Postpartum Hemorrhage: Improving Patient Outcomes With Improved Communication and Post-Drill Debriefing

Sheila L. LaFortune

University of Massachusetts Amherst

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Postpartum Hemorrhage:
Improving Patient Outcomes With Improved Communication and Post-Drill Debriefing

Sheila Louissaint LaFortune

Elaine Marieb College of Nursing, University of Massachusetts, Amherst

DNP Project Chair: Dr. Mary Ellen Burke

Mentor: Sino George

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Abstract

Background: A woman is at risk of dying from postpartum hemorrhage every four minutes. Maternal hemorrhage is found to be the direct cause of maternal mortality, overall accounting for 27% to 75% of maternal deaths worldwide. In the United States, 54% to 93% of maternal mortality could have been prevented. Postpartum hemorrhage remains among the top causes of pregnancy-related deaths worldwide. The purpose of this project is to educate providers of obstetrical care regarding best practices for effective communication during a postpartum hemorrhage by implementing a debriefing educational tool during postpartum hemorrhage mock code drills. Methods: The postpartum hemorrhage team review and debriefing form were implemented during mock postpartum hemorrhage code drills to improve debriefing after critical events. Five educational sessions which lasted ten minutes each along with a pre-survey for recruitment were offered prior to mock postpartum hemorrhage code drills about debriefing. The communication was evaluated after the mock postpartum hemorrhage code drills using the Clinical Teamwork Scale (CTS). Results: Twenty-five nurses participated in the pre-brief survey (n = 25). There were 3 groups of nurses for the 3 mock postpartum hemorrhage code drills, which included 11 nurses (n = 11). The groups rated their performance/teamwork using the itemized tasks after the mock code trainings. Conclusion: Structured debriefing was shown to improve skills and increase knowledge concerning interventions in an emergency. Improved knowledge and confidence with debriefing can lead to improved performance during an actual postpartum hemorrhage. Communication and collaboration during an emergency were shown to improve patient outcomes.

Keywords: postpartum hemorrhage, postpartum hemorrhage risk factors, postpartum hemorrhage debriefing, postpartum hemorrhage management, treatments
Postpartum Hemorrhage:

Improving Patient Outcomes With Improved Communication and Post-Drill Debriefing

INTRODUCTION

Pregnancy-related complications can be devastating for both mother and baby. Postpartum hemorrhage is a leading cause of maternal morbidity and mortality worldwide (American College of Obstetricians and Gynecologists [ACOG], 2017). Complications include hypovolemia, shock, adult respiratory distress syndrome, disseminated intravascular coagulation, acute renal failure, and loss of fertility (ACOG, 2017). According to the Centers for Disease Control and Prevention (CDC), trends in pregnancy-related mortality in the United States, which includes postpartum hemorrhage, have been increasing from 7.2 deaths to 17.3 per 100,000 live births from 1987-2017 (CDC, n.d).

The incidence of postpartum hemorrhage has increased in recent years, as more women are dying from hemorrhage and more women have increased risks of complications from hemorrhage. Erickson et al. (2019) and Nyfløt et al. (2017) attributed several sources of postpartum hemorrhage in women which include abnormal coagulation, uterine atony, retained placenta fragments, or any genital tract trauma. Sebghati and Chandracharan (2017) and Girault et al. (2018) indicate that 50%-75% of women who experience postpartum hemorrhage can experience complications. Patients who have experienced a post-partum hemorrhage may develop significant risks of morbidity which may include multi-organ failure, complications from multiple blood transfusions, and damage to pelvic organs which may lead to a hysterectomy. In addition, some women and their partners experience psychological disorders such as post-traumatic stress disorders and anxiety associated with the birthing process (Girault
et al., 2018). The healthcare team needs to continue to update the patient and their partner during the hemorrhage to decrease anxiety.

Racial and ethnic disparities continue to play a role in pregnancy-related deaths (Petersen et al., 2019). Black, American Indian, and Alaska Native women are more likely to die from pregnancy-related causes than white women. This disparity persists over time and increases with increasing age (Petersen et al., 2019). The CDC’s Pregnancy-Related Mortality Surveillance System (PMSS) found that from 2007-2016, pregnancy-related deaths increased from 15 to 17 per 100,000 births. Hemorrhage contributes to higher mortality rates in black women, and pregnancy-related mortality rates can be as high as 40% in black women (CDC, n.d.).

The CDC’s PMSS attributed 72% of maternal deaths related to postpartum hemorrhage from 2011-2015, and 700 women die of postpartum hemorrhage every year (Petersen et al., 2019). Postpartum hemorrhage is defined as blood loss of 1,000 ml or greater after vaginal birth or cesarean section. The rate of postpartum hemorrhage has been increasing over the past few years, and hemorrhage remains among the most common causes of pregnancy complications and mortality from 2014-2017. The mortality percentage rate from postpartum hemorrhage has increased to 10.7 per 100,000 births (CDC, n.d.). Many pregnant women in the United States have pre-existing and chronic health conditions which can increase their risk of complications during pregnancy and postpartum (Petersen et al., 2019). Women have been requiring an increase in blood transfusions due to inpatient complications from postpartum hemorrhage. Postpartum hemorrhage can be prevented through prompt interventions by obstetrical (OB) providers and is primarily caused by uterine atony.
Background

Postpartum hemorrhage remains the leading cause of maternal morbidity and mortality worldwide. According to the World Health Organization (WHO), maternal hemorrhage is found to be the direct cause of maternal mortality, overall accounting for 27.1% of maternal deaths worldwide (Sebghati & Chandraharan, 2017). “A woman dies from massive maternal postpartum hemorrhage approximately every 4 minutes” (Sebghati & Chandraharan, 2017, p. 34). The American College of Obstetricians and Gynecologists (ACOG) defined maternal hemorrhage as cumulative blood loss greater or equal to 1,000 ml or blood loss accompanied by signs and symptoms of hypovolemia within 24 hours after the birth process (ACOG, 2017). Obstetric providers must act quickly to assess and manage any excessive bleeding.

Obstetric providers, which include physicians and nurse midwives as well as obstetrical labor and delivery and postpartum nurses, play a key role in implementing interventions to prevent complications by increasing knowledge about risk factors and the prevention and management of postpartum hemorrhage. Interventions such as fundal massage and implementing policies, guidelines, and algorithms for continued management of postpartum hemorrhage have been shown to improve maternal outcomes (ACOG, 2017).

Problem Statement

Postpartum women suffer serious consequences from postpartum hemorrhage, including increased morbidity, mortality, and length of stay in the hospital. The incidence and complications of postpartum hemorrhage are exacerbated by inadequate communication during a postpartum hemorrhage and by knowledge deficits of healthcare providers regarding best practices to prevent and manage postpartum hemorrhage, resulting in poor health outcomes. Continued mock postpartum hemorrhage code trainings can decrease anxiety and improve
provider and nurse performance. Educational trainings on mock postpartum hemorrhage codes and debriefing can help providers improve response time to intervene in a postpartum hemorrhage and improve knowledge of regarding common medications used in the treatment of postpartum hemorrhage. Nurses’ knowledge deficits can lead to poor outcomes (Greer et al., 2019). This quality improvement (QI) project helped increase nursing knowledge and confidence through education to improve emergency communication and post-event interdisciplinary debriefing.

