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Implementation and Evaluation of the Quantification of Blood Loss and Postpartum Hemorrhage Education

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IMPLEMENTATION AND EVALUATION OF THE QUANTIFICATION OF BLOOD LOSS AND POSTPARTUM HEMORRHAGE EDUCATION

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An Abstract of the Scholarly Project by
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Postpartum hemorrhage (PPH) is an obstetric emergency that can lead to maternal morbidly and mortality. The literature consistently shows that numerous maternal deaths related to PPH are preventable. The significant contributors identified to maternal deaths from PPH include deficient education obstetrical nurses have on PPH, delayed recognition, and miscalculations of blood loss. After completing a literature review on the current PPH practice and determining the current method of estimation of blood loss (EBL) to be inaccurate, obstetric nurses at a rural, southeast Kansas hospital were educated on PPH to improve recognition and determine cumulative blood loss more accurately by the method of quantification. This study utilized a one-group pretest-posttest design to determine the knowledge gained on PPH and the technique of quantifying blood loss (QBL) after an educational program. A PPH cart was created and navigated to help the nurses calculate QBL and prevent delays in PPH management. The nurses completed a six-week postimplementation survey to determine how the education program affected their knowledge and skills regarding PPH, QBL, and the PPH cart. According to the findings, the study indicated the education program over PPH improved PPH knowledge and skills to quantify blood loss. The results determined the PPH cart was beneficial in performing QBL and the management of PPH. In conclusion, the educational program and conversion from estimation to the quantification of blood loss could ultimately decrease maternal morbidity and mortality.

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Chapter I

Description of the Clinical Problem

Childbirth has been a potential danger to the mother and infant, for nearly all of history. However, in recent years, despite the advances in technology and the decrease in fertility rate, the rate of maternal deaths has increased worldwide. According to the Association of Women's Health, Obstetric, and Neonatal Nurses [AWHONN] (2015), "Approximately half of the maternal deaths have been determined to be preventable" (p.1).

The Centers for Disease Control and Prevention [CDC] (2020) defines maternal mortality as the, "death of a woman while pregnant or within one year of the end of a pregnancy – regardless of the outcome, duration or site of the pregnancy–from any cause related to or aggravated by the pregnancy or its management." In fact, in the United States alone, two to three women die per day from childbirth complications (World Health Organization [WHO], 2019). The CDC (2020) researched the trends of maternal mortality from 1987 to 2015. In 1987, only 7.2 deaths occurred per 100,000 births. The trend has steadily risen to a maximum of 17.2 per 100,000 live births in 2015 (CDC, 2020). From 2011-2015, the CDC (2019) identified ten leading causes of maternal mortality. Of all the maternal death causes, postpartum hemorrhage (PPH) was the 3rd leading cause accounting for 11.2% of all maternal deaths.

PPH is an obstetric emergency with life-threatening consequences. PPH related maternal deaths account for 35% of those childbirth complications (Belfort, 2021). The incidence of PPH varies; however, Belfort (2021) estimates 1% to 5% of deliveries result in a PPH. The CDC researched the trends of the incidence of PPH per 10,000 births from 1993-2014. In 1993 the PPH rate was only 4.3%, compared to 21.2% in 2014 (CDC, 2019). According to AWHONN (2015), the United States is one of the only countries in which the maternal death rate and injuries have increased.

Although PPH is a leading cause of maternal death, not all PPH result in death. PPH can lead to severe complications that can create both short- and long-term effects. Significant complications of PPH include hysterectomy, disseminated intravascular coagulation (DIC), and blood transfusions. The CDC investigated PPH resulting in blood transfusions. In 1993, 7.9% of PPH resulted in a blood transfusion, compared to 39.7 in 2014 (CDC, 2019). The majority of PPH related complications result in more extended hospitalization. As a result, women are faced with higher medical bills and potential residual factors. On average, a birth complicated by a PPH is nearly double the cost of an uncomplicated delivery (Pourat et al., 2013).

Significance of the Problem

PPH occurrence and PPH related deaths continue to be a leading cause of maternal mortality, despite the advances in technology and identified preventable measures (AWHONN, 2015). A major contributor to the maternal deaths from PPH is deficiencies in the education of obstetrical staff regarding PPH, delayed recognition, and miscalculations of blood loss. In a study conducted in the Unites States from 2000-2008,

Didly (2018) found that 73% of the PPH deaths were avoidable if proper postpartum care and accurate blood loss was determined.

According to ACOG (2017), the inaccurate measure of blood loss is where the problem lies after delivery. Failure to recognize blood loss after delivery results in delayed treatment and unsatisfactory outcomes (AWHONN, 2015). As a result, correctly determining blood loss after delivery is a crucial step to prevent the cascade of adverse outcomes of PPH.

The project site has two labor and delivery rooms, five postpartum rooms, and one operating room. The department has two obstetric and gynecologist providers who deliver approximately 200 births per year. At the project site, approximately 7% of deliveries resulted in a PPH in the last calendar year. Also, there has been incidence of mothers receiving blood before discharge; however, they were not diagnosed with a PPH. According to AWHONN (2015), failure to recognize excessive blood loss during childbirth is a leading cause of maternal morbidity and mortality.

Specific Aims/Purpose

The aims of the projects were designed to addresses the leading contributors related to PPH. First, the project was designed to educate the obstetric nurse's knowledge on PPH and QBL. Currently, the target facility uses the technique of estimation of blood loss (EBL) to determine blood loss after delivery. EBL has been used as a common practice in labor and delivery due to its convenience and simplicity (Evenson et al., 2017).

However, research from as early as the 1960's has found that EBL is inconsistent when measuring blood loss. Brant (1967) conducted a study to determine the accuracy of

EBL. In the study, EBL was calculated at each delivery. After EBL was determined, blood was wiped off the floor, and saturated materials were filtered using a centrifuged technique. The researchers then subtracted the weight of the materials from the total weight, similar to the methods used today. In one delivery, the obstetrician determined the blood loss to be 900 milliliters using the EBL technique. However, after the blood was collected, the cumulative amount was 2307 milliliters, and the mother required a blood transfusion (Brant, 1967).

Similarly, Dildy et al. (2004), conducted a study to determine if teaching clinical health estimation of blood loss improves accuracy. The authors concluded that blood loss of fewer than 300 ml results in overestimation. The two studies discussed above, determined smaller volumes of blood loss result in overestimation whereas larger volumes of blood loss result in underestimation (Brant, 1967; Dildy et al., 2004). Miscalculations can be due to amniotic fluid, stool, materials, and clinician error (AWHONN, 2015).

Regardless, both overestimates and underestimates of blood loss directly affect the patient. As a result, the purpose of the project was to educate the participants on the current evidence-based practice guidelines regarding PPH and the quantification of blood loss (QBL) and the implementation of QBL into practice. The gap in obstetric practice is the inconsistency and inaccuracy of calculating maternal blood loss. According to CMQCC (2018), clinicians underestimate blood loss 33-50% of the time. As a result, this project aimed to improve the accuracy of measuring blood loss at the target facility.

Due to the inconsistencies of EBL, the labor and delivery nurses and postpartum staff at the target facility were enrolled in an educational program regarding the

calculation of QBL and PPH. Since the obstetricians currently determine EBL, the obstetric nurses must be knowledgeable and acquire skills in order to assist the obstetrician in correctly identify blood loss. During the educational program a PowerPoint included the current evidence-based practice guidelines regarding PPH prevention, identification, and management. Also, the difference in the current practice of EBL versus QBL was explained.

After the educational lesson, the participants navigated through the PPH cart. According to CMQCC (2018), all labor and delivery units should be equipped with a PPH cart or tray for assisting in calculating QBL and to prevent delays in PPH management. The purpose of the PPH cart was to assist nurses when managing and calculating blood loss. The cart was assembled with equipment and instruments necessary to perform QBL and manage a PPH. In addition to equipment, the facility's PPH policy, algorithm, and posters were easily accessed within the cart. Although treating a PPH is not the purpose of this project, medications were available to manage a PPH. Time was allotted for each participant to visualize and become acquainted with the location of the cart that was placed on the obstetric unit floor.

An EBL versus QBL station was set up. The obstetric nurse first visualized the blood loss and determined the amount by estimation. After determining the EBL, the participant weighed the saturated materials to determine QBL. Measuring the same materials with both techniques allowed the participant to further recognize the inconsistently in the current practice of EBL.

Finally, six weeks after implementation the participants were given a questionnaire to complete that addressed their perception of PPH and QBL

implementation. After completion of the education lesson, QBL was recommended for all births to replace the current practice of EBL.

Theoretical Framework

Research and theory are the foundation of nursing practice (Saleh, 2018). According to Saleh (2018), the knowledge from research that is built on theory assists in improving and identifying gaps in practice. Two theories have been utilized as a framework for the project. The theories utilized are Lewin's Change Theory and Bandura's Social Learning Theory. Using these theories as a framework for the project is pivotal for successful implementation and a step towards closing the gap of miscalculation of postpartum blood loss.

Lewin's Change Theory

Lewin theorizes his three-stage model of unfreezing-change-refreeze is necessary prior to learning and for successful implementation of change (Petiprin, 2020). The theory has three major concepts including driving forces, restraining forces, and equilibrium. The theory begins with unfreezing, which allows one to let go of an old habit or process. The change stage is the process of changing where the individuals works through their thoughts and behaviors. During the change theory, the obstetric nurse will become comfortable with performing QBL and implement at delivery. The final stage, refreezing, is creating a new standard such as using QBL techniques to perform blood loss.

Bandura's Social Learning Theory

Bandura (1977) theorizes that an individual's response to situations improves

subconsciously by consequences. However, he recognized an individual's behavior is further reinforced through repetition and observation. As a result, Bandura created the Social Learning Theory. The theory suggests that individuals learn by direct experience and by observing others (Bandura, 1977). The theory is based on four learning principles, including attention, retention, reproduction, and motivation. Bandura's theory applies to the project because the obstetric nurses were educated by watching a PowerPoint. The principal of attention in the theory suggests the learner must be focused on the topic to gain knowledge. The importance of implementing QBL was relayed early in the presentation to gain the attention of the learner. Next, the retention principle suggests that for the learner to perform a task, they must have a memory of it. Administering a pre-test and post-test determined the retention of the learner and determine if further education is needed. After the learner can recall the information, the principal reproduction must be mastered. According to Bandura (1977), retention is achieved by reproducing an action repeatedly. The learner retained the learning by calculating QBL at each delivery. The final principle, motivation, is once the learner can perform a task, the results are rewarding. After the project was implemented, the obstetric personnel were able to effectively calculate QBL to assist in the missed and underdiagnosed PPH.

Project Questions

Due to the project's significance and multiple steps of data collection, there were two project questions evaluated.

1. Does the administration of a PPH and QBL educational program improve the obstetrical nurse's knowledge?

2. Does the administration of a PPH and QBL educational program improve the comfortability with PPH and successful implementation of QBL?

Definition of Key Terms

Primary postpartum hemorrhage: A condition in which a woman has a blood loss greater than 500 ml within 24 hours after birth (World Health Organization, 2019).

Secondary postpartum hemorrhage: Any significant uterine bleeding occurring between 24 hours and 12 weeks postpartum (Belfort, 2021).

Severe Postpartum hemorrhage: Blood loss greater than or equal to 1000 ml within 24 hours (World Health Organization, 2019).

Prolonged labor: When labor exceeds 20 hours in nulliparous women and 14 hours in multiparous women (ACOG, 2017).

Uterine atony: When the uterus fails to effectively contract after delivery, resulting in
excess bleeding (Belfort, 2021).

Estimation of blood loss: The subjective measurement of blood loss by visual examination only (CMQCC, 2018).

