

POSTPARTUM HEMORRHAGE RECOGNITION AND TREATMENT

By

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### **Abstract**

The purpose of this thesis is to explore how postpartum interventions impact the rate of maternal mortality and morbidity caused by postpartum hemorrhage and to provide evidenced based recommendations for postpartum hemorrhage interventions. Postpartum hemorrhage is the causal factor for 11% of maternal deaths in the country. Also, between 54% to 93% of deaths caused by obstetric hemorrhage may be prevented (ACOG, 2019).

Evidenced based practice recommendations provide nurses and healthcare professionals with the knowledge and guidelines to treat postpartum hemorrhage. The best practice recommendations for postpartum hemorrhage prevention and treatment include providing standardized education for mothers on postpartum complications, assessing the readiness of nurses to treat a hemorrhage, providing annual training and protocol education, and educating nurses on PPH risk factors, so they can assess patients for risk factors on admission. Intervention specific recommendations are using quantitative methods for measuring blood loss, actively managing the third stage of labor with oxytocin administration and uterine massage, assessing the patient's condition and vital signs during a hemorrhage, starting a second large bore IV, administering Lactated Ringers and medications for uterine atony, and ensuring the patient has an empty bladder. Finally, if the patient continues to hemorrhage, refractory PPH interventions should be initiated, and massive transfusion protocol should be activated. The final chapter includes a proposal for the implementation and evaluation of the best practice recommendations using the Plan-Do-Study-Act framework. Ultimately, nurse should continue to seek out updated journal articles and professional guidelines throughout their careers to ensure they provide quality patient care.

## **Chapter One**

The purpose of this thesis is to explore how maternal education and postpartum interventions impact the rate of maternal mortality and morbidity caused by pregnancy complications, specifically postpartum hemorrhage. The other purpose of the thesis is to provide evidenced based recommendations for interventions to educate nurses and patients about postpartum hemorrhage in order to reduce morbidity and mortality from postpartum hemorrhage.

### **Background**

Maternal mortality involves the death of a woman up to one year after giving birth because of postpartum complications. In the United States specifically, maternal death rates have more than doubled since 1987 (Suplee et al., 2016b). The United States has one of the worst track records for preventing mother mortality out of the developed countries. America has an estimated maternal mortality rate (MMR) of 17.2 deaths per 100,000 live births equaling approximately 700 women (Petersen et al., 2019). Postpartum hemorrhage is the causal factor for 11% of maternal deaths in the country. Also, between 54% to 93% of deaths caused by obstetric hemorrhage may be prevented (ACOG, 2019). Because there is limited research on improving the postpartum education patients receive and there is a lack of standardized information available for every woman (Suplee et al., 2016b), focusing on patient education as an intervention for reducing the MMR may provide an effective solution for this problem.

Postpartum hemorrhage is one of the leading causes of maternal morbidity and mortality (Hire et al., 2020). The occurrence of postpartum hemorrhage with the use of procedures to control bleeding (per 10,000 deliveries) has increased from 4.3 to 21.2 over the last 20 years (Center for Disease Control, 2019). Early postpartum hemorrhage occurs in the first 24 hours after delivery, and it is most commonly caused by uterine atony. Late postpartum hemorrhage

happens after the first postpartum day and can result from uterine atony, infection, retained placenta, and other causes (McKinney et al., 2018). Postpartum hemorrhage can be treated and prevented with a variety of interventions. Interventions include the administration of medications, such as Oxytocin, Methylergonovine, Carboprost, Misoprostol, and Tranexamic acid. Other treatments are starting additional bore IVs, mechanical tamponade, and the activation of massive transfusion protocol, (Hire et al., 2020). However, nurses also have the ability to recognize and prevent postpartum hemorrhage. Nurses should frequently assess the tone of the uterus, massage the uterus if it is not firm, encourage frequent voiding, and monitor bleeding (McKinney et al., 2020). Although postpartum hemorrhage can lead to morbidity and mortality, there are many methods available to prevent and treat excessive bleeding after birth.

A variety of practice recommendations exist to limit the occurrences and complications of postpartum hemorrhage (PPH). Every nursing unit should be ready to address PPH. This includes having a hemorrhage cart with all the supplies readily available, creating a response team, creating protocols for transfusions, and educating the nurses on the protocols (Evensen et al., 2017). Also, patients should be screened during the antenatal period for PPH factors (anemia, sickle cell, etc.). Intrapartum interventions include active management of the third stage of labor, avoiding routine episiotomy and instrumental deliveries, using warm perineal compresses, and measuring blood loss. Active management involves uterotonic (oxytocin) administration after the birth of the baby, controlled cord traction when delivering the placenta, and uterine massage after placental delivery. Finally, hospital units should use emergency plans with checklists and provide support for patients and staff (Evensen et al., 2017).

Several organizations have released practice guidelines to prevent maternal deaths related to postpartum hemorrhage. Joint Commission and the Association of Women's Health, Obstetric

and Neonatal Nurses (AWOHNN) have nursing specific guidelines for postpartum hemorrhage management. Joint Commission released a series of requirements in regard to hemorrhage management. The first requirement dictates that all staff and providers that treat postpartum hemorrhage should receive role-specific education about the organization's hemorrhage protocol during orientation, when changes are made to the protocol, or every two years. The next requirement states that drills should be conducted annually to highlight issues within the current protocol or system (Joint Commission, 2019).

AWHONN has created a series of clinical tools that provide education and resources for nurses. The organization developed a PPH Risk Assessment tool that can be used on admission to determine the patient's risk level for a hemorrhage and to determine any anticipatory interventions based on the risk level. There is also several educational resources and tools related to quantification of blood loss (Wattie, 2019). Finally, AWOHNN has a "Recognition, Response, Readiness" model that highlights important steps of recognizing and treating a postpartum hemorrhage. The quantification of blood loss, PPH risk assessment, and maternal warning signs are key parts of the recognition of a hemorrhage. The development of transfusion therapy protocol and postpartum hemorrhage policy allows organizations to respond effectively to an actual PPH. Finally, AWOHNN recommends a team debriefing after a hemorrhage and simulation-based training to ensure all staff members of prepared to manage future postpartum hemorrhages (Wattie, 2019).

The California Maternal Quality Care Collaborative (CMQCC) also has a variety of resources for postpartum hemorrhage management. Their "Obstetric Hemorrhage Emergency Management Plan" categorizes interventions based on defined stages. Stage zero is applicable for every woman in labor and this stage focuses on risk assessment and the active management

of the third stage of labor. Members of the healthcare team should assess all patients for risk factors, use quantitative methods for measuring blood loss, use active management of the third stage, and performing a type and screen (medium risk) or type and cross (high risk) depending on the patient's risk level (Lyndon et al., 2015). If the patient has blood loss greater than 500 ml during a vaginal delivery, greater than 1000 ml Cesarean, or significant vital signs changes (heart rate  $\geq 110$ , blood pressure  $\leq 85/45$ , and  $O_2 < 95\%$ ), stage one protocol should be implemented. Stage one includes activating OB hemorrhage protocol and notifying the charge nurse, the Obstetrician or Certified Nurse Midwife, and the Anesthesia provider. Vital signs should be taken every 5 minutes, cumulative blood loss should be recorded every five to 15 minutes, and any bloody materials should be weighed. The provider should also inspect the vaginal walls, cervix, uterine cavity, and placenta. At least 18-gauge IV access should be obtained, the rate of the Lactated Ringers and Oxytocin should be increased, and fundal massage should be repeated. Methergine can be given 0.2 mg IM if the patient is not hypertensive, and the bladder should be emptied with a straight or foley catheter. Finally, a type and cross should be completed if not already done (Lyndon et al., 2015).