**Analysis of Project Site**

Debriefing after postpartum hemorrhage, specifically the OB rapid response, is not performed consistently at this facility. OB providers such as physicians, registered nurses, certified nurse midwives, and residents are currently not debriefing collaboratively after a postpartum hemorrhage. Debriefing nurses and OB providers post-OB rapid response can improve patient outcomes by identifying gaps in knowledge and can improve communication between healthcare teams.

According to the CDC, postpartum hemorrhage has remained a leading cause of pregnancy-related deaths in the United States during 2014-2017 (CDC, n.d.). Based on a report from the Georgia Department of Public Health, Georgia is one of the states with the highest maternal mortality rates in the nation (Georgia Department of Public Health, 2017). The Georgia Maternal Mortality Review Committee reviews pregnancy-related deaths to determine causes and contributing factors and recommend interventions, and it listed maternal mortality rates of pregnancy-associated deaths from 2015-2017 as 68.9 per 100,000 live births (Georgia Department of Public Health, 2021), where 87% were preventable pregnancy-related deaths (Georgia Department of Public Health, 2021). Hemorrhage was among the leading underlying
causes of pregnancy-related deaths from 2008-2017 (CDC, n.d.), and Georgia is a region with high morbidity and mortality rates from postpartum hemorrhage (Association of Women’s Health, Obstetric and Neonatal Nurses [AWHONN], 2016). This facility does not conduct debriefing after mock postpartum hemorrhage code drills or after actual postpartum hemorrhages.

**Review of the Literature**

The following databases were searched: Cumulative Index of Nursing and Allied Health (CINAHL), PubMed, Cochrane Library, and Web of Science. Search terms included *postpartum hemorrhage AND risk factors AND debriefing AND treatment management*. Additional keywords used included *teamwork, interdisciplinary, discussion, or report*. CINAHL complete EBSCO search terms included *postpartum hemorrhage AND management AND outcomes*, which yielded 504 results. The search filter limit added articles from 2015-2020, which yielded 229 results. PubMed key words were *collaboration or teamwork interdisciplinary OR debrief AND postpartum hemorrhage*, where queries yielded 2,000 results. Further search modifiers included articles from the past five years, which included 1,420 results. Cochrane library keywords included *postpartum hemorrhage and interdisciplinary OR debriefing* and yielded 116 results. The Web of Science keywords included *postpartum hemorrhage AND collaboration or teamwork or interdisciplinary AND debrief or discussion or report* and yielded 5,569,596 results. The Web of Science search modifiers were further divided and searched individual terms, including *postpartum hemorrhage (PPH) and collaboration*, which yielded 73 results; teamwork yielded 38; and interdisciplinary yielded 7,808 results and was then further subdivided to include only debrief, which yielded 24 results.
The search was modified to exclude articles older than five years, which yielded 16,000 results. Non-English articles were excluded, and primary source scholarly research articles were included in the literature review. Inclusion criteria included peer-reviewed scholarly research articles published from 2015-2020. All articles were critically appraised for evidence, including English articles or articles with English translation related to research on PPH and published within five years.

The Johns Hopkins Evidence Model was used after the literature review to critically appraise the articles (Dang et al., 2022). Scholarly research-based articles with the highest ratings were used. Level I and Level II articles with A or B quality ratings were reviewed and included in the literature review. The articles were further appraised and rated regarding strength and quality. After reviewing all the articles on the current problem with inclusion and exclusion criteria, 20 articles were chosen for review.

**Risk Factors**

De Oliveira Nascimento Andrade et al. (2019), Bittle et al. (2018), Evensen et al. (2017), Erickson et al. (2019), and Van Ast et al. (2019) discussed the common risk factors of postpartum hemorrhage which are based on four processes referred to as the four Ts: tone trauma, tissue, and thrombin. The most common cause of postpartum hemorrhage is atonic bleeding. Uterine atony refers to a “boggy” uterus, where the uterus does not contract well to stop bleeding at the placental site. Other risk factors include women who have a history postpartum hemorrhage, multiple pregnancies, older age, and preterm birth. Prolonged induction of labor with oxytocin can exacerbate uterine atony, which accounts for 75% of all cases of postpartum hemorrhage.
The second T, trauma, refers to any injuries during birth from severe vaginal or perineal lacerations, which includes genital tract injuries from fetal macrosomia and difficult instrumental deliveries. The third T, tissue, refers to any retained products of conception, placental fragments, or blood clots not removed by the provider during the birthing process. Finally, the fourth T, thrombin, refers to any coagulation disorders along with any of the other risk factors. Coagulation disorders can be acute or genetically acquired. Most Postpartum hemorrhage complications are attributed to uterine atony (Evensen et al., 2017). The American College of Obstetricians and Gynecology ACOG (2017) practice bulletin identified secondary risk factors which include adult respiratory distress syndrome, shock, and disseminated intravascular coagulation (DIC).

Some women have predisposing risk factors for post-partum hemorrhage, while others develop postpartum hemorrhage without any previous history of risk factors. A thorough prenatal history will assist providers in assessing risk factors. Evensen et al. (2017) discussed the importance of all obstetric providers how to recognize risks associated with postpartum hemorrhage. Early identification by quick assessment can decrease morbidity and mortality. Several risk factors are associated with postpartum hemorrhage. Women with a history of postpartum hemorrhage face an increased risk of postpartum hemorrhage, and the risk can be as high as 9% to 20%. Other risk factors for postpartum hemorrhage include Asian race, high body mass index (BMI), and a history of multiple pregnancies. Additional risk factors include hypertension, macrosomia, retained placental fragments, chorioamnionitis maternal anemia, and prolonged labor increases the risk of postpartum hemorrhage. The American College of Obstetricians and Gynecologist ACOG (2017) practice bulletin included additional complications such as adult respiratory distress syndrome, shock, and DIC. Some women may
have more than one risk factor, which puts places them at increased risk of morbidity and mortality.

African Americans often have a lower incidence of post-partum hemorrhage than Caucasian women but have higher rates of maternal mortality. African American women may have an increased incidence of predisposing risk factors such as high BMI and hypertension, which can limit some medications that can be used; for example, Methergine is a common medication used to treat uterine atony and is contraindicated for patients with hypertension (Evensen et al., 2017).