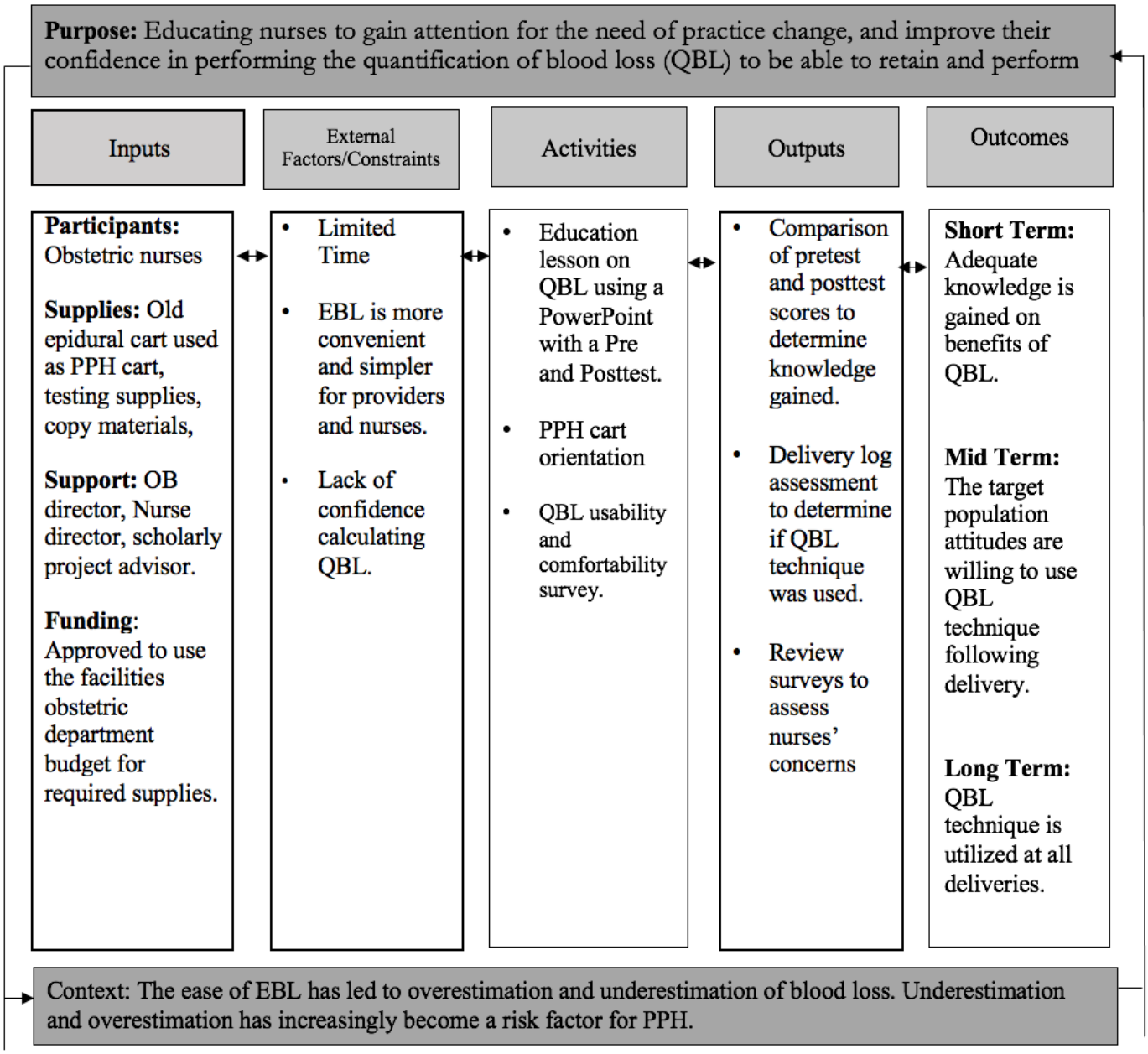
Quantification of blood loss: An objective method used to evaluate obstetric bleeding
using volume and weight-based measurements (CMQCC, 2018).

Third stage of labor: The interval from delivery of the infant to expulsion of the placenta (Belfort, 2021).

Atonic postpartum hemorrhage: The failure of the uterine myometrium to contract after delivery resulting in excessive blood loss (Belfort, 2021).

Nonatonic postpartum hemorrhage: The uterus myometrium remains contracted; however, there is excessive blood loss (Belfort, 2021).

Figure 1. Logic Model



The logic model presented above is a visual depiction of the quality improvement project. The model represents the relationship between the inputs, external factors, activities, outputs, context, and intended outcomes.

Summary

PPH has been identified as a leading cause of maternal mortality. As discussed, a significant contributor to PPH is the inaccurate measurement of postpartum blood loss. Researchers have determined overestimation and underestimation can lead to unsatisfactory outcomes. As a result, the obstetric nurses at the project site were educated on the technique of QBL, following delivery. Also, a PPH cart was created to assist the staff in calculating QBL and managing PPH. To evaluate the effectiveness of the project, the participants took a pre-test and post-test, questionnaire, and skill check off.

To assist in the implementation of the project, Banduras' Social Learning Theory and Lewin's change theory were utilized as the theoretical framework. The Social Learning Theory provides that through repetition and observation, a person's behavior is reinforced. Lewin's change theory assists in implementing the practice change of QBL in all vaginal deliveries. In addition to the theories, the researcher utilized the logic model to assist in planning, organizing, and evaluating of the project.

Overall, the goal of the quality improvement project was to improve the participants knowledge regarding PPH and QBL and implement the QBL technique in all vaginal deliveries. By improving the participants knowledge and implementing QBL into practice, postpartum blood loss will be calculated more accurately and hopefully contribute to decreasing the overall maternal mortality rate.

Chapter II

Review of Literature

A review of the literature on PPH and blood loss measurement was necessary to educate and assess the implementation of the objective measure of blood loss. The purpose of the research was to examine the effectiveness of the education and the obstetric nurse's ability to compute accurate measurements. Due to the continual rise in maternal mortality, there has been continued research on the subject. Since PPH has been identified as a significant contributor, many research studies have been conducted and published on a variety of topics to reduce PPH. An extensive literature search was conducted using the following databases: MEDLINE, PubMed, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) complete, provided by Pittsburg State University's Axe Library. Additional secondary resources used were the American College of Obstetricians and Gynecologists (ACOG) and AWHONN. Key terms and phrases utilized during the literature search include PPH, prevention, treatment, risk factors, interventions, education strategies, blood loss, and quantitative. The search was limited to the English language and full-text articles.

The literature review is broken into several segments. The concepts reviewed in the literature review include an overview of PPH hemorrhage addressing risk factors, identification, treatment, and prevention. After reviewing PPH itself, a more detailed

review of the measurement of blood loss was completed to assist in implementing the process accurately. Finally, research regarding staff education strategies was reviewed in order to educate the obstetric nurses successfully.

Postpartum Hemorrhage

As stated in the introductory chapter, PPH is an obstetric emergency and a leading cause of maternal mortality, accounting for 35% of maternal-related deaths (Belfort, 2021). Although research has identified PPH is occurring in only 1% to 5% of deliveries, most PPH has been determined to be preventable.

Different types of PPH were defined in the introductory chapter. The kinds of PPH include primary and secondary. Primary and Secondary PPH are further broken down into vaginal versus cesarean delivery. ACOG (2017) has identified primary PPH, occurring before birth or within 24 hours of birth, as the most common type of hemorrhage. Although the obstetric nurses may utilize the skills with a secondary PPH, the majority of the education was aimed at primary PPH. In addition to PPH types, some classes have been defined to assist nurses to further classify the hemorrhage. PPH stages are listed below (Belfort, 2021).

- Stage 0 – Every woman in labor/giving birth.
- Stage 1 – Blood loss >500 mL vaginal delivery or >1000 mL cesarean delivery or change in vital signs (by >15 percent **or** heart rate ≥110 beats/minute, blood pressure ≤85/45 mmHg, O2 saturation <95 percent).
- Stage 2 – Continued bleeding with total blood loss <1500 milliliters.

- Stage 3 – Total blood loss >1500 mL or transfusion of more than two units packed red blood cells or unstable vital signs or suspicion of disseminated intravascular coagulation.

In addition to women losing their lives, PPH is an economic burden and contributing to increased healthcare. According to the California Maternal Quality Care Collaborative (2018), the average cost of an uncomplicated vaginal delivery is $5,000. However, when a woman experiences a PPH, she generally has a longer length of stay, resulting in higher medical bills. Marshal et al. (2017) conducted a study to determine if PPH affected hospital stay length. The researchers collected data from the National Inpatient Sample (NIS), which allowed them to have a large sample size. When examining the data, Marshal et al. (2017) determined that hospital length of stay varied depending on the PPH cause. The lengths of stay were noted greatest among nonatonic PPH at 3.56 days. Next, atonic PPH length of stay was 2.98 days. However, regardless of the cause of PPH, the researcher determined PPH lengthened the hospital stay compared to mothers who do not experience a PPH. Due to the increased length of hospital stay, Marshal et al. (2017) estimated that PPH increases obstetric healthcare by $106.7 million each year. As a result, early diagnosis and treatment can reduce the significant societal and cost burdens of this condition and prevent some maternal mortality due to maternal hemorrhage.

To calculate blood loss correctly, the nurse must first understand PPH, including risk factors, causes, prevention, and PPH treatment. The literature review further investigates PPH to identify the topics listed to assist in educating the staff and supporting the scholarly project's importance.

Risk Factors

The risk for a PPH is high due to the increase in uterine artery blood flow. During the third trimester of pregnancy, the uterus' blood flow increases to 500 to 700 ml/min (Belfort, 2021). As a result, the uterine blood accounts for nearly fifteen 15% of the woman's cardiac output. Once the placenta is detached, this concludes the 3rd stage of labor (Belfort, 2021). Typically, bleeding is controlled by a homeostatic mechanism. These mechanisms include contraction of the myometrium and local decidual hemostatic factors that cause clotting (Evenson et al., 2017). A failure of either mechanism can result in a PPH. Additional risk factors that can cause a homeostatic mechanism failure include maternal obesity, smoking, chorioamnionitis, multiple gestations, preeclampsia, prolonged labor, augmented labor, maternal anemia, previous uterine incision, uterine inversion, infection, and primiparity (Belfort, 2021). Recently, there has been an investigation to assess racial-ethnic differences in the prevalence of PPH. Sabato et al. (2020) conducted a study on 6,517 deliveries. After the nationwide data was examined, black women were identified as having a higher rate of PPH (Sabato et al., 2020). After controlling for risk factors previously listed, the researchers reported the PPH rate for black women was 9.7% compared to white women at 6.2% and Asian mothers at 4.4%. Sabato et al. (2020) concluded black mothers are at higher risk for experiencing a PPH. Although risk factors have been identified to place a woman at higher risk for PPH, 20% of PPH occurs in women without any stated risk factors (Evenson et al., 2017). As a result, every delivery should be managed in the instance that a PPH is possible.

Tool kits are available for facilities to determine the risk to the mother. The California toolkit is the most widely used assessment tool used in hospitals across the United States. The tool kit places mothers into low, medium, and high risks (AWHONN,

2015). In doing so, the nurse and physicians are aware of the risks, and information can be quickly passed on throughout the entire department.

Causes

Research has been conducted and has identified significant causes of PPH. Evenson et al. (2017) discuss four T's pneumonic devices for PPH causes. The four T's include Tone, Trauma, Tissue, and Thrombin. Although these are the significant causes of PPH, the reason is not limited to these categories. Regardless of the origin of PPH, many can be avoided by taking preventative measures.