If bleeding continues and the total blood loss is under 1500 ml, then the hemorrhage is classified as a stage two hemorrhage. This stage involves advancing through the other levels of medications, Hemabate and Misoprostol. For a vaginal birth, the possible interventions are moving the patient to the operating room, repairing tears, performing dilation and curettage, placing an intrauterine balloon, and selective embolization. Packed red blood cells should be transfused if the patient shows clinical signs necessitating a transfusion (Lyndon et al., 2015). Stage three occurs when bleeding exceeds 1500 ml. This stage involves the activation of massive transfusion protocol and invasive surgical procedures (B-lych suture, Uterine Artery Ligation,

Hysterectomy) (Lyndon et al., 2015). The CMQCC provides this management plan in a variety of formats, which allows providers and nurses to select the format that works best for them.

The American College of Obstetricians and Gynecologists released several recommendations. The recommendations include using quantitative methods for measuring blood loss instead of a visual estimation (ACOG., 2019). The organization also emphasized the importance of assessing airway, breathing, and circulation while managing a hemorrhage. In a hemorrhage situation, the team should be notified, a cart and medications should be brought to the room, and massive transfusion protocol might be activated. Also, starting a second large bore IV, using Lactated Ringers to replace blood at a 2:1 ratio, and preparing for the transfusion were included in the recommendations. The last section includes medications to be used for uterine atony, such as Oxytocin, Methylergonovine, Hemabate, and Misoprostol (ACOG, 2015).

The World Health Organization also approved two bundles for the treatment of postpartum hemorrhage. The initial response bundle includes using uterotonic drugs, isotonic crystalloids, tranexamic acid, and uterine massage. If the patient continues to bleed, the response to refractory PPH bundle can be initiated. This includes aortic compression or bimanual uterine compression, intrauterine balloon tamponade, and using a non-pneumatic anti shock garment. The second bundle also involves the continued administration of uterotonics and a second dose of tranexamic acid (Althabe et al., 2019). The implementation of bundles and practice recommendations from professional organizations provide nurses and physicians with evidence-based care recommendations for treating postpartum hemorrhage.

### **Significance to Nursing**

As a whole, healthcare systems in the United States need to reduce the maternal mortality rate. By focusing on improving PPH management, nurses and other healthcare professionals

have the ability to promote positive maternal outcomes. Nurses specifically can improve maternal outcomes with thorough maternal education and through implementation of practice guidelines and evidenced based interventions. Overall, nurses need to recognize the problem at hand, improve patient education, and safely and effectively implement interventions to treat postpartum hemorrhage.

### **Summary**

The maternal mortality rate in the United States is a serious health issue that needs to be addressed. There are a variety of preventative and treatment measures that nurses can implement to reduce the number of women that experience morbidity and mortality from postpartum hemorrhage. Practice recommendations from reputable organizations and evidenced based guidelines provide essential information for nurses, providers, and patients. The first step in improving patient care is evaluating the best ways to treat patients.

## **Chapter Two**

Chapter two will include an overview of literature related to maternal morbidity and mortality. The review will illustrate the factors that influence postpartum hemorrhage, such as mode of delivery and social determinants. The research was guided by the following question: in postpartum women (P), how does the presence of a clinical protocol focused on preventing postpartum hemorrhage (I) differ from the absence of a protocol (C) when comparing survival outcomes (O) during the postpartum period (T)? The question focused generally on finding a protocol or intervention to improve survival after the delivery process.

The databases used for the literature review were CINAHL Plus with Full Text and PubMed Central. The searches only included articles published from 2015 to present time in order to ensure the research and evidence is recent enough to provide relevant information. A variety of search filters guided the selection of the articles. The search terms and phrases used in the databases included mother mortality and morbidity, maternal outcomes, birth outcomes, and interventions. One search involved specific terms, such as racial disparities in order to find articles focusing on a specific subset of maternal outcome research. Ultimately, the search terms guided the research and provided clear guidelines for the articles, which resulted in several articles that are relevant to the PICOT research question.

### **Literature Review Results**

#### **Maternal Risk Factors for Post Delivery Complications**

The purpose of the retrospective cohort study was to examine maternal and neonatal outcomes from the perspective of the delivery method after the mother had previously delivered a child via cesarean section (Young et al., 2018). The authors used medical records from all Canadian hospital deliveries from April 2003 to March 2015. Every woman in Canada that met

the studies criteria was selected for the study. The sample was made up of women that delivered in a hospital between 2003 and 2015. The participants specifically were having a child after having their previous child via C-section, and either delivered vaginally or by cesarean section again. The source population consisted of 3,047,401 women, but only 19,7540 met the criteria (Young et al., 2018).

The data for the study was collected from the Discharge Abstract of the Canadian Institute for Health Information (Young et al., 2018). The study involved data such as maternal age, maternal characteristics, mode of delivery, and outcomes for both the mother and the baby. The data was analyzed by quantifying the outcomes with rates, rate ratios, and 95% confidence intervals (Young et al., 2018). The study found that women attempting a vaginal delivery had increased rates for uterine rupture, postpartum hemorrhage, and morbidity and mortality than women that delivered with an elective repeat cesarean section. The absolute rates for severe maternal and neonatal morbidity and mortality were low for both forms of delivery; however, the researchers found statistically significant differences between the relative rates (Young et al., 2018). Furthermore, the vaginal deliveries had a much larger relative rate of morbidity and mortality with a dramatic rate increase between 2012 and 2014.

Because the study involves such a large sample, it has many strengths. The sample size ensures that the research has generalizability, especially in Canada. The authors used the large amount of data and considered mother and neonatal outcomes in a multitude of ways. For instance, the researchers collected data about the participant's ages and blood pressure, whether or not they had diabetes, and if their labor was induced (Young et al., 2018). By measuring these factors, the study minimizes the unknown influence of extraneous variables and creates a full picture of the factors relevant to birth outcomes. However, the reliance on a database does pose

the potential for transcription errors. The authors attempted to minimize errors by validating codes for major diagnoses and procedures (Young et al., 2018)

The next article is a systematic review that sought to synthesize the literature on the impact of social factors on post-pregnancy outcomes in order to emphasize areas for interventions and continued research (Wang et al., 2020). The research was conducted using Ovid, MEDline, CINAHL, Popline, Scopus, and ClinicalTrials.gov as databases to collect the information. The authors used maternal mortality, morbidity, social determinants of health, and the United States as mesh terms. The studies met the following selection criteria: quantitative empirical studies, published in English, the population involved pregnant women delivering in the United States, measures of maternal outcomes were described, and they included social determinants (Wang et al., 2020). After assessing what journal articles fit the criteria, the researchers selected 83 studies.