**Interventions to Minimize the Risk of Postpartum Hemorrhage**

De Oliveira Nascimento Andrade et al. (2019), Bittle et al. (2018), Feduniw et al. (2020), Fukami et al. (2019), and Miller et al. (2017) discussed several interventions to minimize complications from postpartum hemorrhage and further blood loss, which can help prevent further deterioration. Providers must act quickly to perform fundal massage and bimanual compression as well as administer uterotonics to help the uterus contract. Erickson et al. (2019), Gallos et al. (2018), Evensen et al. (2017), Lockhart (2015), and Gyamfi-Bannerman et al. (2018) highlight the importance of quick interventions to prevent further complications. Active management of the third stage of labor helps prevent postpartum hemorrhage, which includes immediate fundal massage and the presumptive use of uterotonics. The third stage of labor relies on early skin to skin contact and breastfeeding to help with maternal oxytocin release. OB providers’ management of the third stage of labor, such as the timely use of oxytocin, can help decrease complications from postpartum hemorrhage and decrease total blood loss (Evensen et al., 2017).
Management of Postpartum Hemorrhage

The WHO (2020) recommends administering 10 international units (IU) of oxytocin (Pitocin) intramuscular or 5 to 10 IU intravenous after delivery of the anterior shoulder. Oxytocin is the first-line agent to prevent and treat maternal postpartum hemorrhage, and other medications can be added as needed to control postpartum hemorrhage. Oxytocin use immediately after the delivery of the anterior shoulder has been shown to decrease postpartum hemorrhage and may prevent retained placenta (Evensen et al., 2017). In addition, controlled cord traction and uterine massage after delivery of the placenta can help prevent immediate postpartum hemorrhage (Evensen et al., 2017).

Many women can successfully complete physiologic births without complications while others face increased risks of postpartum hemorrhage. Avoiding routine episiotomy and stretching the perineum can decrease risks of complications from postpartum hemorrhage. Routine episiotomy can increase the risk of infection and takes longer to heal than a small perineal tear (Evensen et al., 2017).

Tranexamic acid (TXA) is an antifibrinolytic agent that has been used in perioperative settings, including trauma to reduce postpartum hemorrhage, and can be used within the first three hours after birth to prevent bleeding as an adjuvant therapy. Additional medications to help contract the uterus include Hemabate 250 mcg intramuscular, which is contraindicated in patients with asthma, and methylergonovine (Methergine) 0.2 mg IM every two to four hours. Methergine is not to be used in patients with hypertension. Misoprostol (Cytotec) can be administered 800 to 1,000 mcg rectally or 600 to 800 mcg sublingually or orally (Evensen et al., 2017).
Despite the best management and medication interventions, women may still experience severe complications which may lead to a hysterectomy. Following the steps below will help prevent complications after each birth, and the first step is to inspect the vagina for any tissues, retained placenta, or clots. The obstetric provider may have to manually remove placental fragments. The provider performs bimanual uterine compression if needed to prevent further hemorrhage.

Obstetric providers prevent trauma by assessing for lacerations or uterine inversion, suturing any lacerations, draining hematomas, and replacing inverted uteruses, including manual removal of the placenta or curettage if needed. The obstetric provider may then order labs which include coagulation studies. Replacing clotting factors, platelets, and administering fresh frozen plasma occurs if needed. The team needs to respond quickly before severe postpartum hemorrhage occurs. Quick Obstetric team interventions such as calling for help, activating hospital rapid response, and starting emergency interventions can prevent further complications.

If the patient’s condition continues to deteriorate, oxygen is administered via face mask. The nursing team needs to place two large bore intravenous needles, type and crossmatch and obtain complete blood count (CBC) in anticipation of blood product transfusion if needed. If the patient’s condition does not improve, the team may place a consult for anesthesia, surgery, and an intensivist. Some patients need transfer to the intensive care unit for blood pressure support with vasopressors as needed, and the OB attending may consider uterine packing, balloon tamponade, and vessel embolization ligation (Evensen et al., 2017).

Severe cases of postpartum hemorrhage may involve compression sutures and hysterectomy. Additional management includes surgical management such as vascular ligation in which a midline vertical abdominal incision and bilateral artery ligation are performed to reduce
blood flow to the uterus, which is referred to as O’Leary’s suture. The obstetrician may perform a uterine compression suture, referred to as B-Lynch sutures, where large sutures such as chromic sutures are placed from the cervix to fundus to provide physical compression. Hysterectomy is considered when more conservative interventions have failed (ACOG, 2017). Postpartum hemorrhage follow-up care includes continued monitoring blood loss. The OB team will continue to measure quantitative blood loss and vital signs to assess any subtle changes in the patient’s condition. Per ACOG practice guidelines, ongoing assessment for anemia with continued timed studies for complete blood count will help the OB team recognize changes to prevent hemodynamic instability (ACOG, 2017).

More research is needed to differentiate which drug combinations offer the best options for management. Although the literature illustrated oxytocin as the first choice for managing post-partum hemorrhage, there is a gap in practice. According to the Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN), a lack of clinical response from nurses and providers can increase the percentage of maternal hemorrhage-related deaths by 54% to 93% (AWHONN, 2021).

**Preparation for Postpartum Hemorrhage**

Maternal deaths and complications can be prevented by the early recognition of risk factors and quick response from obstetrical nurses and providers. Programs educating about interventions such as administration of the Postpartum Hemorrhage risk assessment tool upon admission, pre, and post birth can improve outcomes (AWHONN, 2021). The Post-partum hemorrhage Risk assessment is used on labor and delivery units (L&D) and postpartum units to help identify patients who are at high risk for postpartum hemorrhage based on risk factors. This tool can help OB providers and staff prepare for high-risk patients and thereby help prevent
complications from postpartum hemorrhage. Clinician continuing educational programs that improve knowledge regarding postpartum hemorrhage treatment algorithms, quantification of blood loss calculator, and the use of debrief forms have been shown to improve outcomes (AWHONN, 2021). Educational resources for clinicians in practice can improve knowledge about the importance of oxytocin administration after birth, the quantification of blood loss after every birth, and the importance of quick responses from clinicians to prevent maternal mortality (AWHONN, 2021).

Most pregnancy-related deaths are preventable and improving provider communication and improving education regarding recognition and early intervention can help improve outcomes. Identifying high risk groups and early intervention can improve patient outcomes and reduce disparity. State and local Maternal Mortality Review Committees (MMRC) help address disparities. Hospitals and healthcare systems can implement QI protocols to improve provider communication and health outcomes (CDC, n.d.).

Obstetric providers start assessing postpartum hemorrhage risk during the antenatal visit by obtaining OB history. Identifying risk factors can help with early management for those at increased risk. Lockhart (2015) and Gyamfi-Bannerman et al. (2018) discussed the need for continued assessment for risk factors and quality prenatal care, which includes assessing for anemia. Identifying racial disparities can help providers increase knowledge regarding patients with increased risk factors. Black women have a 23% increased risk of Postpartum hemorrhage based on the CDC’s PMSS and often have comorbidities such as hypertension, which can limit the choices of obstetric hemorrhage medications.
Emergency Drills for Management of Postpartum Hemorrhage

According to Bittle et al. (2018), Lutgendorf et al. (2017), and Lockhart (2018), implementing institutional obstetric hemorrhage protocols and drills has been shown to improve patient outcomes. Including interactive skills training and didactic modules for obstetric providers to continue improving knowledge and skills has been shown to improve patient outcomes. Key personnel on women’s health units must be able to identify risk factors and locations of hemorrhage carts and medications needed for postpartum hemorrhage. Studies also discussed that the continued teaching of staff regarding accurately measuring blood loss increases the early recognition and timely emergency management of postpartum hemorrhage. According to these authors, educational mock postpartum hemorrhage code trainings to accurately measure blood loss can improve outcomes. Implementing training modules and simulation exercises have showed a decreasing trend in postpartum hemorrhage at participating hospitals (Lockhart, 2015).