Tone

According to the ACOG (2017), tone refers to uterine atony, which accounts for approximately 70% to 80% of PPH. Uterine atony results in PPH when the myometrium fails to contract during the third stage of labor (Belfort, 2021). Risk factors that can contribute to poor uterine tone include prolonged labor, induction of labor, continued use of oxytocin, chorioamnionitis, multiple gestations, polyhydramnios, and uterine leiomyomas (ACOG, 2017). To assess uterine tone, the nurse or physician should palpate the fundus every fifteen minutes for the first two hours following delivery. If the uterus is found poorly contracted (boggy), this is suggestive that the causative factor of excessive bleeding is due to uterine atony (ACOG, 2017). The treatment of uterine atony will be further discussed later in the paper.

Trauma

Trauma is the second leading cause of PPH, which accounts for approximately 20% (AWHONN, 2015). Trauma includes laceration, hematomas, uterine inversion, and uterine rupture (ACOG, 2017). Hematomas should be suspected with a precipitous

delivery or delivery where an episiotomy was cut. According to Evenson et al. (2017), a physician should avoid Episiotomy unless urgent delivery is necessary.

Uterine inversion occurs when the uterine fundus collapses into the endometrial cavity. As a result, the uterus partially or entirely turns inside out. When a uterine inversion occurs, the uterus appears bluish gray in color and is protruding from the vagina (Evenson et al., 2017). Although uterine inversion only occurs in approximately 0.04% of deliveries, it is an obstetric emergency and leads to PPH quickly. Treatment of uterine inversion is manually replacing the uterus to its correct position (Belfort, 2021).

Uterine rupture is a spontaneous tearing of the uterus before or after delivery (ACOG, 2017). Risk factors of uterine rupture include previous uterine incision, prolonged labor, macrosomia, multiple gestations, abnormal placentation, and a short interval between pregnancy (Belfort, 2021). The highest incidence occurs in woman who has had a previous uterine incision.

Tissue

The third T, tissue, refers to retained placental or blood clots, which accounts for 10% of PPH. A retained placenta is a failure of expulsion within 30 minutes (AWHONN, 2015). When the placenta or fragments of the placenta are retained, the uterus cannot contract enough to maintain tone (Belfort, 2021). As a result, "tissue" ultimately leads to "tone" in the four T pneumonic. A trained professional should examine the placenta to ensure the placenta is intact to prevent this type of PPH (ACOG, 2017).

Thrombin

The fourth T, thrombin, refers to coagulation defects. Inherited or acquired

coagulation problems only account for 1% of PPH. According to Belfort (2021), acute coagulopathies are due to HELLP syndrome, placental abruption, and amniotic fluid embolism. PPH resulting from coagulation defects should be suspected when the patient has not responded to other measures or is oozing from puncture sites (Evenson et al., 2017).

Identification and Prevention

As stated previously, nearly half of PPH related deaths have been determined to be preventable. As a result, prevention is critical when educating the staff at the target facility. Prevention should begin on admission, regardless of gestational age. First, the risk factor tool should be utilized to identify potential risk factors and place the mother in low, medium, or high risk.

The nurse and physician should be aware of the patient's baseline laboratory findings and vital signs (Belfort, 2021). A baseline can be determined by collecting a complete blood count before delivery. After delivery, a complete blood count can be performed to assess the significance of the blood loss. Vital signs can also be an indicator of excessive blood loss. Low blood pressure and high pulse rate are indicative of hypovolemic shock.

As stated previously, uterine atony is the leading cause of PPH. After delivery of the baby, the myometrium of the uterus normally contracts to expel the placenta. Once the placenta detaches, uterine contractions are required to compress the blood vessels where the placenta was previously attached. The failure of this mechanism results in increased bleeding due to the failure of constricting the blood vessels (Belfort, 2021).

The literature is consistent with monitoring fundal height, firmness, and blood flow every fifteen minutes following delivery to prevent and identify a PPH.

Pharmacological prevention medications include the administration of oxytocin, misoprostol, and methergine to prevent PPH. According to Evenson et al. (2017), the use of uterotonic drugs alone decreases PPH's risk by 50%.

Treatment

Medications for the prevention of PPH are also used in the treatment. According to Belfort (2021), the first line drug for postpartum is Oxytocin. In the literature, doses of Oxytocin administration vary from 10-30 milliunits depending on obstetrician preference and training. After the Oxytocin administration, several second-line treatment options are dependent on patient history and hemorrhage status. If the bleeding is controlled with Oxytocin, Misoprostol can be administered buccally, orally, or rectally. The literature is consistent that Misoprostol alone is not as effective as Oxytocin in the prevention of PPH. However, the studies that have been conducted show that the combination of Oxytocin plus Misoprostol is more effective than either medication used alone (Khezri & Hamiden, 2015). Additional second-line therapies include Methergine and Carboprost. These options are used if Oxytocin is unavailable or is unsuccessful. Before second-line treatment is administered, other factors potentially causing excess bleeding should be determined (Evenson et al., 2017). There is varying research on second-line treatment options. Both medications appear to be successful for PPH treatment and are selected based on obstetrician preference.

Although uterotonic medications are the mainstay treatment for PPH, uterine massage effectively treats uterine atony (Belfort, 2021). As discussed previously, the

obstetrical nurse should palpate the uterine fundus every fifteen minutes following delivery. If the fundus is noted to be boggy, fundal massage is performed. The diagnosis of uterine atony is made by increased bleeding and palpation of a boggy uterus. When these two-assessment findings are positive, fundal massage should be initiated until the uterine tone is maintained. By performing the uterine massage, the nurse or provider is stimulating the atonic uterus to contract by prompting the release of prostaglandins (Belfort, 2021). Fundal massage for uterine atony is consistent across the literature.

Measurement of blood loss

Blood loss during and after delivery is an essential component of PPH diagnosis and early intervention. The World Health Organization (WHO) (2019) standard for measuring blood loss is a visual estimation. However, multiple sources noted failure to recognize excessive bleeding is a leading contributor to maternal mortality. During the infant and placental expulsion, the physician can use calibrated drapes or containers to assist in determining estimated blood loss. However, according to AWHONN (2015) using visual techniques alone can underestimate blood loss by 33% to 40%.

The recent literature has investigated new techniques to determine blood loss following delivery and found superior techniques. ACOG (2017) examines numerous studies comparing estimation versus quantitative methods. During their investigation, they determined quantitative methods were superior to visual estimation. As a result, ACOG (2017) recommends and reports the transition from blood loss estimation to quantifying is necessary to identify blood loss more accurately.

The literature was consistent that the use of calibrated drapes previously used to estimate blood loss should be continued. However, along with calibrating drapes,

AWHONN (2015) recommends measuring the pad's total weight with blood and subtracting the amount of a dry pad. The difference in weight in grams is equivalent to the volume of blood in millimeters. According to Dildy (2018), visuals aids are an unreliable measure to determine blood loss. The authors suggest using the formula 0.75 x {[maternal height (inches) x 50] + [maternal weight in pounds x 25]}) by percent of blood volume lost ({predelivery HCT - postdelivery HCT}/predelivery HCT) to determine blood loss. Not only can the inaccurate measure of blood loss delay lifesaving measures, but it also can result in overestimation and unnecessary, costly treatment (AWHONN, 2015). Although visual estimation of blood loss is the most widely used practice, the literature is consistent that it is inaccurate.

Staff Education Strategies

According to Xu (2016), an essential component of effectively educating nurses is selecting an appropriate teaching strategy. When selecting a plan, it should be beneficial and account for visual, auditory, and tactile learners (Wolters Kluwer, 2018). Also, the educational lesson should be presented in a way that reflects real situations that can be transitioned into nursing practice (Wolters Kluwer, 2018). By selecting a strategy that addresses all learning styles and is realistic, it will help the learner improve care and patient safety.

The healthcare system is complex and requires continued education throughout one's career. As a result, effective teaching strategies have been researched. The literature presents a variety of methods when educating nursing staff. Each method has varied advantages and disadvantages, which is explored in this literature review. When conducting the literature review, three main themes were identified with numerous

subthemes. The broad themes include teacher-centered learning and student-centered learning.

Regardless of which learning style is used, the literature is consistent with the level of knowledge of learners should be identified. This can be done through surveys or in order to educate them effectively. Resource availability such as mannequins and finances should all be gathered and discussed. After the resources are identified, the overall outcome should be determined by creating objectives. The measurable objectives can be broad or specific, usually a combination of both. Finally, an evaluation should be completed to identify the knowledge gained.

Teacher Centered Learning

Teacher centered learning is considered a traditional approach to education. The teacher operates as the primary focus of learning in the classroom through lectures and presentations. According to Xu (2016), the most common teaching strategy is the lecture format. Also, in teacher-centered learning, students primarily work independently. The benefit to teacher-centered education is that it is cost-effective, and information in large doses can be presented in a short amount of time. If students have questions, those can be answered promptly at the appropriate time. Kordi et al. (2016) conducted a study to compare three learning styles related to PPH. The researchers randomized 105 students into three different groups, including web-based, simulation-based, and conventional training. After the PPH training, the researchers found all three training methods increased the accuracy of PPH estimation; however, there was no significant difference between the three groups. The research conducted by Kordi et al. (2016) supports that although lecture format is one of the oldest forms of education, it is still an effective

teaching strategy in nursing. Although teacher-centered learning is useful, there are drawbacks as well. First, teacher-centered learning reduces collaboration. It does not allow students to practice communication skills, which is a high priority in any nursing profession (Xu, 2016). Finally, since students are not actively involved in the learning, important information may be missed.

Student Centered Learning

In student-centered learning, the instructor is still an authority; however, their primary role is the facilitator to process knowledge. The experience of learning is shared, which allows for students to become active participants (Baron, 2017). Research has shown that since the students are actively involved, they can build communication and collaboration skills (Xu, 2016). There are several types of student-centered learning identified in the literature.

Problem-based learning has been adopted into student learning styles. The technique is for students to engage in learning that is problem-based versus subject-based (Xu, 2016). Research studies have compared problem-based learning versus lecture format. Although students' short-term knowledge appears the same, the retention of knowledge is more significant for students who experience problem-based learning (Baron, 2017).

Another student learner strategy is with the use of simulation. Nelson and Staggers (2018) define simulation as "The use of one for more typologies to promote, improve, and or validate a participant's progression from novice to expert." The use of simulation has continued to emerge as a safe and effective way to train health care professionals. Simulations can be used as a learning technique and can also be great

evaluation tools (Jeffries et al., 2015). A study was conducted by The National Council of State Boards of Nursing examining the knowledge and clinical competency of students with varying clinical time and simulation. Hayden et al. (2014) studied nursing students at ten different schools during their program and six months after. Three groups were created. The groups were as followed: 10% of clinical time was replaced by simulation, 25% of clinical time was replaced by simulation, and 50% of clinical time was replaced by simulation. The authors determined their results from NCLEX pass rates and competency exams. The authors found no significant differences among the three groups through their results, which indicated replacing clinical hours with simulation can be useful in educating health care professionals.

The literature presented for student-centered learning fits the Bandura's Social Learning, which was utilized in the DNP project. The learning style supports the nurses will learn by direct experience and observing co-workers. Also, it allows the nurse to improve performance, which will result in gained self-confidence. As a result, student-centered learning education strategies were implemented in this DNP project to educate staff.

Summary

The chapter focused on the evidence-based literature on PPH, blood loss calculation techniques, and teaching strategies to implement the information. The literature has indicated that PPH is a leading cause of maternal morbidity and mortality. Early recognition and identification are vital in reducing poor patient outcomes. The lack of education on PPH and inaccurate blood loss calculation contributes to maternal morbidly and mortality. The literature identifies the objective measurement of blood loss

as an effective and accurate way to determine postpartum blood loss when taught through student-centered teaching strategies. Chapter III will review the methodology of the scholarly project.