Because the journal article is a systematic review, the sample and design are defined in the context of the selected studies. The included articles are all quantitative empirical studies; however, each article was placed into a category based on its content. The categories were socioeconomic, political, and cultural context; socioeconomic position; and material and physical circumstances (Wang et al., 2020). The category describes what variables were examined in regard to postpartum outcomes. The participants were pregnant women that delivered in the United States. The authors did not describe specific interventions for the research, yet the various studies did consider outcomes like maternal death and emergency hospitalizations or readmissions.

One of the researchers assessed study quality with the National Institutes of Health Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies or for Case-

Control Studies. Two of the authors extracted the data and analyzed it with a descriptive approach. Study design, sample size, data sources, variables, key findings, and other parts of the research were extracted from the articles (Wang et al., 2020).

The extracted data contributed to the findings of the study. The collective results indicated that women of an African American or Hispanic race, those with a lower education level, and women without insurance have an increased risk for maternal morbidity and mortality. Marital status, employment, and income had a limited or insignificant association with maternal death (Wang et al., 2020). Also, the research identified many gaps in maternal outcome research based on social health determinants. For instance, the research on socioeconomic and political factors is limited (Wang et al., 2020). Because the research included in the study identified the limited breadth of research completed on the topic, a limitation of the review is how generalizable it is. Conversely, the systematic review's strengths are related to its ability to highlight the gaps in this field of research. Ultimately, the research study provides a detailed overview of what populations are at risk for postpartum complications; therefore, identifying what women need improved postpartum education and interventions the most.

### **Maternal Education**

The first maternal education article was an exploratory qualitative design that explored the information nurses commonly provide to postpartum mothers (Suplee et al., 2016a). The purpose of the research was to gain an understanding of the type of materials and information provided to women on postpartum complications. The authors used the information gathered from this assessment to illustrate the key messages for after birth and discharge education. The sample was recruited from the six hospitals in New Jersey and Georgia that were involved in the Empowering Women to Obtain Needed Care project. The researchers placed postpartum nurses

from the hospitals in six different focus groups of five to eleven nurses. The sample of nurses involved 52 English speaking Registered Nurses working on the postpartum units of the hospitals, and most of the nurses had over 10 years of experience. The article did not describe a specific sampling technique; however, it is likely a convenience sample.

Each focus group had a facilitator that collected the responses from the nurses through semi-structured interviews. One of the data instruments used in the study was a 10-item demographic survey to collect data on the background and experience of the nurses. Researchers used the Stata version 13 to analyze the demographic data with descriptive statistics. Also, the research team recorded the interviews and transcribed them to create categories for the responses (Suplee et al., 2016a).

The qualitative study revealed several findings (Suplee et al., 2016a). For instance, the education materials commonly used by the nurses included individual interactive methods, written materials, and audiovisual resources. Moreover, one finding revealed that most nurses do not begin their discharge education with the warning signs of postpartum complications, which was identified as a major problem in the context of mother mortality and morbidity. Postpartum complication education included elements, such as information on bleeding and hypertensive disorders. Overall, the findings illustrated the lack of consistency in postpartum education on potential complications and revealed areas for improving education to reduce mortality.

The authors identified a few limitations for the study. Because the sample size was small and limited to a few hospitals, the information in the study may lack generalizability. Furthermore, the data collection method of focus groups reduces the amount of equal input from each participant. Some members may contribute more than others; therefore, the opinions of only a portion of the group may dominate the responses (Suplee et al., 2016a). Although the study had

limitations, it also possessed many strengths. One major strength of the study is related to the foundation it sets for future research. The authors identify problems in postpartum education in order to allow other studies to further explore potential interventions. Also, by using descriptive statistics to analyze the demographic data, the researchers ensure the demographic data is considered in a standardized way for every participant.

A pilot study further considers how improving education might improve postpartum outcomes (Suplee et al., 2016b). This study involves some of the authors from the previous research article and expands upon the topic by providing an actual education intervention. The purpose of the study was to test the effectiveness of standardized education material on improving education of postpartum complications. The researchers specifically tested a discharge education checklist, an education evaluation tool, and an audit tool. The sample consisted of four of the six hospitals from the prior baseline study. One hundred fifty nurses provided the discharge education and they reached over 3,000 mothers. The sample characteristics included a demographic of 25% to 65% Hispanic and African American mothers. The nurses were postpartum registered nurses from the four hospitals. The article did not list a specific sampling technique, but it has the characteristics of a convenience sample.

The pilot study expanded on the prior research of the authors exploratory qualitative research by testing specific interventions. The data was analyzed with descriptive statistics. Also, the data instrument was an online survey that the nurses completed. Of the 150 nurses using the tools, 52 nurses completed the survey, which gave the study a response rate of 33%. The survey asked participants to respond to six statements with the following criteria: strongly agree, agree, undecided, disagree, or strongly disagree. The numerical data from the survey and comments from the nurses were used to establish the findings (Suplee et al., 2016b).

The authors found that the nurses felt the materials (the discharge checklist and handout) were easy to use. Also, the checklist guided postpartum education on post-pregnancy complications in a detailed and sufficient manner. The nurses even reported that the women understood the teaching content and could describe what they learned after receiving the standardized education (Suplee et al., 2016b). Furthermore, by engaging women in discussions about dangerous complications after birth with standardized education tools, nurses can improve the likelihood women will recognize the complications and seek help. There are still many challenges and barriers to overcome for improving education; however, continuing to research these methods is crucial for combatting mother mortality.

The research article had a few limitations. Because the study involved a small sample size and did not retain all of the hospitals and nurses, the data does not necessarily reflect on discharge processes across the nation (Suplee et al., 2016b). Further research with a larger sample size and measures of maternal outcomes needs to be conducted. However, the combination of numerical survey data and comments from the nurses serve as a strength of the study. By incorporating both types of data, the researchers could receive crucial feedback on the education tools, which facilitated discussion for the barriers of the tools. As a whole, the study assessed the effectiveness of standardized education materials to pave the way for future implementation.

### **Postpartum Hemorrhage Interventions**

A qualitative study was conducted to explore the perceptions of Tanzanian health facilities and their readiness to treat postpartum hemorrhage. The researchers wanted to gain a better perspective of the limited training the staff of the healthcare facilities received. Furthermore, the study considered the impact of the “Helping Mothers Survive Bleeding after

Birth” (HMS BAB) training on PPH treatment (Al-beity et al., 2019, 2). Tanzania’s health-care system is decentralized, and the first level of care is district hospitals. Four of the ten intervention districts that participated in the HMS BAB trial made up the setting for the study. Five clinicians, 32 nurses/midwives, 13 attendants, and one Maternal Child Health Aid participated in the focus group discussions. Also, the researchers interviewed 6 clinicians and 7 midwives (Al-beity et al., 2019).

