Reducing Post-Partum Hemorrhage in a Community Hospital by Utilizing an Obstetric Hemorrhage: Patient Safety Bundle

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DNPV-767

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May 25, 2022

Abstract

A community-based hospital in Brooklyn was chosen as the location for the Doctor of Nursing Practice (DNP) quality improvement project, which was implemented in March of 2022. A consensus was reached among the stakeholders that postpartum hemorrhage (PPH) is an issue for concern that could improve with the implementation of the obstetrical hemorrhage patient safety bundle (OHPSB). The participants received instruction regarding the statistics of PPH at the project site as well as how to use the OHPSB. The protocol was comprised of evidence-based treatments including the OHPSB, evaluations, and the measurement of blood loss. The post test scores were higher than the pretest scores following implementation of the OHPSB. A chart audit was utilized to determine if participants were compliant with the usage of the OHPSB. The project lead measured the compliance rate each week beginning with week two of the implementation phase, it is believed that reducing the incidence of postpartum hemorrhage can be accomplished by implementing an OHPSB in a community-based hospital. As a result of the projects implementation the diagnosis of PPH declined from 20 % to 15% over the five-week period. In general, the OHPSB helped participants become more compliant, competent, and confident in their treatment of patients who had a risk for postpartum hemorrhage.

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Postpartum hemorrhage (PPH) is an obstetric emergency that contributes to numerous occurrences of maternal morbidity and mortality. Hemorrhage is a leading cause of maternal death, counting for over a quarter of all maternal deaths globally (Tsolakidis et al., 2021). In the United States (US), it is the fourth leading cause of maternal mortality, and ranked first worldwide. PPH is defined as a blood loss of more than 500 ml following vaginal delivery or more than 1000ml after a cesarean section within 24 hours of birth.

As reported by the Department of Health, (between 2003 and 2005), hemorrhage accounted for 15.25 percent of all maternal deaths in New York State. Ninety-seven percent of all bleeding fatalities happened in women who were admitted to the hospital (Eniola et al.,2020). Women from all socioeconomic groups died, and there is an even greater number of "near misses" (women who suffered serious hemorrhages but lived were documented) (Eniola et al., 2020). Maternal morbidity, such as severe bleeding, blood clots, renal failure, stroke, or heart attack, affected roughly 100 women for every maternal mortality (Eniola et al.,2020). Maternal morbidity rose by 34% in New York City from 2008 to 2014, affecting 2,500 to 3,000 women each year (Eniola et al.,2020).

The Joint Commission is a global leader in healthcare quality improvement and patient safety. The Joint Commission assists organizations across the continuum of care to lead the path to do no harm via leading practices, unrivaled knowledge, experience, and high standards (2021). The Joint Commission accredits and certifies approximately 22,000 healthcare organizations and programs (2021). In the United States, an organization must undertake an on-site survey by a

Joint Commission survey team at least every three years to achieve and retain The Gold Seal of Approval from The Joint Commission.

According to recent research identified by the Joint Commission, maternal hemorrhage is on the rise in affluent countries, including the US (2019). In addition, the rate of hemorrhage-related severe maternal morbidity (defined as the need for four or more units of packed red blood cells) and/or Intensive Care Unit (ICU) level care during the birth process or the immediate postpartum period has surpassed the rate of severe maternal morbidity associated with other causes (2019). According to a study of the Joint Commission sentinel event database for occurrences categorized as maternal death or severe maternal morbidity from 2010 to 2019, maternal hemorrhage was a contributing factor in 51% of reported sentinel events (2019). In efforts to change the direction of these rising rates, the Joint Commission recommends standardization in care. In July of 2020 the Joint Commission released a quick safety advisory to address concern for maternal hemorrhage, which outlined the standardization of care for hemorrhage.