Chapter III

Methodology

Lewin's Change theory was utilized throughout the project to assist in implementing the quantification of blood loss (QBL). The first stage of the theory, unfreezing, had to occur by determining the need for change and assisting the participants in understanding the necessity of practice change (Petiprin, 2020). The inaccurate measurement of blood loss following delivery contributes to the increase in maternal morbidity and mortality. Obstetricians are generally not present during the critical postpartum period. As a result, there was a need to implement QBL to allow obstetric nurses to contribute to blood loss measurement after delivery, recognize a postpartum hemorrhage, and act to control the blood loss. According to Bandura's social learning theory, the participant will absorb an action through attention, retention, motivation, and motor reproduction (Bandura, 1977). This project aimed to educate the participants to gain attention for the need for practice change and improve their confidence in QBL to retain and perform. A PPH cart was created to assist in measuring blood loss and for supplies to be readily available for treatment of a PPH. A skills lab allowed the participant to first estimate blood loss of saturated materials followed by weighing the materials to recognize the inconsistency of EBL. The literature review supported the need

to develop a consistent practice to improve PPH outcomes and provided jurisdiction for the project. This chapter outlines the project design and methods utilized in the project.

Project Design

This study compared the obstetrical nurse's knowledge gained on PPH and performing QBL and attitudes towards implementation. The data was gathered from a pretest and posttest design and a post-implementation survey to determine attitudes and the QBL performance.

Before the educational lesson, each participant was given an unlabeled packet that included a numbered pretest and posttest. The pretest was completed before the educational lesson, which included ten multiple-choice questions. The project utilized a PowerPoint to educate the participants. The PowerPoint contained evidence-based practice guidelines and recommendations on calculating QBL. Also, the educational resource educated the participants on identifying and treating a PPH. If a nurse cannot identify a PPH, the full extent of implementing QBL would not have been reached.

After the educational lesson, the participants were navigated through the PPH cart that was created to assist nurses in calculating QBL. The cart was equipped with materials to calculate QBL. Although treatment of PPH is not part of the project, medication were available within the cart to make it more resourceful. Pictures of dry items with their weight were placed in the cart. The dry weights can be used as a quick reference to add and subtract the weight of saturated materials. The targeted department has a portable scale that is utilized to assist in weighing materials. In the future, purchasing additional scales would be beneficial for each labor room. However, the newborn warmer can be utilized as a scale if the portable scale is in use.

A skills lab was created to allow the participants to first visualize blood saturated materials to determine EBL. After determining the EBL, the participant was to weigh all saturated material to determine QBL. This activity was to reiterate how EBL is a subjective measurement and can vary between individuals and QBL determines a more accurate measurement of blood loss. Also, the skills lab was to allow the participant to practice skills performing QBL before implementing it into practice.

After completion of the educational lesson, PPH cart orientation, and skills labs, a post test was given. The results from the pretest and posttest were compared to determine the level of knowledge gained. In addition to the knowledge gained, the analysis of the test allow the participants to assess their personal strengths and weaknesses.

Following delivery, all saturated laps, sponges, linen, and chux pads will be weighed by the obstetric nurses. The obstetrician will determine how much blood was collected in the calibrated drape and report the value to the nurse. The two measurements will then be added together to determine QBL at delivery. If the obstetrician is not present for delivery or a calibrated drape is not used, all saturated materials should be weighed, including wiping blood off surfaces. At the target facility, the patient remains in the postpartum room for a minimum of two hours following delivery before being taken to their postpartum room. Saturated pads will be continued to be weighed during the postpartum recovery period. The exact time frame for continuing QBL beyond the initial postpartum recovery period has not been established. However, the Association of Women's Health, Obstetric and Neonatal Nurses (2015) recommends that blood loss assessment should continue if the patient has active bleeding, is unstable, or had a blood loss greater than 1,000 ml.

Project Site and Population

The institution for the DNP project is a non-profit organization situated in the heart of rural southeast Kansas. The facility serves over six counties and is continuing to grow. The institution has the following mission statement, "We are dedicated to providing exceptional healthcare—centered around you" (Labette Health, 2020). The vision is to enhance the overall health of our communities (Labette Health, 2020). The rural hospital is accredited by the nationally recognized Healthcare Facilities Accreditation Program (HFAP).

The DNP project was implemented in a 12-bed, inpatient, labor, and delivery unit. The targeted department has five postpartum rooms, two labor rooms, and one operating room. The department has two obstetricians who deliver at the facility from the Advanced OB-GYN Associates of SEK. Between the two obstetricians, they deliver approximately 200 births per year. With local area hospital closures, the obstetricians are traveling and providing services to neighboring counties. As a result, the number of deliveries are predicted to increase at the target facility. Within the next calendar year, the labor and delivery unit is expanding and adding more rooms to care for the anticipated influx of patients. As a result, nurses should become more independent in determining PPH and successfully compute blood loss.

Currently, the obstetricians determine blood loss by estimation. However, this project is educating obstetric nurses to perform QBL. At the target facility, there are twelve full-time nurses and eight short-term staff. Over half of the short-term staff work at another labor and delivery facility. As a result, they may not be familiar with current policies on the PPH of the target facility. As discussed previously, despite consistent

evidence of how to identify and treat PPH, hospital policies vary and may not be based on the current guidelines. As a result, this project is equally important to the short-term staff. The level of experience varies among the nurses. Two nurses in the department are not trained in labor and delivery and are strictly hired for nursery care. These nurses were excluded from the research. Each shift, there is a minimum of two scheduled nurses. However, depending on the census, the number of nurses vary depending on the AWHONN staffing guidelines. Due to limited obstetric nurses each shift, cesarean deliveries are circulated by a surgical nurse. The nurse is not affiliated with the obstetric department. As a result, cesarean deliveries were excluded from the project.

Inclusion criteria included all vaginal deliveries, as well as all nurses trained in labor and delivery. All participants were over the age of 18 years and able to speak and read English. Exclusion criteria included unable to read and write English and being under the age of 18 years. The language exclusion criterion was due to the fact that the survey instruments and educational sessions are only presented in English. There are no other exclusion criteria related to gender, race, ethnicity, religion, or social or economic factors.

Unattended physician births at the target facility are frequent due to the obstetricians not residing within the facility while in the clinic or after hours. As a result, calibrated drapes are not used when the obstetrician is not in attendance. When this occurs, none of the blood lost at delivery is measured. Since the unattended obstetrician birth rate is high, the obstetric nurse must be able to calculate QBL.

Ethical Considerations/Protection of Human Subjects

Before providing education and collecting data, permission from the Pittsburg

State University Irene Ransom Bradley School of Nursing Institutional Review Board was obtained (see Appendix F). Ethical considerations were considered before implementation. The DNP scholarly project's ethical considerations were autonomy, informed consent, anonymity, and confidentiality of the participants. Before beginning the program, packets were assembled. The non-numbered packets included numbered pretest and posttest. Using non-numbered pretest ensures the results remain anonymous. Before beginning, the project's purpose was explained. Risk and benefits of the study were revised before informed consent was obtained. Due to the nature of the project, the primary risk included potential identification with tests and surveys. However, maintaining anonymity with numbers through the implementation phase reduced the risk of identification. Throughout the study, the tests and questionnaires remained anonymous, and no personal identifiers were utilized. There was minimal risk of harm during implementation, and the magnitude of discomfort was not more significant than the participants encounter every shift in labor and delivery.

As discussed previously, the current method of determining blood loss after delivery at the target facility is EBL. Although EBL may not be accurate, it is convenient and straightforward. Since the obstetricians currently determine EBL, the project idea was presented and approved by the obstetricians. Also, the obstetric department manager gave approval of the project and was eager to assist in implementation.

Cost

Although EBL has been proven to be inaccurate, there are steps within it that have been transferred into QBL. For example, in EBL, under-the-buttock drapes are placed under the patient to gather all fluids during the birthing process. However, studies have proven the drapes must be calibrated to determine the amount of blood loss. Toledo et al.

(2007) conducted a study to compare calibrated versus noncalibrated drapes at delivery. When calibrated drapes were used, there was less than a 15% error rate on determining blood loss. However, when noncalibrated were used, the research proved blood loss was underestimated 16% of the time at 300 ml and 41% of the time when blood loss was greater than 2000 ml (Toledo et al., 2007). Luckily, the target facility uses calibrated drapes to assist in determining the amount of blood loss. As a result, purchasing calibrated drapes, which is recommended in the literature, was not included in the cost of the project.

The unit's epidural cart was recently upgraded due to the request of the anesthesia department. The old epidural cart was utilized and created into the PPH cart. The cart is on wheels and easily moved from room to room. Although there is more than one delivery room, only one cart was made. The supplies and medication to assist in identifying and treating a PPH are already being utilized; however, they are not confined to one area. Resources in the department were utilized to create dry weight posters and reference sheets. As a result, the PPH cart had no additional cost for the project.

Instruments

There was multiple instruments utilized in the study. The pretest and posttests were compiled from the necessary information needed to calculate QBL (see Appendix C). The tests and educational lesson information were based on the literature review, current guidelines, and obstetrician preferences to ensure content validity. The tests contained ten multiple-choice questions. The information was organized in a PowerPoint presentation (see Appendix E). Due to the education lesson being conducted in an in-person setting, the study utilized a paper test to ensure completion of the tests. After the

educational lesson, the participants completed the same multiple-choice question posttest. A questionnaire of the comfortability and usability was created using SurveyMonkey see Appendix D). The survey was sent to the participants six weeks after the educational lessons and implementation of QBL. The survey contained ten questions to determine attitudes and the QBL performance rate. The items utilized Likert-scale questions. The final question within the survey was open ended to determine inhibitors for performing QBL. The instruments used in the research did not contribute to the cost of the project.

Timeline

The educational lesson occurred on February 3, 2021. The author collected data from the obstetric nurse's pretest and posttest to compare the knowledge gained on PPH and QBL. The participants navigated through the PPH cart on the same date as the educational lesson. After navigating through the PPH cart, the participants estimated blood loss from blood saturated materials. Each participant then quantified the blood loss to help realize the potential for the inaccuracy of EBL. A questionnaire was administered to determine the obstetrics nurses' attitudes after performing QBL for six weeks and to determine if the educational lesson was beneficial regarding PPH, QBL, and PPH cart. There was no compensation given for participation in the study.

Strength and Weaknesses

There are several strengths to the study. First, the pretest given to the participants at the beginning of the study acted as a control. The control compares the same sample before and after the educational lesson. Although the labor and delivery nurses have varying levels of experience, they passed and completed their twelve weeks of labor and

delivery orientation. As a result, they have the skills necessary to perform QBL at each delivery.

The study's weaknesses include a small sample size, human error, and administering the same pretest and posttest. Although the sample size was small, the potential outcome of implementing QBL makes the project essential. As discussed, the pretest and posttest administrated were the same tests. As a result, it was challenging to determine the actual knowledge gained versus if the participants gained specific knowledge based on the pretest. Finally, human error was a potential challenge when implementing a project about miscalculations. Miscalculations could be due to failing to zero the scale or combining the weights. Finally, workflow changes can be challenging to enforce and make the policy change.

Plan for Sustainability

The sustainability of QBL is dependent on multiple factors. First, the obstetrician ultimately gets to decide how blood loss is collected. With hopes of increasing deliveries in the future, the department will potentially be hiring additional delivery providers. As a result, a new obstetrician may not want nurses calculating the blood loss. As the target population expands, additional resources may need to be purchased, such as scales and PPH carts. Although this may be a financial burden, the hospital's Foundation board can be utilized to purchase supplies. Individuals and businesses in the community donate to the hospital's foundation to assist in purchasing supplies that assist in providing quality health care. Although the accuracy of blood loss is not part of this project, continued research can be conducted to determine if QBL is successful in decreasing the over and underestimation of blood loss and reducing the PPH rate at the target facility. After

implementing QBL in vaginal deliveries, the practice change can be transitioned into cesarean deliveries as well. Finally, if determined that QBL is superior to EBL, the measurement of blood loss policy can be created to ensure continued practice.