The study involved seven focus group discussions and 12 in-depth interviews to evaluate the effectiveness of the HMS BAB training. The research was reported using the COREQ-guidelines. The first author and research assistants recorded the FGDs and IDIs, which the first author later transcribed (Al-beity et al., 2019).

Using MAXQDA 12 software to analyze the transcripts, the author identified two major themes related to the topic (Al-beity et al., 2019). The first theme highlights how inconsistent resource availability can limit care. Moreover, drugs and supplies used to treat PPH are not always available, blood accessibility fluctuates, the referral system is flawed (escalation of care), and there is a limited number of healthcare workers. The second theme describes the prioritization of managing PPH. The overall perception is that PPH hemorrhage is an emergency, and care should be initiated immediately. As a whole, the healthcare workers in these hospital systems recognize the importance of rapid postpartum hemorrhage treatment, but the resources necessary for treatment are not readily available. They also explained that a clear referral system is needed, healthcare workers should communicate efficiently and effectively, and healthcare systems should strive to foster a collaborative environment that promotes teamwork.

A strength of the study includes its thorough analysis of the audio recordings, which identified the key perspectives related to resource accessibility and perception of PPH as an

emergency (Al-beity et al., 2019). A broader picture of perspectives on PPH treatment was created. However, in the context of this thesis, the research has limitations. Because Tanzania's healthcare system does not equate to the U.S. healthcare system, the perspectives are likely not the same. Although resource access might not cause problems for many parts of America, there could still be hospitals with limited access to blood and other supplies, especially in rural areas. Also, the component related to teamwork and effective communication is still applicable to treatment of PPH in America. As a whole, the study emphasizes the existing problems in Tanzania's treatment of postpartum mothers, which also reveals issues that may impact maternal medicine as a whole.

The WOMAN or World Maternal Antifibrinolytic trial was a randomized and double-blind placebo-controlled trial. In the study, the researchers examined the impact of tranexamic acid, which is used to reduce death in bleeding trauma patients, on outcomes related to postpartum hemorrhage. The purpose of the study was to identify how early administration of tranexamic acid impacts mortality and hysterectomy rates in mothers experiencing postpartum hemorrhage (WOMAN Trial Collaborators, 2017). The participants were 16 years and older with a diagnosis of postpartum hemorrhage after delivery. The diagnosis was specifically based on blood loss (500 ml for vaginal delivery and 1000 ml for a cesarean section). Also, any blood loss that caused significant hemodynamic instability met the diagnosis criteria. The sample was made up of women from 193 hospitals based out of 21 countries. The total sample size was 20,000 women.

After the researchers recruited the participants and obtained consent, the participants were randomly assigned to receive tranexamic acid or the placebo. A participant was given the lowest number treatment pack in a box of eight treatment packs to ensure randomization. One

gram of the medication was given intravenously at a rate of 1 mL/min. If bleeding still occurred upon 30 minutes of administration or stopped and started again 24 hours after administration, a second dose was given (WOMAN Trial Collaborators, 2017).

The patient outcome was recorded when the patient died, was discharged, or 6 weeks after randomization. The main outcome included a composite of death from any cause or a hysterectomy within the 42-day time period after randomization. Clinicians also recorded the immediate cause of death. Analysis was completed on an intention-to-treat basis. The researchers calculated risk ratios, 95% confidence intervals, and two-sided p values. The analysis was a complete case analysis and the researchers pre-specified an adjusted analysis for baseline risk because of interactions between the primary endpoints of death or hysterectomy and the secondary endpoint of death related to bleeding (WOMAN Trial Collaborators, 2017)..

Overall, the risk for death due to bleeding was reduced when women received the tranexamic acid as compared to the placebo group. The rate of death due to bleeding was 1.5% in the tranexamic acid group and 1.9% in the placebo group, and the results were statistically significant. There was no significant difference between the groups when looking at deaths from all causes. Administering the medication within 3 hours of giving birth resulted in an even larger reduction in maternal death. Also, outcomes of hysterectomy and the composite primary endpoint of death were similar between the two groups. Tranexamic acid reduces deaths related to bleeding in women with postpartum hemorrhage without causing adverse effects (WOMAN Trial Collaborators, 2017). The strengths of the study include the randomization method, the adjustment of the results for baseline risk, and the lack of bias. One of the weaknesses is the inability for the study to evaluate all-cause bleeding outcomes based on their sample size. The

researchers stated that a larger sample size is needed to achieve accurate findings. Ultimately, the study provides insight into the impact of tranexamic acid on postpartum hemorrhage.

The next article was a prospective observational study that considers how the method for measuring blood loss during a cesarean section changes the recorded blood loss value (Hire et al., 2020). The aim of the study was to determine if quantitative blood loss measured with the Triton L&D system results in fewer activations of postpartum hemorrhage protocol than estimated blood loss. The study also examined the specific postpartum hemorrhage interventions that were used. The study was conducted at Prentice Women's Hospital in Chicago from 2017 to 2018. The sample consisted of 42 cases of cesarean births with an estimated blood loss that was larger than 1000 ml. The exclusion criteria eliminated cases where the quantification technology malfunctioned and births that required cell salvage.

A member of the delivery team determined EBL during the cesarean delivery and a researcher obtained the QBL from underpads, canisters, and laparotomy sponges within 10 minutes of the surgery (Hire et al., 2020). The researchers also recorded what interventions were used when postpartum hemorrhage protocol was initiated. The average blood loss when using EBL was 1,275 ml and the mean blood loss was 948 ml when using QBL. Moreover, 57% of the cases of postpartum hemorrhage protocol activation based on EBL would not have been considered postpartum hemorrhages if QBL was used. When protocol was initiated, the most common interventions were obtaining additional IV access, administering uterotonics, and measuring laboratory values.

Ultimately, the researchers found an overestimation of blood loss when it was visually estimated, which led to unnecessary activation of the postpartum hemorrhage protocol. The study also had strengths and limitations. For instance, the researcher was unaware of the reported EBL

value when they measured the QBL (Hire et al., 2020). This is a strength of the study because it prevents the researcher from being influenced by the EBL. Another strength is the analysis of the common interventions used to treat excessive bleeding. By analyzing the interventions, the researchers created a more comprehensive picture of how the method for measuring blood loss can impact patient treatment. However, the study also had weaknesses. Quantifying blood loss after surgery is very different than measuring it during the surgery (Hire et al., 2020). A member of the healthcare would need to actively quantify blood loss throughout the surgery to assess the need for protocol activation. Also, the study did not account for cases with an underestimation of blood loss. Because participants needed to meet the 1000 ml EBL threshold, cases where the EBL did not result in protocol activation but would have been considered a hemorrhage based on QBL were not included (Hire et al, 2020). Overall, the study conveys the importance of accurately measuring blood loss after a cesarean section.