As a result of Joint Commission's recommendations, The Council of Patient Safety in Women's Health Care (CPSWHC)' have developed an Obstetric Hemorrhage Patient Safety Bundle (OHPSB). It provides structured procedures for improving care and outcomes using evidence-based practices. This bundle isn't a new guideline; rather, it's a collection of existing rules and suggestions organized in a way that makes it easier to follow them consistently. Implementation of the guidelines aim to decrease negative outcomes for mothers and babies and sets the foundation for teamwork. The obstetric patient safety bundle includes four elements, readiness, recognition, response, and reporting which has demonstrated a reduction in morbidity and mortality (Joint Commission, 2019).

As a consequence, of the rising rates of maternal hemorrhage in the United States, The Joint Commission has released a new Quick Safety advisory titled "Proactive prevention of maternal mortality from maternal hemorrhage." The advice examines a new Joint Commission criteria that has gone into effect on July 1, 2020, and addresses complications in maternal hemorrhage. This advisory introduces the OHPSB as well. This DNP project proposes to reduce the prevalence of PPH at a community hospital by utilizing the OHPSB to improve nursing practice and maintain Joint Commission accreditation.

Background

The diagnosis of PPH is directly related to blood loss, which has a great impact on a patient's morbidity or mortality. The amount of blood loss directs the treatment of care the patient is to receive and-determines what protocols will be implemented. It is well known, that measuring blood loss during delivery is difficult and estimations can be erroneous (Tsolakidis et al., 2021). Providers who estimate blood loss have the potential to delay the usage of postpartum hemorrhage protocols due to inaccuracies of their estimations. PPH has also contributed to major complications for patients because of the additional life-threatening interventions and procedures implemented to reverse the hemorrhaging (Jiranee et al., 2021).

Delayed detection or inappropriate clinical treatments can result in severe complications such as hemorrhagic shock, acute respiratory distress syndrome, disseminated intravascular coagulation, acute renal failure, loss of fertility, pituitary necrosis (Sheehan syndrome), and even maternal death (Liu et al., 2020).

In 2018, the maternal mortality ratio rate in the US was 17.4 per 100,000 pregnancies, which equated to about 660 maternal fatalities (Declercq & Zephyrin et al 2020). According to the Association of Women's Health Obstetric and Neonatal Nurses (AWHONN), 125,000

women will suffer an obstetric emergency each year which is equivalent to 2.9 % of all births (2016). As reported by AWHONN, the US is ranked 47th in the world for maternal mortality related to hemorrhage (2016). Following the increasing PPH-related morbidity and mortality rates, various stakeholders, including the government and the healthcare sector, have committed to developing mechanisms to promote the wellbeing of women and reduce mortality rates.

PPH is considered a preventable condition, however, "in obstetrics, reliable blood loss measurement, identification of risk factors, and prompt detection of postpartum hemorrhage remain important challenges" (Andrikopoulou & Alton, 2019). In addition, delays and substandard care in the identification and management of hemorrhaging are to blame for maternal mortality and morbidity caused by post-partum hemorrhage (Jiranee et al., 2021). Missed or delayed diagnosis, as well as a delay in initiating interventions, have frequently been identified as recurrent issues in the management of women with significant obstetric blood loss in maternal morbidity and mortality evaluations. According to the American College of Obstetricians and Gynecologist [ACOG] (2019), an investigation revealed, variables related with detection and management of postpartum hemorrhage result from imprecise estimation of blood loss immediately after birth and the early postpartum period. And this is attributed to being the primary cause of delayed response to hemorrhage (ACOG, 2019). As a result, improving the accuracy and timeliness of a postpartum hemorrhage diagnosis and treatment is a priority. One significant cause for this problem is that most doctors greatly underestimate blood loss after delivery, and fail to recognize considerable blood loss early, which leads to increased morbidity and death (Browne 2021). Overestimation of blood loss can result in hazardous procedures and the possibility of infection via blood products. According to the Association of Women's Health,

Obstetric and Neonatal Nurses (AWHONN) blood loss should be monitored formally after each delivery (2015).