Greer et al. (2019) and de Oliveira Nascimento Andrade et al. (2019) have shown that initiating postpartum hemorrhage safety programs and bundles has been associated with improved outcomes. Structured debriefing offers participants opportunities to analyze thoughts and review knowledge gained during emergency events. Participants can learn from each other and improve response time during emergency events. Skills and safety can be reviewed during debriefing with all staff involved in the code. Debriefing after simulation and postpartum hemorrhage codes and drills offer time for reflections and improve knowledge (Greer et al., 2019).
Debriefing

Nurses working in high stress environments such as labor and delivery, mother baby units, and neonatal intensive care units benefit from debriefing after emergency situations. Michelet et al. (2019) and Laurendine et al. (2020) discuss that mock emergency simulation trainings and debriefing after emergencies improve confidence and performance. They also highlighted those human behaviors that can be affected by certain factors such as stress, miscommunication, and situational awareness can affect responses to codes. Institutional practice and continued training for emergencies can help improve nurses’ responses during an emergency event.

Thompson et al. (2018), Michelet et al. (2019), and Laurendine et al. (2020) discussed how different modalities such as debriefing, and post emergency video trainings have been used to improve confidence in nurses to respond in emergency situations. Nurses often show decreased anxiety after participation in simulation and practice for emergency events. Jacobs (2017), Thompson et al. (2018), and Laurendine et al. (2020) highlighted the importance of following up with staff, nurses, and providers post emergency events. Debriefing could help educators identify gaps in knowledge and skills. Michelet et al. (2019) and Laurendine et al. (2020) showed that communication and response time improved post debriefing.

Debriefing offers a chance for nurses to review procedures and protocols in a non-threatening manner and learn from each other, where there is less anxiety and essential information can be shared. Debriefing offers a platform to transfer knowledge and clarify roles (Thompson et al., 2018). The American College of Obstetricians and Gynecologists (2017) recommends implementing institutional guidelines and continued educational interventions for all obstetric providers. Mock emergency event trainings and education on risk factors should be
reviewed by all staff at least twice per year so that all staff can have sufficient knowledge and understanding regarding postpartum hemorrhage emergencies (ACOG, 2017). Continued communication between the patient and obstetric providers throughout care is important to decrease morbidity and mortality. OB providers on labor, delivery, and postpartum units must continue to practice teamwork, communication, and technical skills to prevent complications from postpartum hemorrhage.

Debriefing allows time for communication and feedback in a nonjudgmental way for nurses and providers to acquire confidence and improve knowledge. Nurses who had practice and knowledge of fundal massage responded more quickly to a post-partum hemorrhage and nurses working in high stress areas benefit from debriefing after an emergency event. Laurendine et al. (2020), Michelet et al. (2019), Thompson et al. (2018), and Jacobs (2017) report response times to emergencies and timing of initiation of fundal massage also improve after postpartum hemorrhage. More research could be conducted on intervention-based protocols such as debriefing and simulation trainings to prevent complications from postpartum hemorrhage. It is not clear how often institutions should implement educational programs for their staff. More research is needed regarding outcome-based solutions on debriefing and mock emergency code trainings.

**Theoretical Framework/Evidence-Based Practice Model**

Donabedian’s theory of structure, process, and outcomes examines healthcare services and quality of care, and it provides the framework for this project. The nursing role effectiveness model as shown in figure 1 adapted from the original model by (Irvine et al., 1998) is an example of this framework which follows Donabedian’s theory (Lukewich et al., 2019). Three categories are involved in providing quality care: structure, process, and outcome.
Structure refers to community, institutions, and how the staff fit into the organization. Structure also includes equipment used and supplies needed to conduct patient care as well as mother-baby nurses’ experience, knowledge, and skills. The organizational unit reviews the staff mix and workload for the assignment each shift. Nurses are expected to attend huddles prior to the start of the shift roll call, and huddle news is reviewed prior to starting the shift. The charge nurse notifies the staff of how many postpartum hemorrhage patients are in the units. The number of patients on magnesium for preeclampsia are also discussed because this would determine the staffing mix. Mother-baby nurses are assigned fewer patients if those patients are high risk based on a color-coded acuity system introduced by the unit director. Patients in isolation with COVID-19 room-in with their babies and the nurse assigned to the mother baby couplets have fewer patients. Patients’ health statuses based on severity level are reviewed.
continuously throughout the shift. This QI project helped management and nurses to continue providing skills and knowledge on postpartum hemorrhage. The debriefing tool used by the nurses during the drills helped them quickly recognize the medications during codes and to learn the risk factors of postpartum patients at risk for hemorrhage. Providers and nurses communicate and assess risk factors for postpartum hemorrhage in a manner that promotes a culture of safety.

Process refers to how nurses, managers, and providers interact to provide treatment for patient care. This QI project discussed how important it is for nurses and providers to communicate during and after codes. The debriefing tool was introduced in the OB rapid response drills and was used to reinforce knowledge regarding risk factors of postpartum hemorrhage. The medications are listed on the tool for quick reference for the nurses. The tool was used to improve communication and discussed the importance of readiness of the staff to respond to postpartum hemorrhage and ensuring that the hemorrhage cart is always checked and fully stocked. Mother-baby nurses are responsible for quickly responding to emergencies and must be knowledgeable of the OB rapid response code activation system.

Outcome refers to how the staff and organization come together to provide quality care by decreasing morbidity and mortality. Communication during postpartum drills was reinforced, and nurses had the opportunity to practice responding to codes during drills. The implementation of this debriefing tool helped nurses improve communication during postpartum hemorrhage mock code drills. Patient satisfaction and patient-centered care also falls under outcome.

**Methods**

**Goals and Objectives**

The goal of this project was to promote debriefing after mock postpartum hemorrhage code drills to increase confidence and knowledge in responding to OB rapid response. This QI
project on postpartum hemorrhage debriefing was implemented in a large tertiary care hospital in Atlanta Georgia and was conducted with nurses in the mother-baby units. The Postpartum hemorrhage team review and debriefing form were implemented during mock postpartum hemorrhage code drills to improve debriefing after critical events. Five educational sessions related to debriefing were offered to obstetrical nurses prior to mock postpartum hemorrhage codes. The communication was evaluated after the mock code drills using the CTS. Table 1 below describes the goals and expected outcomes of debriefing tool implementation.