Summary

Obstetrical nurses have an essential role in the postpartum period and spend the most time analyzing the patient after birth. As a result of the extensive time spent with the patient, nurses must be able to assess and determine blood loss to assist and guide the obstetrician's care. The literature supported the implementation of QBL at the target facility. The project utilized a one group pretest-posttest method in addition to a post implementation survey. The project utilized Lewin's Change Theory and Bandura's Social Learning Theory to assist in creating the education lesson and implementation. Chapter IV will examine the results of the obstetric nurse's knowledge of performing QBL, opinions on comfortability, and how often it was implemented at delivery.

Chapter IV

Evaluation Results

Restatement of Purpose

The project was designed to improve obstetrical nurses' knowledge of PPH and QBL. An education lesson was created and presented on evidence-based practice guideless for PPH and QBL. A PPH educational lesson was created and oriented to participants to assists in PPH management and implementation of QBL. A pretest and posttest design was utilized to determine the knowledge gained and comfortability of performing QBL. This chapter analyzes the data collected and evaluated the following questions:

1. Does the administration of a PPH and QBL educational program improve the obstetrical nurse's knowledge?
2. Does the administration of a PPH and QBL educational program improve the comfortability with PPH and successful implementation of QBL?

Description of Variables

The independent variable was the PPH and QBL education program presented to the obstetric nurses. The educational program included a PowerPoint on current evidence-based guidelines of PPH and QBL, a skills station for comparing EBL versus QBL, and a PPH cart orientation. The dependent variable was the nurse's knowledge

gained and their perceptions of PPH and QBL implementation. Dependent variables were obtained from the participants posttest, and postimplementation surveys.

Description of Population

The demographic form was used to describe the characteristics of the obstetric nurse. The total number of obstetric nurses who participated in the study was sixteen. The demographic characteristics gathered about the participants were their age, years of obstetric nurse experience, gender, the highest degree of nursing achieved, and full-time versus short-term employment status.

Twelve of the nurses were full-time staff and four were short-term staff. The ages were broken into four groups. Of the sixteen participants, the majority fell into the age group of 26- 30 years (56.2%). The age group of 31- 35 years and 35 years and older was identified as having the least participants (12.5%). The level of obstetric nursing experience among the participants varied. Two participants had less than one year of obstetric experience (12.5%). The majority of participants fell between levels of experience between one to five years (43.8%) and six to ten years (31.2%). All of the participants had been previously trained in the obstetric department. The highest nursing degree was split equally. Participants with an Associate Degree in Nursing were 50% and participants with a Bachelor of Science in Nursing degree were 50%. One hundred percent of the participants were female.

Inclusion criteria included all nurses trained in labor and delivery. All of the participants were over the age of 18 years and were able to speak and read English. Exclusion criteria included being unable to read and write English and being under the age of 18 years. The language exclusion criteria are due to the fact that the survey

instruments and educational sessions are only presented in English. There are no other exclusion criteria related to gender, race, ethnicity, religion, or social or economic factors.

Table 1. Demographics

Variable	**Level**	**Frequency (N=16)**	**Percent (%)**
Age (years)	21-25	3	18.8%
	26-30	9	56.2%
	31-35	2	12.5%
	35 and older	2	12.5%
Level of Nursing Education	Associates Degree in Nursing	8	50%
	Bachelor of Science in Nursing	8	50%
Years of Obstetric Nursing Experience	Less than one year	3	18.8%
	1-5 years	7	43.8%
	6-10 years	5	31.2%
	Greater than 10 years	1	12.5%
Employment Status	Full time	12	75%
	Short term	4	25%

Research Question One. Does the administration of a PPH and QBL educational program improve the obstetrical nurse's knowledge?

A specific aim of the project was to improve the obstetric nurse's knowledge regarding PPH and QBL. The obstetrical nurse's knowledge regarding PPH is essential for providing safe care to mothers. Also, QBL knowledge must be gained for

implementation. To reach the specific aims, an educational PowerPoint was developed and presented to the participants. The pretest and posttest scores regarding PPH knowledge and QBL were compared to evaluate question one. The correlation between the pretest and posttest was collected on questions one through ten. The questions for the pretest and posttest were identical. The table represents the participant scores out of ten and the mean of the pretest and posttest scores.

Table 2. Pretest and Posttest Scores

Participant	**Pretest Score**	**Posttest Score**	**Difference**
1	7 (70%)	9 (90%)	2
2	6 (60%)	9 (90%)	3
3	5 (50%)	8 (80%)	3
4	7 (70%)	10 (100%)	3
5	8 (80%)	10 (100%)	2
6	8 80%)	10 (100%)	2
7	6 (60%)	9 (90%)	3
8	7 (70%)	10 (100%)	3
9	6 (60%)	9 (90%)	3
10	7 (70%)	9 (90%)	2
11	7 (70%)	10 (100%)	3
12	8 80%)	10 (100%)	2
13	5 (50%)	9 (90%)	4
14	7 (70%)	10 (100%)	3
15	6 (60%)	10 (100%)	4
16	6 (60%	8 (80%)	2

Mean	**6.63**	**9.38**	**2.75**

The test questions were individually evaluated for scores of the pretest versus posttest. No questions showed a decline in scores. Two questions showed no change between tests. Both of the questions that showed no changes were scored as 100% on both the pretest and posttest. Two questions scored below 50% on the pretest: however, each improved 100% or greater on the posttest. Questions regarding QBL scored the lowest on the pretest. After the educations lesson, the questions regarding QBL improved significantly. The table below addresses each test question number incorrect, correct, and percent correct. Also, the table illustrates the percent of change from pretest to posttest.

Table 3. Test Question Evaluation

Number	**Test Question**	**Pretest**	**Posttest**	**Percent Change**
1	How is a patient assessed for postpartum hemorrhage risk on admission?	Incorrect:3 Correct:13 Percent Correct:81%	Incorrect:0 Correct:16 Percent Correct:100%	23 % improvement
2	A nurse is preparing to assess the uterine fundus. When the nurse locates the fundus, she notes that the uterus feels soft and boggy. Which of the following nursing interventions would be most appropriate initially?	Incorrect:0 Correct:16 Percent Correct:100%	Incorrect:0 Correct:16 Percent Correct:100%	No change
3	What is considered moderate risk for postpartum hemorrhage?	Incorrect:9 Correct:7 Percent Correct:44%	Incorrect:2 Correct:14 Percent Correct:88%	100% improvement

4	When weighing blood saturated materials 1 gram =___ ml.	Incorrect:7 Correct:9 Percent Correct:56%	Incorrect:1 Correct:15 Percent Correct:94%	67% improvement
5	What is the first line medication for treating a PPH?	Incorrect:0 Correct:16 Percent Correct:100%	Incorrect:0 Correct:16 Percent Correct:100%	No change
6	How much blood loss is considered a postpartum hemorrhage after a vaginal delivery?	Incorrect:3 Correct:13 Percent Correct:81%	Incorrect:0 Correct:16 Percent Correct:100%	23% improvement
7	What is the most common cause of a postpartum hemorrhage?	Incorrect:6 Correct:10 Percent Correct:63%	Incorrect:0 Correct:16 Percent Correct:100%	60% improvement
8	A calibrated drape was not utilized during delivery of the infant. To determine blood loss using the quantitative method the nurses should do what?	Incorrect:8 Correct:8 Percent Correct:50%	Incorrect:3 Correct:13 Percent Correct:81%	63% improvement
9	When determining the quantification of blood loss, it is beneficial to know the materials dry weight. A blue chux's dry weight is what?	Incorrect:11 Correct:5 Percent Correct: 31%	Incorrect:3 Correct:13 Percent Correct:81%	160% improvement
10	When should the postpartum hemorrhage cart be taken into the delivery room?	Incorrect:7 Correct:9 Percent Correct:56%	Incorrect:1 Correct:15 Percent Correct:94%	67% improvement

Based on the table and test results, the lowest pretest score was six out of ten correct, and the highest pretest score was eight out of ten correct. When combing all the participant's pretest scores, the average was 63%. In comparison, the lowest posttest score was eight out of ten, and the highest posttest score was ten out of ten. The posttest score average was significantly higher at 94% compared to the pretest average of 63%.

Also, each participant's test scores improved indicating years of experience does not impact the ability to gain knowledge.

During the data analysis, a paired t-test was performed using to compare the obstetric nurse's knowledge on PPH and QBL before the educational lesson and after participation. Then, the paired difference was analyzed. There was increase in mean scores between the pretest (M=6.63, SD=0.957) and posttest (M=9.98, SD=0.719) conditions; t=16.1024, p=0.0001. The results are in the tables below.

Table 4. Paired Statistics

Paired Sample Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pretest	6.63	16	0.957	0.239
Posttest	9.98	16	0.719	0.179

Table 5. Paired Samples Test

Paired Samples Test

	Paired Differences					t	df	Sig (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Posttest-Pretest	2.75	0.171	0.634	-3.11	-2.39	16.1024	15	0.0001

Research Question Two. Does the administration of a PPH and QBL educational program improve the comfortability with PPH and successful implementation of QBL?

Research question two was evaluated with a six-week postimplementation survey. The survey created was a 7-point Likert scale with a score between strongly disagree to strongly agree. The obstetric nurse was asked to circle the number that best represents

their perception of PPH and QBL for questions one through nine. Question ten was an open-ended question addressing inhibitors for performing QBL. Fourteen of the sixteen participants completed the six-week postimplementation survey. The responses to the survey were evaluated by the following scores: Strongly disagree (1-1.80), Disagree (1.81-2.60), Somewhat Disagree (2.61-3.40), Neither Agree nor Disagree (3.41-4.20), Somewhat agree (4.21-5.0), Agree (5.10-5.89), Strongly agree (5.90 and above).

The obstetric nurses who completed the survey all strongly agreed that adhering to postpartum management guidelines is essential in reducing maternal morbidity and mortality. Also, 100% of the participants thought PPH training is necessary in the obstetrical department to remain current on evidence-based practice guidelines regarding PPH. Questions regarding the participant's confidence and perception of QBL means fell between 5.1and 5.89 or 5.9 and above either agreeing (5.1-5.89) or strongly agree (5.9 and above). Question nine addressed the performance of QBL. Of the fourteen participants, 64% of them report performing QBL in all vaginal deliveries. For participants who have not completed QBL in all deliveries, question ten had an open-ended format addressing factors that have inhibited QBL calculation. Common themes identified were inadequate staffing, not enough time, and minimal postpartum blood loss.

Table 6. Post Implementation Survey Analysis

Number	**Survey Question**	**N**	**Mean**	**Std. Deviation**
1	I gained knowledge from the education lesson on PPH and QBL.	14	6.93	0.267
2	After the educational program, I can apply the skills to perform QBL.	14	6.50	0.519

3	Adherence to postpartum management guideline recommendations is important in saving women's lives.	14	5.64	0.633
4	Training on postpartum hemorrhage (PPH) is essential.	14	7.0	0
5	The benefits of performing QBL outweigh the additional workload.	14	7.0	0
6	I am confident in my skills to perform QBL.	14	6.93	0.267
7	The PPH cart assists me in calculating QBL and treating PPH.	14	7.0	0
8	I do not need additional training before I can commit to performing QBL.	14	6.14	0.254
9	Since the education program, I perform QBL in all vaginal deliveries.	14	6.64	0.230

Summary

The purpose of the research was to improve obstetric nurses' knowledge of PPH and QBL. The project sought to determine if an educational program improves the knowledge of PPH and QBL, assisted with implementing QBL into practice, and determined the nurse's perceptions. The data from a pretest and posted was analyzed to determine if knowledge was gained from an educational lesson on PPH and QBL. A paired t-test was run on the sixteen participants' pretest and posttests scores. The pretest mean score was 6.63 compared to the posttest mean score of 9.98. The mean increase was 3.35, with a p-value of <0.0001, indicating knowledge was gained.