Obstetrical hemorrhage may be challenging to predict due to 20% of women have no identified risk factors; therefore, all members of the obstetrical care team must always be prepared for this potentially life-threatening obstetrical emergency (Joint Commission, 2021). The obstetrical hemorrhage patient safety bundle is a guideline implemented to reduce and prevent the prevalence of maternal morbidity and mortality attributed to hemorrhage. It contains four domains known as the four "R's," readiness, recognition, response, and reporting. Readiness refers to the institutions ability to provide optimal care in the event of a hemorrhaging crisis. Readiness includes access to a hemorrhage cart, medications, treatment team, and blood products. Recognition includes identifying risk factors, performing risk assessments, actively manage the third stage of labor, and quantifying blood loss. AWHONN (2015) suggest the use of cumulative quantification of blood loss. Response describes the emergency management plan and includes the support provided to patient and family. Lastly, reporting establishes a culture of huddles and debriefs. High risk patients are identified, and successes and failures of the crisis are discussed. Reporting typically includes the multidisciplinary team.

Problem Identification

Early identification of PPH is a growing challenge in the local community hospital because current practice guidelines are not strictly adhered to. In obstetrics, reliable blood loss measurement, identification of risk factors, and prompt detection of postpartum hemorrhage remain important challenges (Andrikopoulou & D'Alton, 2019). There is strong data pointing to significant clinical gaps between current and actual practices (Jiranee et., .2021). Surveys taken from practicing registered nurses from the community hospital illustrate recognition of

postpartum hemorrhage after the patient was deemed stable and for transfer to step-down care. Current practice at the community hospital includes estimation of blood loss which plays a significant factor in delayed recognition of PPH. Another factor is lack of education and reinforcement of current evidence base practice. The OHPSB serves to optimize the quality of care and deliver on the Joint Commission's latest guidelines. It includes performance of risk assessments, quantification of blood loss, and actively managing the third stage of labor.

Project Question

In a Community Hospital, will implementation of an OHPSB compared to current practice reduce the risk of maternal morbidity and mortality over a 4–5-week period?

Search Terms

A systematic search on electronic databases including Touro University of Nevada Jay Sexter Library of Nursing, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, Cochrane library, Joint Commission, and Google Scholar was performed to examine relevant literature between 2016 to 2021. Key terms utilized included, "postpartum hemorrhage," "obstetrical hemorrhage protocol," Book reviews, newspaper articles, and dissertations were omitted from all database searches. "Obstetrical hemorrhage patient safety bundle," "and obstetrical hemorrhage national guidelines." The search phrase utilized in CINAHL "Implementing an obstetrical hemorrhage patient safety bundle in a community hospital" yielded 391 items. The term, "obstetrical hemorrhage protocol" yielded two articles. The Cochrane Library identified 1 article using the search term "Obstetrical hemorrhage patient safety bundle." Utilizing the same search phrase on Google Scholar, 5,000 articles were revealed. The search phrase "obstetrical hemorrhage" utilized on PubMed identified 109,000 articles. The term "obstetrical hemorrhage patient safety bundle" utilized on the Joint

Commission site yield 6 articles. The search term “obstetrical hemorrhage national guidelines” utilized on the AWHONN site revealed 11 articles.

The studies were subjected to an abstract evaluation to see whether they were peer-reviewed, represented best practice, and were relevant to the PICOT and the practice site's goal and vision. In addition, a review performed on the discussion and conclusion section, a final analytical analysis of the article, and clinical recommendations were narrowed down and selected for the final literature review. The publications that were eliminated were not appropriate to the practice setting, did not support the practice site's aims, did not reference national guidelines, were written in other languages, were not peer reviewed, were greater than five years, and were duplicated articles, and did not provide findings that could be replicated. Both governmental and professional organizations were searched for national guidelines. The selected articles were appraised and equivalent to level 1 and level V. In total, 20 articles were selected from search.