**Table 1**

*Goals, Objectives, and Expected Outcomes*

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<thead>
<tr>
<th>Goals</th>
<th>Objective(s)</th>
<th>Outcome(s)</th>
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<tr>
<td>Nurses will be more confident in responding to postpartum hemorrhage.</td>
<td>100% of nurses on the mother baby unit will attend educational sessions on debriefing.</td>
<td>At least 85% of nurses attended one of the education presentations.</td>
</tr>
<tr>
<td>Nurses will debrief after each mock postpartum hemorrhage code drill and actual hemorrhage.</td>
<td>100% of nurses and 100% of involved providers will participate in debriefing after each mock postpartum hemorrhage code drill and after actual postpartum hemorrhage.</td>
<td>100% of nurses debrief after postpartum hemorrhage mock code drills. No increase in the number of nurses and providers debriefing after actual postpartum hemorrhage codes.</td>
</tr>
<tr>
<td>Nurses will increase knowledge of common postpartum hemorrhage medications.</td>
<td>100% of nurses will indicate increased knowledge of common postpartum hemorrhage medications after attending the education sessions and debriefing.</td>
<td>80% of nurses reported increase knowledge of common postpartum hemorrhage medications after educations.</td>
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Project Site and Population

The site for this QI project is a large, 528-bed tertiary teaching hospital in Georgia. This hospital is one of an eleven-hospital system which provides all types of services from surgical procedures to family medicine. The community is diverse with African Americans, Asians, and Caucasians comprising 49.8%, 4.8%, and 38% of the population respectively (United States Census Bureau, n.d.). There is a large Hispanic community as well as many immigrants from the Caribbean and African Nations who come to the hospital to deliver their babies. The hospital also provides medical services to internal nursing staff and physicians.

The mother/baby unit is divided into two separate units depending on patient flow, where one unit has 10 beds and the second has 33 beds. Eight to twelve nurses are scheduled for days and nights in 12-hour shifts. One RN is on call each shift depending on activity from labor and delivery. The units are busy with admissions ranging from six to eight couplets per shifts. Mothers with babies in the neonatal intensive care unit (NICU) are placed closer to their babies. The hospital is designated as baby friendly, and all term-healthy babies room with their parents. Postpartum residents take first calls, but if they are unable to resolve the issue, then the OB attending is to be notified of the situation.

Two midwives alternate to cover triage during the day shift. Midwives do not respond to OB rapid response due to residents in training learning how to respond to emergencies. Residents cover night triage. Complex gynecological (GYN) and OB patients are assigned a separate resident in the hospital. At the time of this DNP QI project, staffing fluctuated from 90 to 72 nurses on staff. The COVID-19 pandemic caused staffing challenges, and travel nurses were brought in to assist with staffing the unit. The DNP student has a background in midwifery and women’s health and currently teaches mock code emergency drill trainings on mother baby units.
**Measurement Instruments**

To measure the outcomes of this DNP project, the CTS was used after each mock postpartum hemorrhage code debriefing session (Guise et al., 2008). The CTS (see Appendix C) evaluates teamwork and communication during an emergency using a 6-point Likert item scale to evaluate performance after simulation trainings with response options of unacceptable, poor, average, good, and perfect. The scale consists of three subscales asking about (1) how well the team oriented new members, (2) closed-loop communication, and (3) situational awareness. The CTS is a standardized tool developed by the State Obstetric & Pediatric Research Collaboration (STORC) OB Safety Initiative Team through support of the Agency for HealthCare Research and Quality (AHRQ). The validation of the CTS scale by AHRQ involved standardized videos of teams responding to the same obstetrical OB clinical scenario which lasted 5-6 minutes. Three evaluators consisted of one perinatologist, obstetrician/gynecology, and a doctoral-prepared midwife. This tool was obtained with permission from STORC.org OB Safety Initiative Development and Validation of the Clinical Teamwork Scale (see Appendix C).

Data were collected via demographic survey questions (see Appendix B). The team review and debriefing form (see Appendix D) on postpartum hemorrhage was used after the mock postpartum hemorrhage code to improve debriefing after mock postpartum codes and after actual OB rapid response to postpartum hemorrhage and other emergencies. This form was obtained from the Council on Patient Safety in Women’s Healthcare and ACOG (Appendix D). The debriefing tool covers five areas: readiness, recognition, prevention, response, and teamwork communication. Additional questions were used to examine barriers in responding to codes, access, and timeline of mock code drills. Nurses were also asked how often they debriefed after each code.
Mock Postpartum Hemorrhage Code Drills

Three mock postpartum hemorrhage code drills were offered on December 11, 2021. A room was blocked on the mother-baby unit for mock postpartum hemorrhage code drills. An empty patient room was used to review the layout of the room and location of emergency equipment such as the suction canister and oxygen. The nurses were given roles such as patient, primary nurse, and physician. Mother-baby nurses participated in mock postpartum hemorrhage code drills with the team leader to simulate an emergency hemorrhage situation in which the patient called the nurse and stated she was bleeding. The nurse role playing as a patient stated to the primary nurse that she felt dizzy. Vital signs changes were simulated to reflect low blood pressure and tachycardia. The primary nurse called for help, activated the hospital emergency code number, and notified the hospital operator of the location of the emergency. The hospital has a dedicated emergency phone number which the nurses rehearsed repeating and dialing. The team also reviewed steps to take if the primary nurse is unable to use the phone. The primary nurse called out to other nurses, the unit secretary, or pressed the emergency code button in the room. The primary nurse was instructed to remain at the bedside and delegate what was needed to be done. The primary nurse has more knowledge of the patient and was to remain with the patient and communicate with the team as new members arrived at the postpartum hemorrhage mock code drill.

One nurse was also responsible for obtaining an emergency cart. Activating OB rapid response brings additional staff from labor and delivery, OB residents, and the OB attending. Mother-baby nurses were observed for communication, response to the emergency, and fundal massage techniques. Nurses were also taught about hemorrhage medications. Nurses are often the first to respond to hemorrhage codes on the unit, and this project was thus conducted with
nurses. The team reviewed when to activate the OB rapid response such as changes in vital signs or the uterus not contracting with a boggy uterus and obvious bleeding during assessment. Bleeding was simulated with cranberry sauce. The OB attending or midwife then ordered methergine 0.2 mg IM x1 dose. Methergine is contraindicated in patients with a history of hypertension, but in this scenario, the simulation patient had no history of hypertension. The team reviewed how to obtain quantitative blood loss by measuring the pads. To facilitate communication, the team practiced situation, background, assessment, recommendation (SBAR) communication with the OB attending or midwife who attended the code. The nurses were taught to debrief after implementing the debriefing tool, which was reviewed after the mock code drills. The nurses were instructed to have residents and attendings stay on unit whenever possible and contribute to debriefing post-OB rapid response.

The drill team staff ordered labs, including Type and crossmatch with complete blood count (CBC) hemoglobin and hematocrit. Additional labs include coagulation studies, electrolytes, and liver function tests. Blood urea nitrogen and creatinine levels were ordered to monitor kidney functions. The provider and team must act quickly to determine the underlying cause of the hemorrhage. The drill team reviewed the hemorrhage protocol for the hospital if a patient needs transfer to the operating room. The transportation go bag is a red bag placed in the medication room if a massive hemorrhage occurs and contains additional IV supplies and fluids if needed in route to the operating room. The drill team also rehearsed the steps to remove medications from the code cart. Nurses were taught how to perform quick removal and transport of medications. Oxytocin and methergine are kept in the medication room at this facility.
Implementation Procedure

The Plan-Do-Study-Act (PDSA) model was used to guide implementation of this QI project. The DNP student met with the postpartum nurses on the unit. The nurses who showed an interest were given a consent with instructions and then informed about the debriefing tool. Recruitment continued from November 18th to December 11, 2021.

