role and formed a four-expert team comprising an obstetrician/gynecologist who is a public health expert, a pediatrician, an anesthesiologist, and a nurse/midwife. The Nepal Society of Obstetrics and Gynecology (NESOG) coordinated the peer review process, along with senior faculty from obstetrics and gynecology, pediatrics, anesthesia, and midwifery.

NMS is comprehensive and covers a wide range of topics, from routine antenatal care to medical disorders of pregnancy, including topics such as principles and standards of maternal and newborn health care, human rights-based principles, health education/awareness, primary/secondary prevention, domestic violence, pain management in labor, etc. NMS incorporates medical evidence based on WHO standards of care for mothers and newborns and underwent significant review and revision. It is user-friendly, with a simple, well-presented format. Nonetheless, the NMS section regarding PPH has weaknesses, despite PPH being the leading cause of maternal death in Nepal. Some potential areas that could be

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strengthened are discussed below.

SPECIFIC AREAS FOR STRENGTHENING

Antenatal Care

NMS's ANC section covers the key components of history-taking. In "Past History," it mentions soliciting whether the patient had any previous pregnancy complications. More-targeted questions would help establish if patients experienced previous PPH or have risk factors for PPH. A recent meta-analysis showed that previous history of PPH, placenta previa, placental abruption, uterine rupture, and multiple gestation are important risk factors.[8,9] Knowing such risk factors helps in planning delivery and subsequent management of the remainder of pregnancy. Patients and family would have time to plan logistics: make arrangements for blood donors within the family; gather funds (much medical care in Nepal is self-funded); organize transport; etc. It would also allow healthcare providers time to correct related medical disorders, such as anemia.

Anemia

In its primary and secondary prevention sections, NMS describes anemia diagnosis and management, including deworming after the first trimester, when to start oral iron therapy, dietary advice, and when one should switch from oral to parenteral therapy. However, sickle cell anemia (SCA) is not extensively-discussed, although SCA is prevalent in the Terai region,[10] where it is the major cause of anemia during pregnancy. Most healthcare workers are not aware the government has set up sites for free SCA testing and treatment. Terai region ANC uptake and rates of newborn delivery in a healthcare institution are poor compared to the rest of the country.[6,7] Evaluating pregnant Terai women for SCA would allow such women to attain optimal health in the event of PPH. Screening for SCA could be selectively performed in Terai pregnant women and pregnant women whose anemia does not respond to conventional iron therapy.

Previous Cesarean Section

Women with a previous cesarean section require a more-detailed assessment of their history and a thorough review of their previous medical documents. While NMS has a section regarding managing patients with a scarred uterus, which mentions the risk of uterine rupture, there is no mention of PPH. Importantly, NMS states that an ultrasound performed between 36-38 weeks is a good predictor of uterine rupture; myometrial thickness >3.5 mm is associated with less chance of rupture. However, NMS fails to mention that women with previous history of a uterine scar, especially a cesarean scar, have greater chance of having placenta acreta spectrum (PAS) (formerly referred to as morbidly adherent placenta) which is a major cause of PPH. PAS encompasses the full extent of pathologic adherence of the placenta, including placenta acreta, placenta increta, and placenta percreta.[11] Women and their family need to understand they are greater risk of having these conditions. An ultrasound examination identifies PAS,[12,13,14] allowing necessary arrangements well in advance.

Labor and Delivery of Baby and Placenta

Active management of the third stage of labor (AMTSL) is well-covered in NMS' "Labor Management" section. NMS emphasizes to watch patients at least two hours post-delivery and observe for vaginal bleeding. NMS should mention that clients who had prolonged labor, prolonged second stage of labor, over-distended uterus, multiple fetuses, pregnancy-induced hypertension, pre-labor rupture of membranes, and vaginal instrumental deliveries are more prone to have PPH; such patients need to be carefully observed.[8] NMS advocates for active management of the third stage of labor for all deliveries, using oxytocin 10 IU IM.

After delivery of the placenta, one must make sure the placenta is complete. It should be carefully evaluated for a potential succenturiate lobe or other evidence of retained placental fragments or membranes which could lead to PPH. Patients should be monitored in the labor room for two hours before transfer to the ward; patients with PPH risk factors should be monitored every 15 minutes for two hours post -delivery, prior to shifting them to postnatal ward.

However, there are contradictory recommendations in labor management. The initial section mentions the order of AMSTL steps: oxytocin, cord clamping and cutting, uterine massage, and controlled cord traction, as recommended by the WHO.[1] But, in the section on the standard for controlled cord traction (CCT) and uterine massage for active management, NMS recommends performing CCT only after signs of placental separation, when, in fact, it should be performed earlier. NMS readers may be confused if conflicting messages such as this are given. CCT placental separation is not awaited; rather, once oxytocin is given and the uterus contracts, CCT is initiated. If placental separation is awaited, there could be additional blood loss which could be catastrophic, especially to anemic patients.