Review Synthesis

Post-partum hemorrhage is caused by complications such as uterine atony, retained placenta, birth canal lacerations, uterine rupture, placenta accrete, various forms of coagulopathies, uterine inversion, and infection which can be avoided (Simpson, 2018). The necessity of adopting an OHPSB is shown by the results of the literature review. The postpartum hemorrhage bundle is vital to reduce the prevalence of maternal morbidity and mortality. Some of the barriers include but are not limited to insufficient and lack of risk assessment, preparation, and delayed management (De Tina et al., 2019). The concepts many authors agree upon to prevent and manage PPH are readiness, recognition, response, and reporting. Readiness includes availability of medication, supplies, blood products, and

establishment of a team (Alliance for Innovation on Maternal Health, 2015). Recognition is the performance of risk assessments, performing quantitative blood loss, and actively managing the third stage of labor (Alliance for Innovation on Maternal Health, 2015) Response is the implementation of an emergency management plan. Reporting implies a culture of huddling, multidisciplinary reviews, and monitoring of outcomes (Alliance for Innovation on Maternal Health, 2015). The standardization in management of obstetrical patients satisfies the Joint Commissions quick safety advisory recommendation to reduce sentinel events (Joint Commission, 2019). Postpartum hemorrhage is a dangerous and life-threatening illness that might progress adversely if it is not detected early enough or treated incorrectly. Hemorrhagic shock, acute renal failure, pituitary necrosis (Sheehan syndrome), disseminated intravascular coagulation, and maternal mortality are all possible outcomes in the worst-case scenario (Liu et al., 2020).

Various studies were utilized in the literature review. The article written by Jiranee et.al (2021) conducted a cross sectional study. This study highlighted the use of evidence-based recommendations for the prevention and treatment of postpartum hemorrhage as it reduces maternal morbidity and death considerably. This article is significant to the project in that it satisfies the domain “response” in the obstetric hemorrhage patient safety bundle. Hire et.al, (2020) completed an observational trial to compare quantification of blood loss with estimation of blood loss as it relates to activation and or detection of the hemorrhage protocol. This article entertains the domain “recognition” in the bundle as quantifying blood loss will accurately identify PPH in addition to patient symptoms. Eniola et.al, (2020) conducted a qualitative study that at attributes PPH to social determinants of health and maternal risk factors. A retrospective study conducted aimed to identify risk factors, causes, and adverse effects of PPH (Liu et

al.,2020). A cross-sectional study performed by Sheldon (2015) identified current practice, risk factors, as well as consequences related to PPH. Data collected from the Joint Commission (2019) and CDC revealed maternal risk factors and healthcare disparities were associated with racial/ ethnic backgrounds. The risk factors reported included but are not limited to uterine atony, lacerations, retained placenta, and coagulation defects (Evensen et al., 2017). Identification of risk factors satisfies the domain of readiness in the OHPSB. A narrative review by Tsolakis et.al (2021) reports the significance of PPH in America and the inaccuracies of blood loss reporting resulting in untimely recognition and intervention. This review also highlights the need for standardization or implementation of parameters to reduce the incidence of PPH.

The emerging themes from the presenting articles are delayed recognition, identification, and timely intervention of PPH. Delayed recognition and timely intervention may be associated with lack of standardization of care or enforcement of current protocols in place, and the necessity for a guideline is apparent. Each article reflects on the importance of a distinct domain of the patient safety bundle.

As reported by the Joint Commission, although there are some recognized risk factors for postpartum hemorrhage it's worth noting that 20% of hemorrhages occur in women who have no risk factors (2019). All members of the obstetrical care team must be prepared for this often-unpredictable emergency at all times. The pillars of high-reliability thinking are situational awareness and obsession with failure, both of which are essential components of care methods in today's fast-paced clinical care domains. The potential that any woman in labor may become a victim of PPH again places emphasis on the readiness domain of the safety bundle.

The provided articles illustrate a lack of standardization as evident by the growing numbers of PPH. According to the Joint Commission, from 1993 to 2014, the rate of postpartum

hemorrhage climbed from 7.9 %to 39.7%, this included the necessity of a blood transfusion (2021). This can be attributed to gaps in care and non-adherence to practice guidelines. However, in totality, the articles support the OHPSB. The bundle addresses a teamwork solution in reducing the prevalence of maternal morbidity and mortality related to PPH.