The final article considers oxytocin administration in the context of postpartum hemorrhage. The randomized controlled prospective study specifically evaluated the effects of the timing of oxytocin administration during the third stage of labor on the rate of hemorrhage in low-risk patients (Yildirim & Ozyurek, 2018). To qualify for the study, participants needed to meet the following criteria: no risk factors for PPH, gestational age between 36 and 42 weeks, pregnant with one living fetus, cephalic presentation, adequate expected birth weight (2500-4500 g), younger than 40, and a parity between zero and five. Patients with acute fetal distress, an abdominal delivery, labor augmentation, high blood pressure, placenta previa, and any other significant birth or pregnancy complications were excluded from the study. After factoring in the criteria, data was collected from 172 participants that received oxytocin before placental delivery and 171 participants that received oxytocin after placental delivery.

Controlled cord traction was not used during the third stage of labor in order to illustrate the effects of oxytocin independently (Yildirim & Ozyurek, 2018). The first group received ten IU of intramuscular oxytocin within one minute of fetal delivery. The second group received the ten IU directly after the delivery of the placenta. A complete blood count was taken before birth and at the 24-hour postpartum period. The researchers also measured uterine tone every 15 minutes while the patient was in the delivery room and recorded the duration of the third stage of labor. Parametric tests and a linear model were used to analyze the results (significance was  $P < .05$ ).

The findings indicated no significant differences in the rate of postpartum hemorrhage or mean blood loss between the two groups (Yildirim & Ozyurek, 2018). However, the duration of the third stage of labor was shorter for the group receiving the oxytocin before placental delivery. The researchers concluded that the timing of administering intramuscular oxytocin did not influence the rate of postpartum hemorrhage. The researchers identified strengths and limitations in their study. One limitation was the lack of blinding with the practitioners performing the interventions. Because the practitioners needed to perform the oxytocin administration at different times, they were not blind to what interventions the participants received, which allows for bias to affect the results. However, the study did have extensive inclusion and exclusion criteria to ensure every participant was considered to have a low risk for postpartum hemorrhage. The article demonstrates the role oxytocin has in preventing postpartum hemorrhage and it illustrates the limited influence time of administration has on maternal outcomes.

### **Summary**

The analysis of literature related to maternal morbidity and mortality after delivery has illustrated the healthcare field's current understanding of the problems that exist. Researchers

have identified that education for women after they give birth varies from hospital to hospital and even between nurses working in the same hospital. Furthermore, some mothers may receive a less detailed education than others, which increases their risk for postpartum complications. The review also demonstrated that mode of delivery and social determinants can impact the survival of mothers. Finally, the research studies focused on postpartum hemorrhage interventions emphasize the importance of treating postpartum hemorrhage quickly and effectively to reduce negative maternal outcomes. Although the research has exposed many problems in current birthing practices, there is still much to be discovered. Several of the articles highlighted the limited research done on maternal outcomes. They stressed the importance of conducting further research on education, social determinants of health, and interventions in the context of postpartum outcomes. If continued research is completed, it will pave the way to standardizing care for mothers to ensure they have the highest likelihood of having a positive outcome.

Because the research is relevant to the current state of obstetrics and postpartum care, there are several clinical implications. Nurses need to assess if the education they provide to postpartum mothers is consistent between all patients, covers the necessary information, and actively strives to reduce negative maternal outcomes. Also, nurses active in research should continue to test clinical interventions. The United States has one of the highest rates of maternal mortality for a developed nation, and the statistics will not change unless the practices change.

### Chapter 3

Because postpartum hemorrhage is one of the leading causes of maternal morbidity and mortality, providing evidenced based practice recommendations (see Table 1) will provide nurses and healthcare professionals with the knowledge and guidelines to treat postpartum hemorrhage (Hire et al., 2020). Postpartum hemorrhage is a complex medical condition, and a variety of nursing and medical interventions exist. Furthermore, nurses that understand the current guidelines from professional organizations and the evidenced based interventions will be more prepared to manage a hemorrhage situation.

**Table 1***Best Practice Recommendations for Postpartum Hemorrhage Prevention and Treatment*

Recommendation	Rationale	References	Level of Evidence
Assess the current patient education practices nurses implement and ensure each patient is receiving consistent and detailed education.	All postpartum women are not provided with the same education on postpartum complications. Improving education on postpartum complications may reduce mother morbidity and mortality rates.	Suplee, P.D., Kleppel, L., & Bingham, D. (2016a). Discharge education on maternal morbidity and mortality provided by nurses to women in the postpartum period. <i>Journal of Obstetric, Gynecologic, &amp; Neonatal Nursing</i> , 45(6), 894-904. <a href="http://dx.doi.org/10.1016/j.jogn.2016.07.006">http://dx.doi.org/10.1016/j.jogn.2016.07.006</a>	Level VI
Use a standardized tool for educating mothers about postpartum complications, such as the POST BIRTH	When a standardized discharge tool was used, the checklist assisted nurses with postpartum complication education and	Suplee, P.D., Kleppel, L., Santa-Donato, A., & Bingham, D. (2016b). Improving postpartum education about warning signs of maternal morbidity and mortality. <i>Nursing for Women's Health</i> , 20(6), 552-567. <a href="http://dx.doi.org/10.1016/j.nwh.2016.10.009">http://dx.doi.org/10.1016/j.nwh.2016.10.009</a>	Level III

Tool in the Save Your Life handout.	provided detailed information. The patients understood what was taught and effectively described when to seek care.		
Ensure the nurses and the nursing unit are ready to manage a hemorrhage by providing education on the organization's postpartum hemorrhage protocol and having annual training drills.	Nurses recognize PPH as an emergency, but do not always have the resources and training to manage a hemorrhage.	<p>Alwy Al-beity, F., Pembe, A. B., Kwexi, H. A., Massawe, S. N., Hanson, C., &amp; Baker, U. (2020). We do what we can do to save a woman" health workers' perceptions of health facility readiness for management of postpartum haemorrhage. <i>Global Health Action</i>, 13. <a href="https://doi.org/10.1080/16549716.2019.1707403">https://doi.org/10.1080/16549716.2019.1707403</a></p> <p>Joint Commission. (2019). <i>Provision of care, treatment, and services standards for maternal safety</i>. <a href="https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/r3_24_maternal_safety_hap_9_6_19_final1.pdf">https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/r3_24_maternal_safety_hap_9_6_19_final1.pdf</a></p> <p>Wattie, L. (2019, January 21). <i>Postpartum hemorrhage: best practices to reduce health disparities</i> [PowerPoint Slides]. Association of Women's Health, Obstetric and Neonatal Nurses. <a href="https://california.awhonn.org/wp-content/uploads/2019/03/awhonn_wattie_pph_best_pract.pdf">https://california.awhonn.org/wp-content/uploads/2019/03/awhonn_wattie_pph_best_pract.pdf</a></p>	<p>Level VI</p> <p>Level VII</p> <p>Level VII</p>
Educate nurses on the maternal risk factors for post-delivery complications,	One study found that vaginal deliveries have a higher relative rate for maternal	<p>Wang E., Glazer, K. B., Howell, E. A., &amp; Janevic, T.M. (2020). Social determinants of pregnancy-related mortality and morbidity in the United States. <i>Obstetrics &amp; Gynecology</i>, 135(4), 896-915. <a href="https://doi.org/10.1097/AOG.0000000000003762">https://doi.org/10.1097/AOG.0000000000003762</a>.</p> <p>Young, C.B., Liu, S., Muraca, G., Sabr, Y.,</p>	<p>Level I</p> <p>Level IV</p>