In November 2021, five educational sessions related to debriefing were offered to obstetrical nurses prior to Postpartum hemorrhage mock code drills. Each educational session taught participating nurses about the importance of debriefing after emergencies and lasted approximately ten minutes. The clinical nurse Specialist and unit nurse educators distributed a list with mock emergency code drill dates each fiscal year. Obstetrical nurses are required to attend two postpartum hemorrhage mock code drills per year, which were offered every 2 hours during 8 to 12 hour shifts during the week, weekends, and nights to accommodate all staff on the unit. There was previously no information about debriefing provided in the mock postpartum hemorrhage code trainings, and this study regarded a new session offered during the postpartum hemorrhage mock drill trainings.

The nurses were notified about the postpartum hemorrhage team review and debriefing form prior to implementation, and the form was reviewed after nurses signed the consent. Presentations about the debriefing form sections were conducted with the nurses prior to implementation. Implementation of the postpartum hemorrhage team review and debriefing form started on December 11, 2022, during mock postpartum hemorrhage code trainings. On this day, the nurses practiced using the debriefing tool after each postpartum hemorrhage mock code drill. This project also promotes interdisciplinary debriefing with OB providers such as attending physicians and OB residents.
Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 28 was used to analyze the data. The baseline data were collected to elicit information about how many nurses were able to debrief after OB hemorrhage codes. Nurses’ compliance with debriefing tool contents such as regarding readiness of OB rapid response carts was based on the debriefing tool using the CTS, which was used to evaluate response times to obtain the emergency code carts and communication among the three groups. Postpartum hemorrhage emergencies require healthcare professionals to always be alert and responsive. All three groups practiced communication and their response to a simulated hemorrhage emergency, and descriptive statistics were used to analyze the data.

Ethical Considerations/Protection of Human Subjects

The University of Massachusetts, Amherst (UMass) Institutional Review Board (IRB) approval was obtained prior to initiating the DNP project (Appendix A). Meetings with clinical nursing staff were scheduled on November 17, 2021, right after receiving IRB approval, and then recruitment began on November 18, 2021. The participants were notified prior to implementation. Permission was obtained via written consent after receiving permission from the hospital and UMass IRB approvals. The DNP student protected the privacy of patients and participants. No names were placed on the surveys, and only randomized 3- to 4-digit codes were used on pre and post surveys. The list of participants and their identifying numbers were kept in a locked file cabinet. This QI project was completed with nurses.

Results

Twenty-five nurses were recruited from November 18 through December 11, 2021. Eleven nurses participated in the three mock postpartum hemorrhage code drills on
implementation day. A convenience sample of 25 mother-baby nurses were used for the pre
survey to recruit nurses for this project after obtaining permission from the IRB.

Table 2 shows demographic data of the participants in the drill, and Table 3 shows communication and teamwork ratings by group after using the debriefing tool.

Table 2

*Participants’ Demographics (N=25)*

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>Frequency (n)</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>5</td>
<td>20.0</td>
</tr>
<tr>
<td>30-40</td>
<td>7</td>
<td>28.0</td>
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<td>40-50</td>
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<tr>
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<td>16.0</td>
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<tr>
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<tr>
<td>Black or African American</td>
<td>18</td>
<td>72.0</td>
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<td>4</td>
<td>16.0</td>
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<tr>
<td><strong>Education</strong></td>
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<td></td>
</tr>
<tr>
<td>Bachelor</td>
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<tr>
<td>Masters</td>
<td>3</td>
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<tr>
<td>Missing</td>
<td>2</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
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<td></td>
</tr>
<tr>
<td>Christian</td>
<td>3</td>
<td>12.0</td>
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<tr>
<td>Episcopal</td>
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<td>4.0</td>
</tr>
<tr>
<td>Baptist</td>
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<tr>
<td>Jehovah’s Witness</td>
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<td>4.0</td>
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<tr>
<td>Protestant</td>
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<td>4.0</td>
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<tr>
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<tr>
<td><strong>Years of practice</strong></td>
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<tr>
<td>Less than 5 years</td>
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<td>16.0</td>
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<td>3</td>
<td>12.0</td>
</tr>
<tr>
<td>30+</td>
<td>5</td>
<td>20.0</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>8.0</td>
</tr>
</tbody>
</table>
The data from Table 2 show that 28% of the participants were between the ages of 30-50 years old. Most participants (80%) had a baccalaureate degree, 28% of the nurses had 5-10 years of practice as a nurse, and 48% had less than 5 years in women’s health.

**Table 3**

*Clinical Teamwork Scores by Study Group*

<table>
<thead>
<tr>
<th>CTS component measure</th>
<th>Group 1 (n=7)</th>
<th>Group 2 (n=2)</th>
<th>Group 3 (n=2)</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td>9.33(1.15)</td>
</tr>
<tr>
<td>1. Teamwork</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Overall teamwork</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>9.33(1.15)</td>
</tr>
<tr>
<td>2. Orient new members</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>3. Transparent thinking</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>4. Directed communication</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>5. Closed-loop communication</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>Situational awareness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Overall situational awareness</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>2. Resource allocation</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>Decision making</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Overall decision-making rating</td>
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<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>2. Prioritization</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>Role responsibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Overall role responsibility leader</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>2. Role clarity</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>3. Performance as leader</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>4. Performance as helper</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>8.67(1.15)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 shows the CTS groups’ participation results. The CTS scale is a 6-item scale with a range from 0 (unacceptable) to 10 (perfect) which measures teamwork and communication. All three groups overall performed well with communication and teamwork, as the group ratings range from 8-10 (M = 9.33; SD = 1.15).

**Discussion**

The purpose of this study was to improve outcomes of postpartum hemorrhage by integrating debriefing after mock postpartum hemorrhage code drills. A structured debriefing tool was implemented for use after each mock code drill. The nurses who participated in the drills had an opportunity to rate the overall teamwork and communication on the CTS after using the mock code drill debriefing tool.

**Evidence-Based Practice**

Postpartum hemorrhage can occur any time on L&D and postpartum units. Based on the literature review, OB providers such as certified nurse midwives, OB attendings and nurses who are well prepared to respond to postpartum hemorrhage emergencies can prevent complications. ACOG and AWOHN recommend that OB providers attend drills, continuing education classes and stay up to date regarding common risk factors for postpartum hemorrhage. Obstetric OB providers’ knowledge of medications used for postpartum hemorrhage and awareness of subtle changes to maternal conditions can improve outcomes. This QI project helped postpartum nurses improve communication during mock code drills, who are thereby more knowledgeable about risk factors and common medications used in postpartum hemorrhage.

There are several strengths of this QI project, which educated mother-baby nurses about common medications to prevent postpartum hemorrhage. Nurses also learned about risk factors
of postpartum hemorrhage and communication techniques during codes, and several were able to participate in the educational training and learn about the debriefing tool as it relates to postpartum hemorrhage. Nurses were able to review hospital protocol to activate OB rapid response and locations of emergency supplies needed to respond effectively in hemorrhage drill emergencies.