Literature Theme Development

Background information, current understanding, national guidelines related to the quality gap, and contextual information outlining any suboptimal treatment that has a detrimental influence on the quality at the project location are all discussed. The articles chosen for this project covered post-partum hemorrhage and wide range of topics that were relevant in the formulation of the project's themes. The project themes enforce delayed recognition, identification, and timely intervention as attributing factors to PPH and the importance of standardization of care. The link between many variables such as insufficient performance of risk assessments and estimation of blood loss provided adequate grounds for postpartum hemorrhage's frequency in the community hospital**.** The Joint Commission as well as the selected articles **s**uggest PPH can be positively impacted by standardizing care, hence the creation of the obstetrical hemorrhage patient safety bundle.

Impact of PPH

PPH is a serious labor complication that can be unfavorable to a women's health. The impact of PPH may vary from anemia, administration of blood products, hysterectomy, infertility, myocardial ischemia, and depression (Evensen et al., 2017). Renal failure, respiratory failure, extended breathing, coagulopathy/disseminated intravascular coagulation (DIC), sepsis, anemia, superficial venous thrombosis, and uterine perforation were among the adverse health outcomes documented in the early postpartum period after experiencing a PPH. Complications

reported in later months tended to be less severe; however, some of these complications have developed into chronic conditions (Carroll et al., 2016). Complications of PPH emphasizes the importance of performing risk assessments. It is also important to know, risk assessments do not negate the fact that PPH occurs in 20% of women without risk (Evensen et al., 2017). The PPH potential in all laboring women stresses the importance of remaining in a state of readiness. Evensen et al., (2017) addresses the "R's" in the OHPSB. The author identified readiness and the observation of easy accessibility to a hemorrhage cart, blood products, and availability of emergent medication. Recognition is identified in through the observation of screening and assessments. The literature clearly identifies complications of PPH and importance of standardization in care.

Quality Gap

The literature continues to identify barriers to obstetrical hemorrhage as inefficient assessments, delayed recognition, and delayed implementation of interventions. Failure to identify significant blood loss and promptly execute treatments can result in death (Browne. M. 2021). According to a new CDC Foundation research, hospitals may be able to avoid up to 70% of hemorrhage-related maternal fatalities. This result indicates that the leading causes of maternal death can be reduced if not eliminated. This indicates that, with the appropriate methods, we may significantly reduce one of the leading causes of maternal death. Furthermore, to address the racial disparity that Black women are more likely than White women to die from postpartum hemorrhage, utilizing the OHPSB has important implications for achieving health equity.

National Guidelines/Initiatives

Approximately 3% to 5% of obstetric patients will have postpartum hemorrhage (Evensen et al., 2017). These avoidable occurrences account for one-fourth of maternal fatalities globally and 12% of maternal deaths in the US each year (Evensen et al., 2017) Early postpartum hemorrhage is defined by the ACOG as at least 1,000 mL total blood loss or loss of blood coinciding with signs and symptoms of anemia. The Council on Patient Safety in Women's Health Care highlighted key actions that labor, and delivery units should follow to reduce the occurrence and severity of postpartum hemorrhage. Among the proposals are the development of a bleeding cart with supplies, as well as the utilization of huddles, quick reaction teams, and large transfusion protocols (Evenson., 2017). Advanced Life Support in Obstetrics (ALSO) training can be used as part of a comprehensive strategy to improve patient care.

Prevention & Management Protocol

The literature agrees, prevention and management are effective with implementation of an OHPSB. Patient care is improved when safety bundles are used. A safety bundle provides a structured way of improving care processes and patient outcomes. A straightforward set of evidence-based practices, when performed collectively and reliably, have been proven to improve patient outcomes (Browne, M. 2021). The OHPSB standardizes identification and response. Implementation of the OHPSB necessitates a state of readiness despite the absence of risk factors. Browne, M. (2021), included in the OHPSB, a customized assessment of the four "T's," tone, trauma, tissue, and thrombin. Assessment of tone is important as it attributes to 70%of PPH (ACOG2017). Tissue trauma may lead to PPH as well as a retained placenta; finally, thrombin refers to any alterations with clotting (Browne, M. 2021).