specifically postpartum hemorrhage.	morbidity and mortality than women that delivered via an elective repeat cesarean section. Data from a systematic review demonstrated that the following factors increase a women's risk for morbidity and mortality: of an African American or Hispanic background, a lower education level, and the absence of insurance.	Pressey, T., Liston, R., & Joseph, K.S. (2018). Mode of delivery after a previous cesarean birth, and associated maternal and neonatal morbidity. <i>The Canadian Medical Association Journal</i> , 190(18), 556-564. <a href="https://doi.org/10.1503/cmaj.170371">https://doi.org/10.1503/cmaj.170371</a>	
Implement a postpartum hemorrhage risk assessment tool that assesses a patient's risk factors for postpartum	AWOHNN recommends using a risk tool on admission to determine if a patient is at risk for a hemorrhage	Wattie, L. (2019, January 21). <i>Postpartum hemorrhage: best practices to reduce health disparities</i> [PowerPoint Slides]. Association of Women's Health, Obstetric and Neonatal Nurses. <a href="https://california.awhonn.org/wp-content/uploads/2019/03/awhonn_wattie_pph_best_pract.pdf">https://california.awhonn.org/wp-content/uploads/2019/03/awhonn_wattie_pph_best_pract.pdf</a>	Level VII

hemorrhage on admission.	before their delivery and to determine any anticipatory interventions for the patient.		
Use quantitative methods to measure blood loss instead of estimating blood loss.	Blood loss can be incorrectly quantified when it is visually measured.	ACOG Committee Opinion No. 794: Quantitative blood loss in obstetric hemorrhage. (2019). <i>Obstetrics and gynecology</i> , 134(6), 150-156. <a href="https://www.acog.org/-/media/project/acog/acogorg/clinical/files/committee">https://www.acog.org/-/media/project/acog/acogorg/clinical/files/committee</a> Hire, M. G., Lange, E. M. S., Vaidyanathan, M., Armour, K. L., & Toledo, P. (2020). Effect of quantification of blood loss on activation of a postpartum hemorrhage protocol and use of resources. <i>JOGNN</i> , 49, 137-143. <a href="https://doi.org/10.1016/j.jogn.2020.01.002">https://doi.org/10.1016/j.jogn.2020.01.002</a>	Level VII  Level II
Administer oxytocin during the third stage of labor.	The duration of the third stage of labor was shorter for the group that received oxytocin before placental delivery.	Yildirim, D., & Ozyurek, S. E. (2018). Intramuscular oxytocin administration before vs. after placental delivery for the prevention of postpartum hemorrhage: A randomized controlled prospective trial. <i>European Journal of Obstetrics &amp; Gynecology and Reproductive Biology</i> 224, 47–51. <a href="https://doi.org/10.1016/j.ejogrb.2018.03.012">https://doi.org/10.1016/j.ejogrb.2018.03.012</a>	Level II
Perform uterine massage.	Included in the WHO initial response bundle for managing PPH. Uterine massage promotes	Althabe, F., Therrien, M., Pingray, V., Hermida, J., Gülmezoglu, A. M., Armbruster, D., Singh, N., Guha, M., Garg, L. F., Souza, J. P., Smith, J. M., Winikoff, B., Thapa, K., Hébert, E., Liljestrand, J., Downe, S., Garcia Elorrio, E., Arulkumaran, S., Byaruhanga, E. K., Lissauer, D. M., ... Miller, S. (2020). Postpartum hemorrhage care bundles to improve adherence to guidelines: A WHO technical consultation. <i>International</i>	Level VII

	contraction to reduce blood loss.	<i>journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics, 148(3), 290–299.</i> <a href="https://doi.org/10.1002/ijgo.13028">https://doi.org/10.1002/ijgo.13028</a>	
Assess airway, breathing, and circulation during a hemorrhage.	Included in the ACOG bundle. When postpartum hemorrhage occurs. Cumulative blood loss equal to or larger than 1000 ml or blood loss with signs of hypovolemia within 24 hours. Abnormal vaginal delivery bleeding greater than 500 ml.	American College of Obstetrics and Gynecology. (2015). <i>Managing Maternal Hemorrhage.</i> <a href="https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf">https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf</a>	Level VII
Obtain vital signs every 5 minutes, record cumulative blood loss every 5 to 15 minutes, and	Included in Stage one of the CMQCC Hemorrhage Management Plan when the patient	Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. (2015). <i>Improving health care response to obstetric hemorrhage.</i> California Maternal Quality Care Collaborative. <a href="https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit">https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit</a>	Level VII

weigh bloody materials.	experiences blood loss greater than 500 ml with a vaginal delivery and 1000 ml with a Cesarean delivery.		
Start a second large bore IV, at least 18 gauge.	Included in the ACOG bundle and CMQCC plan to expand fluid volume when excessive blood loss and hypovolemia occur.	American College of Obstetrics and Gynecology. (2015). <i>Managing Maternal Hemorrhage</i> . <a href="https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf">https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf</a> Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. (2015). <i>Improving health care response to obstetric hemorrhage</i> . California Maternal Quality Care Collaborative. <a href="https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit">https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit</a>	Level VII  Level VII
Use Lactated Ringers to replace blood at a 2:1 ratio.	Included in the ACOG bundle and CMQCC plan for the expansion of fluid volume for blood loss and hypovolemia.	American College of Obstetrics and Gynecology. (2015). <i>Managing Maternal Hemorrhage</i> . <a href="https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf">https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf</a> Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. (2015). <i>Improving health care response to obstetric hemorrhage</i> . California Maternal Quality Care Collaborative. <a href="https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit">https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit</a>	Level VII  Level VII
Administer isotonic crystalloids.	Included in the WHO initial response bundle	Althabe, F., Therrien, M., Pingray, V., Hermida, J., Gülmezoglu, A. M., Armbruster, D., Singh, N., Guha, M., Garg, L. F., Souza, J. P., Smith, J. M., Winikoff, B., Thapa, K., Hébert, E., Liljestrand, J., Downe, S., Garcia Elorrio, E., Arulkumaran,	Level VII