Postpartam Hemorrhage

In Nepal, the current approach to PPH diagnosis is still visual estimation, which is widely-recognized to be inaccurate and tends to underestimate blood loss.[16] The WHO's guideline development group has updated the following recommendation on assessment of postpartum blood loss to read: "For all women giving birth, routine objective measurement of postpartum blood loss is recommended to improve the detection and prompt treatment of postpartum hemorrhage. Methods to objectively quantify blood loss, such as calibrated drapes for women having vaginal birth, can achieve this." Similarly, as regards the use of care bundles for PPH treatment, WHO recommends that, "a standardized and timely approach to the management of PPH, comprising an objective assessment of blood loss and use of a treatment bundle supported by an implementation strategy, is recommended for all women having a vaginal birth. The care bundle for the first-line treatment of PPH should include rapid institution of uterine massage, administration of an oxytocic agent and tranexamic acid, intravenous fluids, examination of the genital tract, and escalation of care."[15]

Care bundles are complex interventions consisting of sets of evidence-based practices (generally 3-5) that, when performed collectively and reliably, improve the process of care and patient outcome. To ensure maximum success of PPH treatment bundles, early detection is key. In March 2023, findings of the E-MOTIVE trial were published.[16] The study reported a 60% reduction in the primary outcome of severe PPH, or laparotomy or maternal death from PPH, with early detection of PPH and the use of bundled treatment. A calibrated blood-collection drape for early detection of postpartum hemorrhage and a bundle of first-response treatments were utilized. NMS mentions a first-line care bundle for primary PPH: uterotonic drugs, isotonic crystalloids, tranexamic acid (TXA), and uterine massage. More detail on the PPH treatment bundle needs to be emphasized (for example, NMS doesn't specify which uterotonic drugs are first-line vs. second-line, how often can

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they be repeated, or potential side effects). A standardized evaluation checklist and management protocol, including referral mechanisms for various health facility levels, should be included.

Refractory Postpartam Hemorrhage

A small percentage of women have refractory PPH, in which a woman has received all interventions within the PPH treatment care bundle yet continues to bleed. NMS should include more detail about interventions such as compressive measures (aortic compression or bimanual compression), indications for Intrauterine Balloon Tamponade (IBT), when to use non-pneumatic anti-shock garment (NASG), and when to refer.[17,18] Operative management options should be mentioned. Details about B Lynch sutures to compress both sides of the uterus, O'Leary sutures to decrease pulse pressure of the bilateral uterine arteries, and internal ileac artery ligation should also be included in NMS.[19,20,21,22] If bleeding persists despite these measures, then hysterectomy is the only option. A peripartum hysterectomy is associated not only with permanent sterility, but also increased surgical risk, with a higher risk of bladder and ureteral injury. Full informed consent, including the risks and alternative options, must be discussed with patients and their families. Supracervical hysterectomy (subtotal) may be performed alternately as a faster surgery with potentially-fewer complications. Uterine artery embolization is another option for treatment of both primary and secondary PPH and should mentioned in NMS.[23,24]

Secondary Postpartam Hemorrhage

Secondary PPH (excessive vaginal bleeding between 24 hours to twelve weeks postpartum) is the most-common cause of readmission in hospitals after delivery and occurs in 1% of pregnancies.[25,26] Common causes are: uterine infection (endometritis), women with pre-labor rupture of membranes, and cesarean delivery. Other causes include retained placental fragments or tissue; abnormal involution of the placental site (inadequate closure and sloughing of the spiral arteries at the placental attachment site); uterine arteriovenous malformation; and Gestational Trophoblastic disease (very rare). Secondary PPH is mentioned in NMS, but with little detail about how to prevent, recognize, and manage this condition. Background information should be included, such as risk factors for secondary PPH; means to prevent or mitigate it (correction of anemia, antibiotic prophylaxis for pre-labor rupture of membranes); key messages in postpartum counseling; and how to manage this condition. Unlike primary PPH, the etiology in secondary PPH is different.

NMS should emphasize the importance of a thorough history and examination, which establishes a diagnosis in most cases.: iImportant information includes duration of labor, pre-labor rupture of membranes, multiple pelvic examination during labor, mode of delivery, retained placenta, and significant blood loss during delivery. After stabilizing the patient, management depends upon the various causes. In addition to hospital admissions, the morbidity associated with secondary PPH includes anemia, hypovolemic shock, need for blood transfusion, and, occasionally, hysterectomy.[27]

Other Related Aspects

Another crucial area not addressed in NMS is massive blood transfusion protocols; even tertiary hospitals do not have clear guidelines on this. A national guideline would help institutions have a reference point in terms of national recommendations. Many healthcare workers are reluctant to give multiple transfusions, as the true amount blood loss might not be always substantiated from notes of patients who are referred; thus, inadequate blood replacement is given and crucial time is lost waiting for lab results. Eventually, women suffer long term complications, such as Sheehan's syndrome, renal failure, and other chronic morbidity.

Although data is lacking on the best management of PPH blood transfusion, guidance for massive blood transfusion protocol should also be included in NMS. Current recommendations are based on trauma data, although trauma patients and PPH patients have different coagulation profiles at baseline compared to non-pregnant women, raising concerns whether trauma protocols can be generalized in obstetric patients, who undergo major physiological changes during pregnancy.[28]

CONCLUSION

The new NMS volume includes a significant amount of new information pertaining to the antenatal, delivery, and postpartum periods. However, there is much opportunity to include various steps that can be taken to reduce morbidity and mortality from PPH. To this end, the MoHP, working collaboratively with relevant professional organizations, could organize a consultative meeting of experts and prepare a supplementary module focused on PPH.

ABBREVIATIONS

AMTSL	Active management of third stage of labor
ANC	Antenatal care
AVM	Arteriovenous malformation
CCT	Controlled cord traction
LMICs	Low- and middle-income countries
MMR	Maternal mortality ratio
MoHP	Ministry of Health and Population
NESOG	Nepal Society of Obstetricians and Gynecologists
NMS	National Medical Standards
PAS	Placenta accreta spectrum
PPH	Postpartum hemorrhage
PSTD	Post-traumatic disorder
SCA	Sickle cell anemia
UAE	Uterine artery embolization
USG	Ultrasonography
WHO	World Health Organization

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