Several nurses were able to share concerns and offer feedback regarding which changes they would desire for the postpartum hemorrhage mock code drills. This project illustrated the need for hospitals to continue offering trainings to nursing staff for emergency response and to provide support after codes. Continued support from hospital administration through debriefing and mentorship will increase confidence and improve performance. This QI project has offered data to hospital administration about the need to conduct mock code drills. Management can continue to budget mock code trainings and incorporate administrative pay for their nursing staff.

This QI project improved outcomes on many levels. Mother-baby nurses’ knowledge and skills improved. Novice nurses lack information about medications and care coordination of the hospital postpartum unit, and Experienced nurses require ongoing skills and knowledge refreshers to continue providing care for mother-baby couplets. Clinical symptom management and coordination of care with other members of the healthcare system will contribute to the ultimate best outcome of the patient. Nurses and OB providers collaborating post codes to promote a culture of safety will improve patient outcomes.

This QI project educated nursing staff on debriefing using the team review debriefing form about best practices to prevent complications from postpartum hemorrhage. Teaching Mother-baby nurses about debriefing has been shown to increase confidence and identify gaps in knowledge. Mock postpartum hemorrhage code drill trainings offer education for staff and
promote best practices such as focus assessment and fundal checks during change of shifts to prepare nurses in responding to critical events. Debriefing after drills helps nurses to always be ready. Effective communication skills and collaboration with the education department were key to facilitating this QI project. This facility promotes evidence-based practice and encourages nursing staff to promote evidence-based care.

Early recognition of risk factors in postpartum women can help decrease adverse outcomes. At least 60% of maternal deaths are preventable. All OB providers can play an important role in preventing maternal deaths. A structured debriefing tool was introduced during mock postpartum hemorrhage code drills to assess readiness, recognition of hemorrhage, and prevent adverse outcomes from postpartum hemorrhage.

The results of this project support that debriefing improves communication. Studies by Michelet et al. (2019) and Laurendine et al. (2020) discussed that mock code simulation trainings and debriefing post codes improved confidence and performance. These results are consistent with the claim that debriefing improves confidence and knowledge as discussed by Greer et al. (2019) and de Oliveira Nascimento Andrade et al. (2019). Jacobs, 2017; Thompson et al., 2018 have shown that initiating postpartum hemorrhage safety programs and bundles has been associated with improved outcomes and that nurse working in high stress areas benefit from debriefing after emergencies. Nurses found debriefing to help prepare for the next emergency.

Some barriers identified by the nurses included novice nurses and physicians leaving right after emergencies. Nurses also described several delays such as obtaining medications and lack of knowledge about which medications to pull from the medication cart. Communication and staffing issues were reported as barriers to quickly responding to codes. This QI project showed an increase in nurses participating in debriefing during mock postpartum hemorrhage code drills.
Since implementation, the mother-baby nurses use the tool after each mock emergency trainings. Three months after debriefing, nurses continue using the debriefing tool and the DNP student continues to teach mother-baby nurses about the tool. The staff continues to find ways to overcome barriers to debriefing and having more nurses and attending physicians to participate in debriefing after emergencies.

One limitation of this study is that comfort levels could not be measured right after implementing the debriefing tool. The nurses on the unit rated their comfort levels as medium to high before the implementation, except for some novice nurses who lacked any experience in responding to emergencies. The nurses rated their confidence level in the pre-survey as medium to high, except for a few novice nurses who started within the past year and reported low confidence in responding to codes on the unit. Several nurses did not return the posttest, so pre-intervention data were obtained but no post-data were available for some participants for measuring any differences right after implementation. Some nurses had to provide patient care and could not participate in the mock code drill that day, which further limits the sample size.

This study can be replicated using correlation statistics with a larger sample size. There were ongoing staffing issues, and travel nurses were hired due to the ongoing COVID-19 pandemic. Postpartum hemorrhage mock code drills are open to all nurses from day and night shifts. All postpartum staff and travel nurses were invited to participate in this project, but the mock postpartum hemorrhage code drills were offered on the weekends, and some nurses do not work weekends. Those who were on weekend rotations found that it was convenient for them.

Transitioning to online pre-registration for mock postpartum hemorrhage code trainings enables the nurses to review the PowerPoints and attend mock postpartum hemorrhage code drills on days that they do not provide patient care. This approach will increase convenience and targeted
dates that nurses are available as well as provide more time dedicated to training, and the
debriefing tool can be used to reinforce knowledge.

Most nurses reported having 5-10 years of nursing experience, which may have explained
why the high comfort rating. Travel nurses were invited to mock postpartum hemorrhage code
trainings but were not involved in the final survey or data analysis, which may have limited the
number of participants.

The travel nurses were not interested in participating in the survey, but eager to learn the
mock postpartum hemorrhage code drills. Management would not allow recruitment right before
the mock postpartum hemorrhage code drills due to time constraints for participants to practice
them. Having more time to involve travel nurses may have increased the number of participants
in the final data analysis. The second limitation is that this was the last mock PPH code drill
requirement for the year, and several nurses had already completed their mock postpartum
hemorrhage code trainings for the year, so few nurses showed up for the implementation.
Although this project was open to all mother-baby staff, it was challenging to recruit staff before
and after work. Some nurses who wanted to come were providing patient care and were thus not
able to attend during work hours. Despite these limitations, these results provide several
theoretical and practical implications.

**Setting Facilitators and Barriers**

Barriers included the timeline and resistance from outsiders. The DNP student worked
directly with nursing education and key stakeholders to overcome barriers. The DNP student will
promote nursing best practices through emphasizing the importance of communication and
teamwork when responding to emergencies. Nurses were encouraged to support each other,
especially new graduate nurses who have not experiencing an emergency or through debriefing.
A contract agreement from the site was approved and support letter received from clinical leadership. Facilitators included a motivated unit manager and clinical nurse specialist who promote unit-based education to promote knowledge for nurses. Key stakeholders such as human resources, nurse managers, directors, and clinical nurse specialists were informed early in the process and had opportunities for involvement prior to implementation through ongoing meetings with the site preceptor and clinical nurse specialist. Continued communication with leadership helped decrease barriers. A structured debriefing tool during mock code trainings provides a reminder to nurses and other healthcare providers to debrief after emergencies. Nurses can also learn about medications and skills needed during structured debriefing. Reflections and skills review after drills can be reviewed during mock postpartum hemorrhage drills. In future research, it would be useful to extend the current findings by examining pre and post surveys of novice nurses and experienced nurses and then document how communication can improve over time. This study can be conducted with a larger sample size and timeline can be extended to include more nurses. Providers such as OBGYN physicians, midwives, and residents can also be included. Medications use in postpartum hemorrhage require future research as well as regarding which medication combinations are best based on the patient population. The present study enhances our understanding of the relationship between structured debriefing and improved communication among nurses and other healthcare providers. Implementing a debriefing tool can be used to reinforce knowledge after mock code drills.

**Conclusion**

and other medical emergencies can be traumatic for both patients and families. Nurses and other involved healthcare disciplines must be able to respond quickly and work efficiently to promote patient care and safety. Debriefing after emergencies has been shown to decrease
nursing anxiety and increase confidence. Early recognition of risk factors in postpartum women can help decrease adverse outcomes.