Six weeks after implementation, a ten-question survey was administered to evaluate the participant's perceptions. Only fourteen of the sixteen participants completed the postimplementation survey. Of the participants who completed it, all strongly agreed following current evidence-based practice guidelines and training on PPH is essential to assist in decreasing maternal morbidity and mortality. However, 34% of

obstetrical nurses report they have not used QBL in all vaginal deliveries. Reasons for not adopting the practice were deficient staffing ratio and inadequate time.

Chapter V

Discussion

Purpose

The purpose of the study was to create an educational program on PPH and QLB. The program focused on current evidence-based guidelines for prevention, identification, and management of PPH. QBL was explained and compared to the current practice of estimation of blood loss (EBL). In addition to the educational program, a PPH cart was created to assist the obstetric nurses in performing QBL, managing a PPH, and being more present at the bedside. The study evaluated if the educational program improved the participant's knowledge of PPH and QBL and assessed their perceptions. Ultimately, enhancing knowledge on PPH and implementing QBL will help reduce maternal morbidity and mortality.

Relationship of Outcomes to Research

The project aimed to answer two research questions. Both of the questions were answered thoroughly by analyzing the data collected. Each question outcome is addressed below.

Does the administration of a PPH and QBL educational program improve the obstetrical nurse's knowledge?

This question was evaluated by comparing the participant's pretest and posttest scores. Both tests contained ten identical multiple-choice questions. The tests included questions relating to PPH and QBL. The pretest evaluated the obstetrics nurse's current knowledge of PPH and QBL. After the education lesson, the posttest was utilized to determine if the education resource improved their knowledge on PPH and QBL. Each participant's pretest score and posttest score were evaluated.

The obstetric nurses' current knowledge determined a mean overall score of 6.63, or 63% accuracy of questions answered correctly. The highest scored attained on the pretest was 80%. This indicated regardless of years of experience, the obstetrical nurses are unaware of all PPH and QBL education. When evaluating individual questions, the participants scored the lowest on questions relating to QBL (questions 3, 8 & 9). Since the current practice was EBL, the obstetric nurses had minimal experience or training with QBL. Two questions scored 100% on the pretest that related to PPH nursing management.

After participating in the educational lesson, the participant completed a posttest. The posttest scores improved to an overall mean score of 9.98, or 94% accuracy. The mean increased 3.35 points and 49.2%. All questions showed improvement except two questions, two and five. The two with no change were the two questions which were already at 100% on both the pretest and posttest. The questions related to QBL that scored at or below 50% had a percent improvement of 100% or greater after the educational lesson.

Several associations support the improvement of knowledge through PPH and QBL education. AWHONN and the California Maternal Quality Care Collaborative

(CMQCC) have determined that PPH prevention and management training is essential and can improve the knowledge of obstetrical nurse (AWHONN, 2015; CMQCC, 2018). By improving knowledge and making facilities more equipped, these organizations see a decrease in maternal morbidity and mortality. AWHONN recommends PPH prevention and management training to help reduce maternal morbidity and mortality rate. Additionally, AWHONN recommends taking steps to implement QBL to assists in the identification of PPH. The CMQCC initiated its program in 2006 and first created a reporting system to determine leading causes of maternal mortality. After identifying PPH as a leading cause of maternal mortality, toolkits and training were developed and implemented in California hospitals. From 2006 to 2013, the California maternal mortality rate reduced by 55% while the national rate continued to rise. In 2013, the California maternal death rate was 7.3 per 100,000 compared to the United States overall maternal death rate of 22.0 per 100,000 (CMQCC, 2018). Although the total death reduction is not from PPH prevention alone, it is a leading indicator and supports education programs regarding PPH.

Does the administration of a PPH and QBL educational program improve the comfortability with PPH and successful implementation of QBL?

This question was evaluated with the six-week post-implementation survey. The survey contained nine Likert scale questions and one open-ended question. The participant was asked to circle the number that best represented their perception of PPH and QBL implementation on a seven-point Likert scale, "strongly disagree," "disagree," "somewhat disagree," "neither agree nor disagree," "somewhat agree," "agree," and

"strongly agree." Each of the listed categories was coded beginning at One (Strongly agree) to seven (strongly agree).

Fourteen of the sixteen participants completed the six-week post-implementation survey. All of the participants strongly agreed that training on PPH and adhering to current evidence-based guidelines is essential. The Joint Commission recently revised its standards of care due to the continued increase in maternal mortality. The majority of revisions related to PPH were effective as of July 2020. A revision that supports PPH training's importance is the joint commission's new requirement for PPH training should be conducted annually (Lyons, 2019).

One of the National Maternal Health Initiative's safety aims recommends QBL to determine blood loss at delivery. Sixty-four percent of the participants report primarily using QBL as their technique to measure blood loss. Inhibitors to implementation reported were inadequate staffing ratio and insufficient time. Although deficient time was a primary indicator of why QBL was not performed, 93% of the participants strongly agree the benefits of QBL outweigh the additional workload.

Observations

Although the study only had sixteen participants, 84% of the entire target institution attended. Only one full-time staff member did not participate in the education lesson. Ninety-two percent of the full-time staff attending increased the success rate of QBL implementation and improves patient safety. Throughout the education lesson, the participants gave the presenter full attention and were actively engaged. Even participants who had numerous years of experience appeared to have an interest in the presentation.

The study instruments used to collect the data were in paper format. The pretest and post-test were given at the educational lesson time, ensuring they were completed and collected. The questions included current evidence-based guidelines of PPH prevention, identification, and management. The test also includes questions regarding QBL implementation and the use of the PPH cart. The six-week postimplementation was also in paper format; however, they were more challenging to collect. Two participants did not complete the post-implementation survey. Potentially an electronic version of the postimplementation survey would have allowed all participants to complete it due to four of the participants being short-term staff with extended periods between shifts. However, since the tests and surveys were anonymous the researcher could not determine who did not complete the postimplementation survey. The postimplementation survey allowed the participants to voice their perceptions of the training and new practice of QBL and collect data for the project. Overall, the study instruments utilized to collect the data were sufficient for the project.

Throughout the project, the researcher also gained knowledge on PPH and QBL. Training at the target facility over PPH had never been implemented. Training at the target facility on PPH only occurred through the experience of PPH. Fortunately, the target institute is adopting the joint commission recommendation of annual PPH training.

Evaluation of Theoretical Framework

Lewin's change theory and Bandura's Social Learning Theory were used as the theoretical frameworks for this scholarly project. The project's goal was to first inform the obstetrical nurses on the current evidence-based practice guidelines of PPH and QBL

techniques in a method they could gain knowledge. After improving the knowledge, another goal was to implement QBL into practice.

Lewin's change theory is a three-step model unfreezing, change, refreezing utilized to implement change. According to Lewin's change theory, a system needs the incentive to change for success (Petiprin, 2020). The support of the obstetric unit director and obstetricians of the project was the first step for unfreezing. The unfreezing stage was further accomplished by educating the obstetric nurses on the benefits and improve the safety of QBL through the educational program. The change stage of Lewin's theory is implementing the change. QBL is now to be utilized in all vaginal births. Currently, the target institution is in the refreezing stage. The final step of the theory is accepting and remaining consistent with the new change. Although most participants reported they used QBL in all vaginal deliveries, 36% have not utilized QBL as their primary method of blood loss.

Bandura's social learning theory proposes that individuals learn by direct experience or by observing others (Bandura, 1977). The theory has four principles: attention, retention, reproduction, and motivation. The obstetric nurse's attention was gained with the pretest and PowerPoint presentation. The significance of PPH and QBL was relayed to gain further attention from the participant. The retention of the learner was evaluated with analyses of the pretest and posttest results. All of the participants improved their scores, assisting in mastering the principle of retention. The focus of reproduction was practiced when the obstetric nurse was able to visualize EBL of blood-saturated materials and then calculate QBL of the same materials. Although the nurse was able to reproduce QBL in a safe environment, the investigator realizes it may take

longer to master the skill at delivery. The final principle of motivation was not completely assessed in this project; however, the majority of participants recognize the importance of implementation on the postimplementation survey.

Evaluation of Logic Model

The logic model created in chapter I addressed inputs, external factors, activities, outputs, context, and intended outcomes. The inputs managing supplies varied from what was initially estimated. Due to COVID-19, the old epidural cart was utilized in the room designated for mothers who were COVID-19 positive. The orientation of the cart and supplies was still designed for the original cart; however, it created difficulties in preparation. Before implementation, the cart was able to be developed into the PPH cart as the use in the COVID-19 room had been limited, and the supplies were redistributed. Also, larger prints for QBL posters were unable to be printed within the target department due to printer size. The external factors that could inhibit QBL implementation were limited time, the convenience of EBL, and confidence. Although only one education lesson took place, 50% of the participants strongly agreed they could apply the skills learned to perform QBL after the educational lesson. The obstetric nurses reported inhibitors of performing QBL were time and inadequate staff. This proves the external factor of EBL convenience to be true. The activities of an education PowerPoint, pretest and posttest, PPH cart orientation were completed. The survey portion was only partially fulfilled as not everyone completed it. The outcomes were also only partially achieved. The delivery log was not evaluated to determine if QBL was utilized due to patient information being exposed. Instead, a survey question related to QBL implementation was asked. The short-term goal was achieved as all the participants improved knowledge

between pretest and posttest scores. The midterm goal of willingness to change was partially assessed throughout the postimplementation. Finally, the long-term goal of implementing QBL in all deliveries is not yet achieved.

Limitations

A weakness of the study was a small sample size. With the sample size only being sixteen, the study's power is reduced, and it increases the margin of a type II error. Although the sample size was small, 92% of the full-time staff attended, and 80% of the entire team in the obstetric department participated in the training. As a result, most staff attending the training increases the chances of QBL practice change and improves patient safety. The instruments utilized in the study were appropriate. However, the pretest and posttest contained identical questions. A potential threat of using the same test questions can threaten the internal validity. Lastly, not all the participants completed the post-implementation survey.

Implications for Future Research

There are several avenues for this project to continue. First, further research could be conducted to determine if the PPH cart, PPH education, and QBL decreased the target institution's overall PPH rate. Due to time constraints, this could not be done for this project. In the future, the PPH rate before implementation could be determined, and approximately one year after implantation, the PPH could be revaluated. Also, this project only incorporated vaginal deliveries. In the future, it could be expanded to cesarean deliveries as well. Another avenue the project could take would be to compare EBL versus QBL. The project design could have been improved by incorporating this aspect. Potentially, it could have eased the implementation of QBL and allowed the

participants to understand the inaccuracy of EBL. Currently, the obstetric nurse determines QBL using a paper format. In the future, a QBL calculator could be created within the charting system to improve accuracy. Finally, this project could have been expanded to incorporate additional facilities to allow the results to affect a larger population of postpartum mothers.

Implications for Practice/Health Policy/Education

This education lesson and implementation of QBL could be expanded to an additional department within the target institution. QBL can be applied to miscarriages in the emergency room or the surgical department. The project could also be expanded to neighboring hospitals to affect more maternal morbidity and mortality changes.

As discussed previously, the new Joint Commission standard regarding maternal health discussed PPH training annually (Lyons, 2019). This presentation proved to show an increase in knowledge of the participants. As a result, this format could be utilized in the future for PPH education to meet the Joint Commission's requirements.