	for the expansion of fluid volume when excessive blood loss and hypovolemia occur.	S., Byaruhanga, E. K., Lissauer, D. M., ... Miller, S. (2020). Postpartum hemorrhage care bundles to improve adherence to guidelines: A WHO technical consultation. <i>International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics</i> , 148(3), 290–299. <a href="https://doi.org/10.1002/ijgo.13028">https://doi.org/10.1002/ijgo.13028</a>	
Administer medications for uterine atony: Oxytocin, Methylergonovine, Hemabate, and Misoprostol.	Included in the ACOG bundle, WHO initial response bundle, and CMQCC hemorrhage management plan. Uterotonics are given to stimulate the uterus to contract to decrease blood loss.	Althabe, F., Therrien, M., Pingray, V., Hermida, J., Gülmezoglu, A. M., Armbruster, D., Singh, N., Guha, M., Garg, L. F., Souza, J. P., Smith, J. M., Winikoff, B., Thapa, K., Hébert, E., Liljestrand, J., Downe, S., Garcia Elorrio, E., Arulkumaran, S., Byaruhanga, E. K., Lissauer, D. M., ... Miller, S. (2020). Postpartum hemorrhage care bundles to improve adherence to guidelines: A WHO technical consultation. <i>International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics</i> , 148(3), 290–299. <a href="https://doi.org/10.1002/ijgo.13028">https://doi.org/10.1002/ijgo.13028</a> <a href="https://doi.org/10.1002/ijgo.13028">https://doi.org/10.1002/ijgo.13028</a> American College of Obstetrics and Gynecology. (2015). <i>Managing Maternal Hemorrhage</i> . <a href="https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf">https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf</a> Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. (2015). <i>Improving health care response to obstetric hemorrhage</i> . California Maternal Quality Care Collaborative. <a href="https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit">https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit</a>	Level VII  Level VII  Level VII
Empty bladder with a straight or foley catheter.	Included in Stage one of the CMQCC Hemorrhage	Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. (2015). <i>Improving health care response to obstetric hemorrhage</i> . California Maternal Quality Care Collaborative.	Level VII

	<p>Management Plan when the patient experiences blood loss greater than 500 ml with a vaginal delivery and 1000 ml with a Cesarean delivery. A full bladder can result in uterine atony.</p>	<p><a href="https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit">https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit</a></p>	
<p>Early administration of Tranexamic Acid.</p>	<p>Included in the WHO initial response bundle for managing PPH. Tranexamic acid is an antifibrinolytic agent that reduces bleeding. The risk of death due to bleeding was reduced when women received tranexamic acid in a research study.</p>	<p>Althabe, F., Therrien, M., Pingray, V., Hermida, J., Gülmezoglu, A. M., Armbruster, D., Singh, N., Guha, M., Garg, L. F., Souza, J. P., Smith, J. M., Winikoff, B., Thapa, K., Hébert, E., Liljestrand, J., Downe, S., Garcia Elorrio, E., Arulkumaran, S., Byaruhanga, E. K., Lissauer, D. M., ... Miller, S. (2020). Postpartum hemorrhage care bundles to improve adherence to guidelines: A WHO technical consultation. <i>International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics</i>, 148(3), 290–299. <a href="https://doi.org/10.1002/ijgo.13028">https://doi.org/10.1002/ijgo.13028</a></p> <p>WOMAN Trial Collaborators. (2017). Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial. <i>The Lancet</i> 389, 2105-16. <a href="http://dx.doi.org/10.1016/S0140-6736(17)30638-4">http://dx.doi.org/10.1016/S0140-6736(17)30638-4</a></p>	<p>Level VII</p> <p>Level II</p>

<p>Activate Massive Transfusion Protocol</p>	<p>Included in the ACOG bundle for the treatment of excessive blood loss and hypovolemia. Also, included in the CMQCC management plan when total blood loss exceeds 1500 ml.</p>	<p>American College of Obstetrics and Gynecology. (2015). <i>Managing Maternal Hemorrhage</i>. <a href="https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf">https://www.acog.org/-/media/project/acog/acogorg/files/forms/districts/smi-ob-hemorrhage-bundle-poster-managing-maternal-hem.pdf</a></p> <p>Lyndon, A., Lagrew, D., Shields, L., Main, E., &amp; Cape, V. (2015). <i>Improving health care response to obstetric hemorrhage</i>. California Maternal Quality Care Collaborative. <a href="https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit">https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit</a></p>	<p>Level VII</p> <p>Level VII</p>
<p>Initiate the refractory PPH bundle is the patient continues to bleed after the initial response bundle. This includes aortic compression or bimanual uterine compression, intrauterine balloon tamponade, using a non-pneumatic anti shock garment, the continued</p>	<p>Included in the WHO refractory response bundle for managing PPH. The refractory bundle is initiated when bleeding continues despite previous interventions.</p>	<p>Althabe, F., Therrien, M., Pingray, V., Hermida, J., Gülmezoglu, A. M., Armbruster, D., Singh, N., Guha, M., Garg, L. F., Souza, J. P., Smith, J. M., Winikoff, B., Thapa, K., Hébert, E., Liljestrand, J., Downe, S., Garcia Elorrio, E., Arulkumaran, S., Byaruhanga, E. K., Lissauer, D. M., ... Miller, S. (2020). Postpartum hemorrhage care bundles to improve adherence to guidelines: A WHO technical consultation. <i>International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics</i>, 148(3), 290–299. <a href="https://doi.org/10.1002/ijgo.13028">https://doi.org/10.1002/ijgo.13028</a></p>	<p>Level VII</p>

administration of uterotonics, and a second dose of tranexamic acid.			
Team debriefing should occur after a postpartum hemorrhage and after postpartum hemorrhage training.	Debriefing allows the team to identify individual, team, and system process errors.	Wattie, L. (2019, January 21). <i>Postpartum hemorrhage: best practices to reduce health disparities</i> [PowerPoint Slides]. Association of Women’s Health, Obstetric and Neonatal Nurses. <a href="https://california.awhonn.org/wp-content/uploads/2019/03/awhonn_wattie_pph_best_pract.pdf">https://california.awhonn.org/wp-content/uploads/2019/03/awhonn_wattie_pph_best_pract.pdf</a>	Level VII

## Summary

One nursing specific intervention that a nurse can provide is patient education. Education allows mothers to develop an understanding of their condition and improves their ability to advocate for their own health. A series of studies assessed the current education practices nurses employ and then tested the use of a standardized tool to improve on the pre-existing education methods. The researchers found that postpartum education is not consistent between hospitals, and even between nurses working on the same units (Suplee et al., 2016a). After implementing the standardized POST BIRTH tool, the nurses in the study stated that their patients understood the material and could explain when they should report concerning postpartum symptoms (Suplee et al., 2016b).

Hospitals should also assess the readiness of their nurses to manage a postpartum hemorrhage emergency. One study found that nurses felt they did not always have the resources to manage a hemorrhage (Alwy Al-beity et al., 2020). Continual assessment of a maternity unit's readiness will allow the staff to vocalize what resources they need and if they feel ready to manage a postpartum hemorrhage. A key part of ensuring readiness involves staff education on the hemorrhage protocol and annual training drills (Joint Commission, 2019). Another significant aspect of ensuring readiness involves educating the nurses. Nurses should understand that vaginal deliveries and cesarean deliveries are different and pose unique risks for post-delivery complications (Young et al., 2018). Also, nurses should know that the social determinants of health directly influence a women's risk for morbidity and mortality (Wang et al., 2020). Educating nurses on the social factors that impact patient outcomes, such as race and education level, is a key aspect of reducing the present disparities within healthcare. Nurses can use their knowledge of hemorrhage risk factors by completing a risk assessment when a patient

is admitted. AWOHNN has even created a postpartum hemorrhage risk assessment tool that can be used when assessing patients for risk factors (Wattie, 2019).