Communication and collaboration during emergency and debriefing have been shown to improve patient outcomes. Interdisciplinary debriefing will help mother-baby nurses and all OB providers to work collaboratively to improve patient outcomes. Debriefing will help all team members communicate and collaborate to decrease adverse outcomes and thus improve care in obstetric settings. This project can be replicated in any healthcare settings. Department-specific debriefing tools and introducing debriefing through mock code trainings can help improve communication and confidence over time.

Three months post implementation, the debriefing tool is currently used after all mock emergency code trainings. There was no specific debriefing tool for the postpartum department, and the facility was using the code blue debriefing tool. The debriefing form has since been added to the code carts and is now used on both units in the hospital. Improving communication in healthcare setting regards a continuous process that will benefit patients, healthcare professionals, and organizations. Despite the ongoing challenges during the COVID-19 pandemic, nurses and other healthcare professionals continue to forge ahead and improve healthcare outcomes.
References


https://doi.org/10.7205/MILMED-D-16-00030

https://doi.org/10.1097/SIH.0000000000000395


https://doi.org/10.1186/s12884-016-1217-0

https://doi.org/10.15585/mmwr.mm6818e1


LETTER OF EXEMPT DETERMINATION

Date: November 10, 2021

To: Professor Mary Burke and Sheila LaFortune, College of Nursing

From: Professor Lynnette Leidy Sievert, Chair, University of Massachusetts Amherst

IRB

Protocol Title: Postpartum Hemorrhage: Improving patient outcomes with improved communication and post drill debriefing

Protocol ID: 3094

Review Type: EXEMPT -NEW

Category: #2 and #3

Review Date: 11/10/2021

No Continuing Review Required

UM Award #:

The Human Research Protection Office (HRPO) has reviewed the above-named submission and has determined it to be EXEMPT from the federal regulations that govern human subject research (45 CFR 46.104)

Note: This determination applies only to the activities described in this submission. All changes to the submission (e.g., protocol, recruitment materials, consent form, additional personnel), must be reviewed by HRPO prior to implementation. A project determined as
EXEMPT, must still be conducted in accordance with the ethical principles outlined in the Belmont Report: respect for persons, beneficence, and justice. Researchers must also comply with all applicable federal, state, and local regulations as well as UMass Amherst Policies and procedures which may include obtaining approval of your activities from other institutions or entities. All personnel must complete CITI training.

Consent forms and study materials (e.g., questionnaires, letters, advertisements, flyers, scripts, etc.) - Only use the consent form and study materials that were reviewed by the HRPO.

Final Reports - Notify the IRB when your study is complete by submitting a Close Request Form in the electronic protocol system. Serious Adverse Events and Unanticipated problems involving risks to participants or others - All such events must be reported in the electronic system as soon as possible, but no later than five (5) working days.

Annual Check In - HRPO will conduct an annual check in to determine the study status.

Please contact the Human Research Protection Office if you have any further questions. Best wishes for a successful project
Appendix B

Demographic Data

4 Digit Identification Code #------------------ Date--------

Age: 20-30 ( ) 30-40 ( ) 40-50 ( ) 50-60 ( ) 60-70 ( )

Gender: 1= Male ( ) 2= Female ( ) 3 = LGBTQ ( ) 4= Transgender
6= other

Race: 1= American Indian or Alaska Native ( ) 2 = Asian ( ) 3= Black or African American ( )
4= Native Hawaiian or other Pacific Islander ( ) 5= White or Caucasian ( )

Religion-----------------

Years as a practicing nurse: <5 years ( ) 5-10 years ( ) 10-20 ( ) 20-30 ( ) 30+ ( )

Years working in Women’s health

Highest nursing degree completed:
1= Diploma ( )
2= Associate degree ( )
3= Bachelor degree ( )
4= Masters degree ( )
5= Doctorate degree ( )

Physician responding to OB Rapid Response

Attending Physician Years in Practice________

OB Resident years in Practice___________

How many OB Rapid Response have you attended? __________

Were you able to debrief with nursing staff after OB Rapid Response? __________
Please share any barriers with debriefing. _____

Pre/Post Survey Questions

Have you ever attended continuing education in Women’s health?
1. Yes 2. No 3. unsure

What level of comfort do you feel after participating in codes/ OB Rapid Response?
----Low ----medium ------ high

What do you feel is the biggest barrier in responding to codes on your unit?

Do you feel you have enough access on information and timeline for Mock code trainings?

Do you think this educational program of ongoing Mock codes is helpful?

What would you change about the Mock educational program?

Would you recommend interdisciplinary debriefing?

How many codes have you attended in the past 12 months?

OB Rapid response---- Code MET------- Code blue----- Code Neo----

Do you feel prepared for the next code after debriefing?

Do you debrief after every code?

How confident are you in your ability to use your resources to identify patients at increased risk for postpartum hemorrhage (PPH)?

LOW_________ Medium_________ High____________

Debriefing after codes helped me with increase knowledge and confidence.

Yes_____ No_________ Maybe________

Are the Code Carts Ready with supplies needed during OB Rapid Response? ____

How do you feel about response time to codes on the unit? _______
Anything else you would like to share? ___________
Appendix C

Clinical Teamwork Scale (CTS™)

Table C

Clinical Teamwork Scale

<table>
<thead>
<tr>
<th>Overall</th>
<th>Not Relevant</th>
<th>Unacceptable</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How would you rate teamwork during this delivery/emergency?</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication</th>
<th>Not Relevant</th>
<th>Unacceptable</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Communication Rating:</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Orient new members (SBAR)</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Transparent thinking</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Directed communication</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Closed loop communication</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Situational Awareness</th>
<th>Not Relevant</th>
<th>Unacceptable</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Situational Awareness Rating:</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Resource allocation</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Target fixation</td>
<td>□ Yes □ No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision Making</th>
<th>Not Relevant</th>
<th>Unacceptable</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Decision Making Rating:</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Prioritize</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role Responsibility</th>
<th>Not Relevant</th>
<th>Unacceptable</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Role Responsibility (Leader/Helper) Rating:</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Role clarity</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Perform as a leader</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Perform as a helper</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th>Not Relevant</th>
<th>Unacceptable</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patient friendly</td>
<td>□ 0</td>
<td>1 2 3</td>
<td>4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note:  Not relevant- The task was not applicable to the scenario.

Additional Notes (Anything regarding individual performance, assertion of position, etc.?)}
Appendix D

Debriefing Tool

Team Review and Debriefing Form: Postpartum Hemorrhage

<table>
<thead>
<tr>
<th>READINESS</th>
<th>Yes/No</th>
<th>Opportunity for Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage cart stocked with all needed supplies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemorrhage medications immediately available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency response team established</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Massive transfusion protocol available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency blood release protocol available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RECOGNITION &amp; PREVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review risk factors for hemorrhage in this patient: (list factors)</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSESSMENT/ACTION</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Provider/Team recognizes PPH in timely manner</td>
</tr>
<tr>
<td>Team calls for hemorrhage cart</td>
</tr>
<tr>
<td>Provider/Team calls for additional assistance</td>
</tr>
</tbody>
</table>

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