Conclusion

Despite advances in technology, the maternal mortality rate has continued to rise in the United States. In recent years, researchers have taken a closer look at the major causes of maternal death. A leading cause identified that is primarily preventable is due to PPH. The leading contributors identified to failed PPH recognition are deficient education on PPH, delayed recognition miscalculations of blood loss, and inaccurate blood loss measures. As a result, the project's purpose was to improve obstetrical nurses' knowledge of PPH and implement QBL into practice. The study aimed to enhance the participant's knowledge regarding PPH current evidence-based practice guidelines and

QBL importance and technique. The gained knowledge was assessed with the utilization of a pretest and posttest. When comparing the test results, educational lesson was successful in improving the participant's knowledge. A postimplementation survey was distributed six weeks after the educational lesson to determine the participant's perception of PPH training and QBL implementation. Although QBL has not been solely adopted into practice, the participants recognize the importance of PPH training and adopting QBL into practice.

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APPENDIX

Appendix A

Informed Consent

You are invited to participate in a scholarly project conducted by Marlee Cares, who is a DNP student at Pittsburg State University. The scholarly project is regarding postpartum hemorrhage (PPH) and quantification of blood loss (QBL).

First, you will be asked to complete a pretest on PPH and QBL. Following the pretest, an educational session will be provided on the current recommendations on postpartum hemorrhage and the techniques of calculating QBL. After the lesson, you will be navigated through a PPH cart to assist with calculating QBL and treating PPH. After familiarizing yourself with the PPH cart, you will undergo an interactive skills lab to compare EBL and QBL and determine blood loss. Finally, a posttest will be given to determine the knowledge gained. Six weeks after the program, a postimplementation survey will be completed to determine your attitudes regarding the new practice change and benefits of the program.

The potential risks associated with this study are possible identification with tests and surveys and increased anxiety about new duties. There will be no compensation for participation; however, foreseeable benefits include an increased level of knowledge, confidence, and clinical judgment.

If you have decided to participate in this project, please understand that your participation is voluntary and that you have the right to withdraw your consent or discontinue participation at any time with no penalty. You also have the right to refuse to answer any question(s) for any reason with no penalty.

In addition, your anonymity will be maintained. To maintain your privacy, a code number will be utilized. During the study, the information will remain locked in a cabinet. The only individuals with access to the data are the unit director and the principal investigator.

If you have any questions regarding this project, you may contact the researcher at mcares@gus.pittstate.edu. If you have questions regarding your rights as a research participant or any concerns regarding this project, you may contact my advisor, Dr. Barbara McClaskey, at bmcclaskey@pittstate.edu.

I understand the above information and voluntarily consent to participate in the research. I further attest that I am at least 18 years of age.

_____

_____ Participant Signature

Date

Appendix B

Demographic Form

For the following items, please circle the letter by the answer that best represents you (one per item).

1. Age
    A. 21-25 years old
    B. 26-30 years old
    C. 31-35 years old
    D. Older than 35 years

2. Gender
    A. Female
    B. Male

3. Years of obstetrical Nursing Experience
    A. Less than one year
    B. More than one year but less than five years
    C. Greater than five years

4. Employment Status
    A. Full time
    B. Short term

5. Highest level of education
    C. Associates Degree in Nursing
    D. Bachelor of Science in Nursing

Appendix C

Pretest/Posttest

6. How is a patient assessed for postpartum hemorrhage risk on admission?
    A. Assume everyone is at risk
    B. Complete the postpartum hemorrhage risk assessment on admission
    C. Reviewing the chart

7. A nurse is preparing to assess the uterine fundus. When the nurse locates the fundus, she notes that the uterus feels soft and boggy. Which of the following nursing interventions would be most appropriate initially?
    A. Massage the fundus until it is firm
    B. Push on the uterus to assist in expressing clots
    C. Encourage the mother to void

8. What is considered moderate risk for postpartum hemorrhage?
    A. Singleton pregnancy
    B. Previous uterine incision
    C. Three vaginal deliveries

9. When weighing blood saturated materials 1 gram =___ ml.
    A. 2
    B. 1
    C. 5

10. What is the first line medication for treating a PPH?
    A. Oxytocin
    B. Methergine
    C. Cytotec

11. How much blood loss is considered a postpartum hemorrhage after a vaginal delivery?
    A. 1000 ml
    B. 500 ml
    C. 250 ml

12. What is the most common cause of a postpartum hemorrhage?
    A. Retained placenta
    B. Uterine atony
    C. Lacerations

13. A calibrated drape was not utilized during delivery of the infant. To determine blood loss using the quantitative method the nurses should do what?
    A. Have the obstetrician estimate blood loss

B. Do not record a blood loss
C. Weigh all saturated materials and combine for a total
D. The nurse should estimate the blood loss

14. When determining the quantification of blood loss, it is beneficial to know the materials dry weight. A blue chux's dry weight is what?
    A. 20 grams
    B. 10 grams
    C. 5 grams

15. When should the postpartum hemorrhage cart be taken into the delivery room?
    A. When the patient arrives to the unit
    B. At completion of the second stage of labor
    C. When postpartum bleeding cannot be controlled by fundal massage

Appendix D

Post Implementation Survey

Using the scale below, please circle the number that best represents your perceptions of postpartum hemorrhage and quantification of blood loss

Strongly Disagree =1	Disagree=2	Somewhat Disagree= 3	Neither Agree nor Disagree=4
Somewhat Agree= 5	Agree=6	Strongly Agree=7	

1. I gained knowledge from the education lesson on PPH and QBL

   1 2 3 4 5 6 7

2. After the educational program, I can apply the skills to perform QBL

   1 2 3 4 5 6 7

3. I am confident in my skills to perform QBL

   1 2 3 4 5 6 7

4. Adherence to postpartum management guideline recommendations is important in saving women's lives.

   1 2 3 4 5 6 7

5. Training on postpartum hemorrhage (PPH) is essential

   1 2 3 4 5 6 7

6. The benefits of performing QBL outweigh the additional workload

   1 2 3 4 5 6 7

7. The PPH cart assist me in calculating QBL and treating PPH

   1 2 3 4 5 6 7

8. Additional training is necessary before I can commit to performing QBL

   1 2 3 4 5 6 7

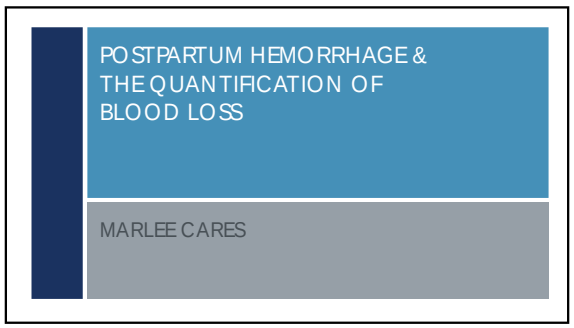
9. Since the education program, I perform QBL in all vaginal deliveries

   1 2 3 4 5 6 7

10. List what has inhibited you from performing QBL in all vaginal deliveries

Appendix E

Educational Resource



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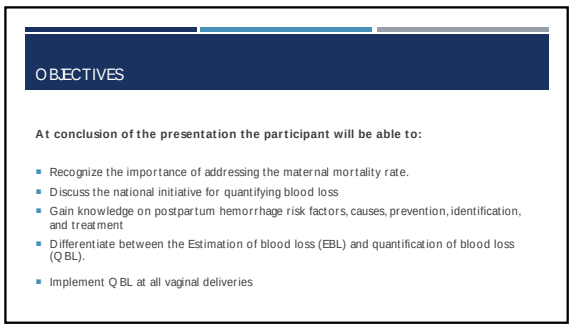

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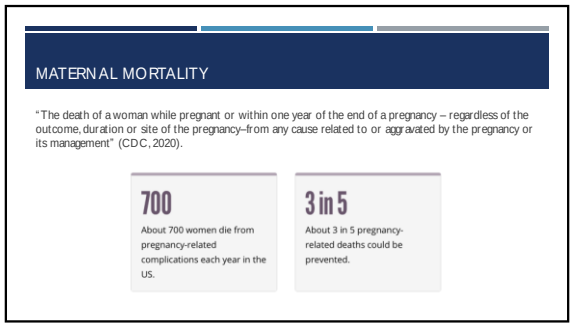

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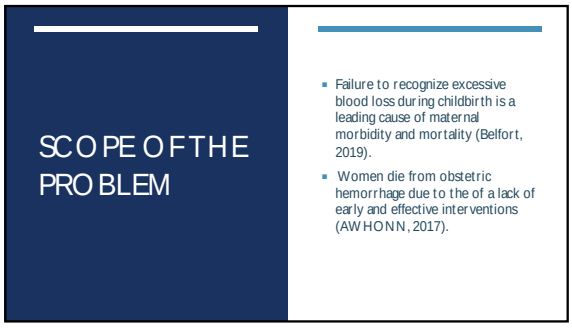

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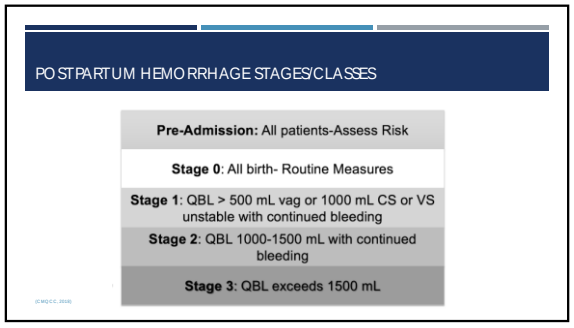

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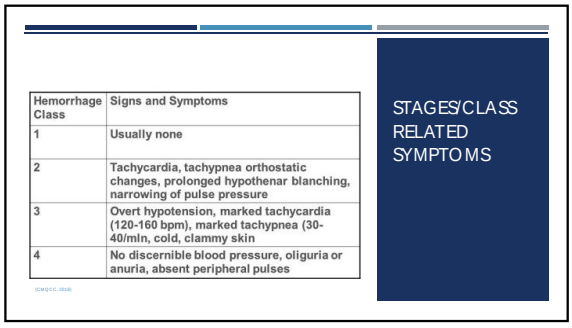


6

POSTPARTUM HEMORRHAGE

Types

- primary postpartum hemorrhage: A condition in which a woman has a blood loss greater than 500 ml within 24 hours after a vaginal birth (Belfort, 2019).
- Secondary postpartum hemorrhage: Any significant uterine bleeding occurring between 24 hours and 12 weeks postpartum (Belfort, 2019).

Statistics

- 3rd leading cause of maternal deaths
- Accounts for 35% of maternal related deaths
- Nearly half have been determine to be preventable
- Occurs 1 to 5 percent of deliveries

7

IDENTIFY AT RISK CALCULATOR

LOW RISK

MEDIUM RISK

HIGH RISK

8

LOW RISK

- Less than 4 vaginal deliveries
- No history of PPH
- No previous uterine incision
- No known bleeding disorder
- Singleton pregnancy

9

MEDIUM RISK

- Prior cesarean birth
- Prior uterine incision
- Multiple gestation
- Greater than 4 vaginal births
- Chorioamnionitis
- Estimated fetal weight > 4 kg
- Large uterine fibroids
- BMI >35

10

HIGH RISK

- Placenta previa
- Placenta accrete
- Hematocrit <30
- Platelets <100,000
- Known coagulopathy
- Active bleeding upon admission

11

IDENTIFIABLE CAUSES

FOUR T's Pneumonic

- **Tone** -70-80 %
  - Uterine atony
- **Trauma** – 20%
  - Trauma includes laceration, hematomas, uterine inversion, and uterine rupture
- **Tissue** – 10%
  - Retained placenta
- **Thrombin** – 1%
  - Inherited or acquired coagulation

12

UTERINE ATONY

"Failure of Myometrium to contract the uterus fills with blood because of the lack of pressure on the open blood vessels of the placental site" (Belfort, 2019).

Predisposing factors

- Prolonged later
- Intrapartum oxytocin
- Grand multiparity
- Over distention of uterus

Key to successful managemen

PREVENTION!