The rest of the practice recommendations are related to the detection and treatment of postpartum hemorrhage. Several interventions can be implemented during every birth to reduce the likelihood of hemorrhages occurring. Administering oxytocin during the third stage of labor (Yildirium & Ozyurek, 2018) and performing uterine massage can be employed to actively manage the third stage of labor (Althabe et al., 2020). Measuring blood loss quantitatively instead of by estimation results in more accurate measurements, which leads to more accurate diagnosis and treatment (Hire et al., 2020). Ongoing quantification of blood loss throughout a hemorrhage is also an essential part of PPH management (Lyndon et al., 2015).

Nurses and other members of the healthcare team can collaboratively use treatment bundles developed by reputable organizations. During a hemorrhage, nurses should assess a patient's airway, breathing, and circulation (ACOG, 2015), obtain vital signs every five minutes, and ensure the patient has an empty bladder (Lyndon et al., 2015). ACOG and WHO also recommend the use of uterotonics like Oxytocin, Methylergonovine, Hemabate, and Misoprostol for managing a PPH (ACOG, 2015). Additional treatment interventions include starting a second large bore IV and replacing blood with Lactated Ringers at a 2:1 ratio (ACOG, 2015). The administration of Tranexamic Acid can also be used as a pharmacological treatment (WOMAN, 2017). If the patient continues to lose blood, massive transfusion protocol can be activated and treatments included in the refractory bundle can be initiated (bimanual uterine compression, intrauterine balloon tamponade, using a non-pneumatic anti shock garment) (Althabe et al., 2020).

Finally, a team debriefing should occur after the hemorrhage to allow for reflection on how well the team managed the hemorrhage and how they can improve in future hemorrhages (Wattie, 2019). Because nurses are a key part of the interprofessional team during a hemorrhage, they should be well versed in the current evidenced based practice recommendations for postpartum hemorrhage management. This will allow them to function as an effective member of the healthcare team. Because medicine is continually evolving, it is essential that nurses take the initiative to read the most up to date research and practice recommendations.

## Chapter 4

The previous chapters of this thesis explore the current professional organization guidelines and evidence related to postpartum hemorrhage prevention and management. Several best practice recommendations were created by synthesizing the evidence from research articles and guidelines from various organizations. Chapter four will focus on a proposed plan for implementing and evaluating the best practice recommendations. The model used for the proposed implementation and evaluation of the recommendations is the Plan-Do-Study-Act model (Institute for Healthcare Improvement, 2017).

The Plan-Do-Study-Act (PDSA) cycle is a tool that is utilized to document the testing of a change. The first step of the cycle is to plan a method for testing the change (Plan) and then the test is carried out (Do). The test can then be studied through observation, analysis, and learning (Study). Finally, any modifications that will be made to the next cycle should be determined (Act) (Institute for Healthcare Improvement, 2017). Overall, this cycle provides a useful framework for creating the proposed plan.

### **Plan**

The objective for this PDSA cycle is to test the proposed implementation of a nursing education session focused on best practice recommendations for postpartum hemorrhage management. The plan for the implementation and evaluation of the recommendations is to hold an education session for labor and delivery and postpartum nurses at Holy Cross Hospital in Nogales, AZ. The first step in coordinating this event is to contact the Unit Educator and Unit Manager about the education session. We would discuss where the session could be held and when the training should be held. The presentation will include an overview of the evidence

based literature and guidelines pertaining to postpartum hemorrhage management; however, the focus of the presentation will be an explanation of the best practice recommendations.

The participants will also be evaluated after the implementation of the presentation to test the effectiveness of the intervention. This will be completed with a pre and post-test evaluation. The test will include questions about the evidenced based recommendations in the presentation. Testing the participants on the recommendations before and after the presentation will allow for analysis of how the presentation impacted the post-test scores when compared to the pre-test scores. This will demonstrate if the nurses expanded their knowledge on postpartum hemorrhage management after the presentation. The prediction for the implementation of the education session would be that the participants would have a score improvement from the first test to the second test.

After the educational session a simulation of a postpartum hemorrhage will be conducted. By including a simulation in the education experience, the nurses will be able to practice the interventions they learned about in a more applied manner. The performance of the participants in the simulation will also be used to determine the effectiveness of the education session. Feedback from the participants after the simulation could also provide any additional information about the effectiveness of the education session. Nurses would have the chance to explain how they felt the information included in the session impacted their ability to complete the simulation.

## **Do**

The next stage of the proposed testing cycle would involve actually having the presentation at Holy Cross Hospital at the decided upon place and time. The participants will take the pre-test, attend the presentation, and participate in the simulation. The participants will

then take the post-test and provide feedback on how the information affected their simulation experience. The data from the tests and the feedback will be collected for later analysis.

Throughout the session, any issues or unexpected observations will also be documented.

### **Study**

This portion of the cycle will focus on analyzing the data and the feedback. The pre-test and post-test scores will be compared to determine if there is a significant difference in the two scores. The tests results will be used to determine if the predicted outcome, an improvement in test scores, was correct. Furthermore, an overall improvement from the first test to the second test would indicate that the teaching session was effective and that the participants expanded their knowledge on postpartum hemorrhage treatment interventions. The data from the simulation can also be included to determine the effectiveness of the interventions. The feedback from the simulation would also be categorized to determine if any underlying themes were common in the comments the participants provided. The themes could guide future changes in the implementation of the education session.

### **Act**

The final stage of the PDSA cycle emphasizes the evaluation and modification of the tested intervention. The test data and the simulation performance data would determine if the education session was effective and if the education cycle should be modified. For instance, if the participants found a component of the session unhelpful, then this component could be removed in the future. Positive feedback would influence what aspects of the education would remain the same. Ultimately, the evaluation of the education session is essential for determining if the intervention is effective and beneficial for the participants.

## Summary

The dissemination of the evidence based best practice guidelines is an essential part of providing nurses with information on the current professional guidelines and evidence-based findings related to postpartum hemorrhage management. The PDSA cycle is an effective framework for implementing and testing if the method for sharing the recommendations allows the participants to understand and learn about the recommendations. Although hosting an education session allows for nurses to learn more about postpartum hemorrhage management, this set of guidelines does not portray a comprehensive overview of everything the nurses should know. The best practice recommendations demonstrate interventions for managing a PPH and convey the significance of nurses continuing to learn about postpartum hemorrhage management throughout their careers. Overall, nurses can learn more about hemorrhage management and provide quality patient care if they continue to seek out updated journal articles and professional guidelines on a regular basis and continue to practice in simulation trainings.

## References

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