13

TRAUMA- LACERATIONS

Predisposing Factors

- Spontaneous or Precipitous delivery
- LGA , Presentation, and Position of baby
- Contracted Pelvis
- Vulvar, cervical, perineal, ureteral area and vaginal varices

Key to successful management

Meticulous inspection of lacerations

14

TRAUMA- UTERINE INVERSION

"The uterus inverts or turns inside out after delivery"

Complete inversion, a large red rounded mass protrudes from the vagina

Incomplete inversion, uterus can not be seen, but felt

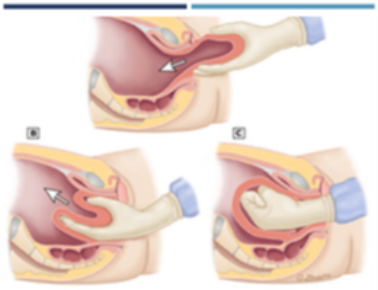
Predisposing Factors

- Traction applied on the cord before the placenta has separated.
- Incorrect traction and pressure applied to the fundus, especially when the uterus is flaccid

Treatment

- Manually replace uterus
- Administer Oxytocin
- Monitor bleeding and vital signs

15



UTERINE INVERSION

16

TISSUE

"Incomplete separation of the placenta and fragments of placental tissue retained" (Belfort, 2019).

Signs

- Boggy , relaxed uterus
- Dark red bleeding

Treatment

- D & C
- Administration of Oxytocin
- Administration of Prophylactic antibiotics

17

Complete

- Complete Risk factor tool in OB TraceVue Upon admission
- Determine risk level- mild, moderate, high

Collect

- Collect Baseline Hemogram

Type and Cross

- Type and Cross patient

Discuss

- Discuss risk factors with obstetrician

PPH cart

- Place in room at completion of the second stage of labor

ANTENATAL PREVENTION

18

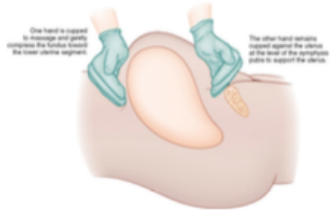
POSTPARTUM PREVENTION

- Assess uterine tone
  - Every 15 minutes x4
  - Hourly x4
- Ensure obstetrician examines placenta for retainment
- Document and assess lacerations
- After expulsion of placenta
  - Start Pitocin 300 units at 300 ml/ hour
  - Ensure provider administers Cytotec 400-1000 mcg

19

ASSESSMENT OF UTERINE TONE

- **Assess**
  - Every 15 minutes X4
  - Every hour x4
  - Once a shift
- **Atonic Uterus**
  - Perform uterine massage



20

IDENTIFICATION

ASSESSMENT OF VITAL SIGNS

MONITOR LABORATORY STUDIES

ASSESSMENT OF BLOOD LOSS

21

TREATMENT – MEDICATION

- 1st line
  - **Oxytocin**
    - 30 units IM or IV
- 2nd line
  - **Methergine**
    - 0.2 mg IM Q 2-4 hours
  - **Carboprost**
    - 0.25 mg IM Q 15- 80 minutes do not exceed 8 doses/24 hours
  - **Cytotec**
    - 400-1000 mcg

22

COMPLICATIONS

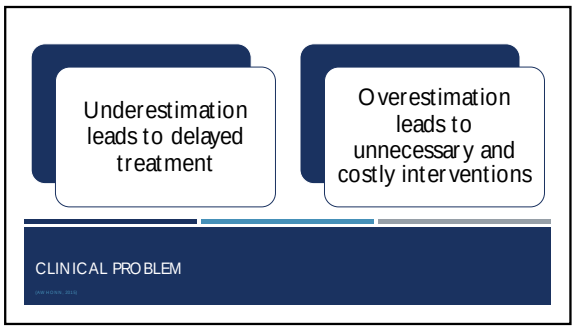
- Anemia
- Shock
- Fatigue
- Septicemia
- Death

23

ESTIMATION VS QUANTIFICATION OF BLOOD LOSS

Estimation	Quantification
• Subjective	• Objective
• Convenient & Simplistic	• Time consuming
• High rate of error	• Lower rate of error

24



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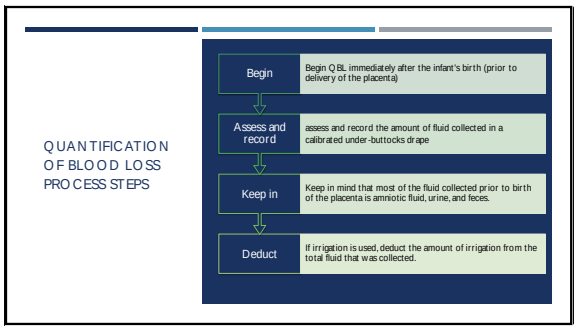

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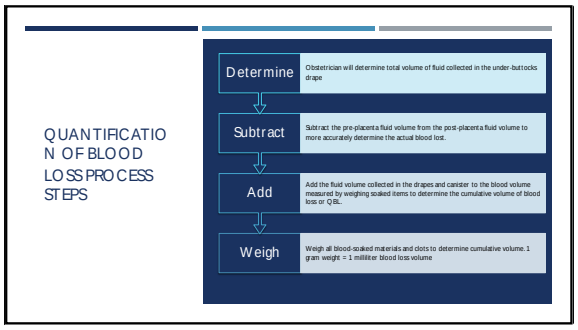

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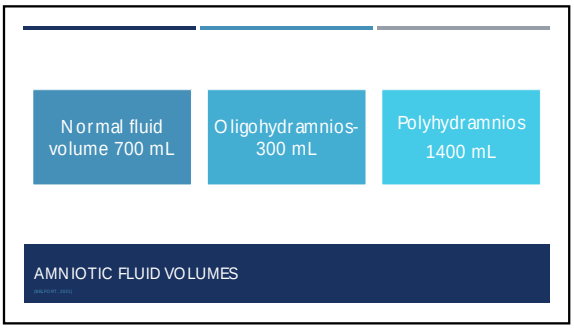

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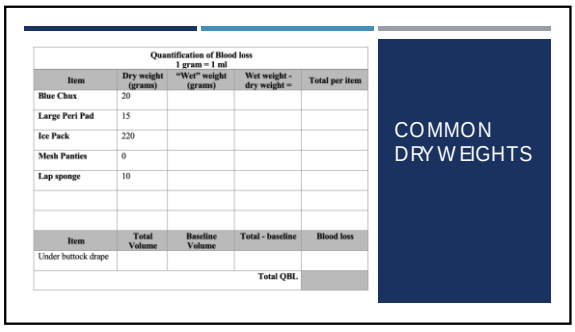

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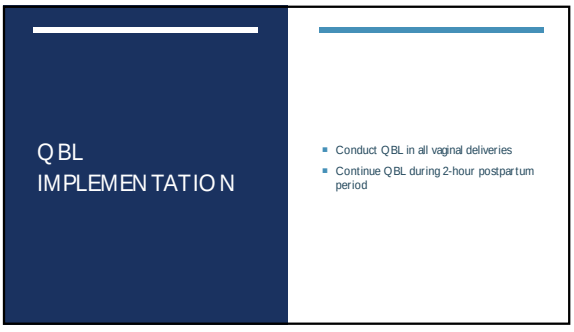

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POSTPARTUM HEMORRHAGE CART ORIENTATION

31

PPH CART

- Allows nurse to be present at the bedside
- Combines supplies in one location
- Assist in calculating QBL
- Familiarization with cart

32

INTERACTIVE QBL SKILLS LAB

33

ESTIMATE BLOOD LOSS _____ ML?

34

QUANTIFY BLOOD LOSS _____ ML?

35

REFERENCES

- Association of Women's Health, Obstetric and Neonatal Nurses. (2015). Quantification of blood loss: AWHONN practice brief number. *Journal of Obstetric, Gynecology, & Neonatal Nursing*, 44, 158-160. 10.1111/1552-6909.12519
- Belfort, M. (2021). Overview of postpartum hemorrhage. *UpToDate*: Retrieved October 20, 2019, from https://www-uptodate-com.library.pittstate.edu/contents/overview-of-postpartum-hemorrhage?search=postpartum%20hemorrhage&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1.
- *California Maternal Quality Care Collaborative* . (2018). *OB hemorrhage tool kit 2.0*: https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit.
- *Center for Disease Control and Prevention*. (2020). Pregnancy mortality surveillance system: https://www.cdc.gov/reproductivehealth/maternal-mortality

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Appendix F

Pittsburg State University Application for Approval of Investigations Involving the Use of Human Subjects

Pittsburg State University
Application for Approval of Investigations
Involving the Use of Human Subjects

This application must be completed by the Investigator and sent to the Academic Affairs by the first Tuesday of the month during the fall and spring academic semesters to be considered for full review on the second Tuesday of the month.

Expedited and exempt reviews can be turned in any time. For questions about the review process contact Cindy Johnson at 620-235-4175 or at irb@pittstate.edu.

1. Investigator(s) Name(s): Marlee Cares
2. Department: Irene Ransom Bradley School of Nursing
3. Local Address: 3221 Briggs Parsons, KS 67357
4. Phone: 620-778-4578
5. E-Mail Address: mcares@gus.pittstate.edu
6. Project Title: Implementation and Evaluation of the Quantification of Blood Loss and Postpartum Hei
7. Expected Completion Date: May 2021
8. Expected Starting Date: January 2021
9. Application review type. Use review criteria in Form CR-1 to determine category. Check all that apply.

☐ Full Review	☐ Protocol Change	☐ Thesis/Special Investigation
☐ Expedited Review	☐ Continued Review	☐ Faculty Research
☑ Exempt Review	☐ External Support	☐ Publish Research
☐ A Class Project	☐ Research in Foreign Country	

10. If notification of human subject approval is required give date required: N/A
    Name of agency: Labette Health Obstetrics department
11. If you are a student, complete the following:
    Faculty Sponsor: Dr. Barbara McClaskey
    Department: Irene Ransom Bradley School of Nursing
    Phone: 620-235-4443

When submitting to an external IRB, a full copy of that application must be submitted to the PSU IRB as well.

CERTIFICATION AND APPROVAL

Certification by Investigator: I certify that (a) the information presented in this application is accurate, (b)only the procedures approved by the IRB will be used in this project, (c)modifications to this project will be submitted for approval prior to use, and that all guidelines outlined in the PSU Policy and Assurance Handbook for the Protection of Human Research Subjects will be followed as well as all applicable federal, state and local laws regarding the protection of human subjects in research as outlined in Form VA-1.

MarleeCares) 01/08/2021

Signature of Investigator Date

Faculty Sponsor: If the Investigator is a student, his/her Faculty Sponsor must approve this application. I certify that this project is under my direct supervision and that I accept the responsibility for ensuring that all provisions of approval are met by the investigator.

Barbara McClaskey Digitally signed by Barbara McClaskey Date: 2021.01.08 13:54:10 -06'00'

Signature of Faculty Sponsor Date

Department Review Committee Chair: I acknowledge that this research is in keeping with the standards set by our department, university, state and federal agencies and I assure that the student principal investigator has met all departmental requirements for review and approval of this research.

Signature of Department Review committee Chairperson 1/13/2021 Date

01/15/21

Institutional Review Board Chairperson Date

1. **Description of the Subjects (If advertising for subjects, include a copy of the proposed advertisement.)**

A. How many subjects will be involved? 20 obstetric nurses

B. Subject Population (check all that apply):

☑ Adults ☐ Prisoners ☐ Minors ☐ Intellectual Disability

☐ Physically Ill ☐ Disabled ☐ Special Education

☐ Other (explain): _____

C. For projects conducted in schools or school settings, written approval from the School Administrator must be obtained. Please attach to end of this application.

What grade are the students in? N/A

Approximate Age of Students? N/A

How many classes involved? N/A

What subject: (secondary)? N/A