Agreement in the literature is evident, the US postpartum hemorrhage is still the top cause of morbidity and mortality Lutgendorf et al., (2017), Evensen et al, Browne, M., Jiranee et

al., etc. The use of massive transfusion procedures intended to rapidly release transfusion packs including packed red cells, clotting factors, and platelets, has been demonstrated that comprehensive bleeding protocols and postpartum hemorrhage bundles promote patient safety. Although a massive transfusion protocol is an important step in obtaining needed blood products, systems processes, and teamwork, communication must ensure prompt recognition of the need for a massive transfusion, timely delivery of life-saving measures (Lutgendorf et al., 2017). All processes mentioned in this section falls under the umbrella of standardization of care, hence the importance of the OHPSB.

Review of Study Methods

The literature review's research methodologies were consistent and parallel. Randomized controlled trials, meta-analyses of randomized controlled trials, retrospective and observation studies, mixed techniques, comparative studies, multicentered cross-sectional research, integrative reviews, and systematic reviews of peer reviewed literature were all included in the investigations. The following research approaches and procedures were found to be suitable for applying the OHPSB. Inpatient obstetrical units were used for part of the research. Andrikapoulou,M.& De' Alton (2020), AWHONN (2015), and Hire et al.,(2020) assessed quantification of blood loss in standardizing measurements for accuracy and early detection of blood loss. Bazirete et al., (2020) surveyed risk factor as it attributes to identification of patient at risk, thereby lowering the risk of PPH. De Tina et al.,(2020), Eniola et al.,(2020), and Jiranee et al., (2020) along with Joint Commission presented studies which identified a lack of standardization alignment with maternal morbidity and mortality and emphasizing the need for standardization to aid in lowering the prevalence of PPH. Evensen (2020) placed emphasis on standardization of active management of the third stage of labor.

Collectively the research methodologies utilized for this project satisfy both the DNP project aims and objectives. Standardizing care in readiness, recognition, response, and reporting will serve to benefit the project site as evident in the literature. Research methods can be duplicated and illustrated in the implementation of the OHPSB.

Aims of the Project

The aim of this project is to reduce maternal morbidity and mortality after childbirth as evidenced by a decline in incidents of PPH by utilizing the OHPSB.

Project Objectives

1. To reduce the incident of maternal morbidity and mortality by promoting early identification and management of Postpartum hemorrhage with utilization of the OHPSB
2. Implement multidisciplinary staff education to the OHPSB.
3. Assess staff proficiency and OHPSB compliance utilizing pre and posttest

Theoretical Model: The Donabedian Framework

Avedis Donabedian formulated the theory for assessing quality of care that is versatile enough to be used in a range of circumstances. The model is constructed on three interconnected concepts: care structures and clinical outcomes, all in which will be crucial to implementing the OHPSB. (See Appendix A)

The Model's History and Application

The Donabedian model was constructed to describe and evaluate the techniques used to measure quality of care, as well as to suggest some future research areas. In a 1966 paper titled "Evaluating the Quality of Medical Care," Donabedian outlined the three elements that make up his framework. Donabedian (1966) concentrated on evaluating framework and approach at the

medical professional interaction level, omitting factors linked with high-quality care delivery at the broader or population level (Donabedian, 1966). Furthermore, the author's first article on the framework did not focus on administrative components. As a result, he saw quality of care as a general concept impacted by a variety of variables and subject to evolve, but he characterized it as a representation of present objectives and ideals (Donabedian, 1966) Due to the evolving use of technology in the healthcare system and in the greater culture information technology requires separate component (Donabedian, 1966). Later, Donabedian created an insightful prologue to his research techniques, defining the three characteristics that he believed were critical to assessing the quality of healthcare service. Throughout the second half of the twentieth century, the Donabedian Model gained prominence in public health.

In 1980, Donabedian released a book that expanded on the three framework principles. Donabedian (1980) defines the care structures and processes, as well as the outcomes, while emphasizing conceptual frameworks shouldn't be regarded as quality characteristics, other than as categorizations of models that can be used to infer on the quality of health care quality delivery.

The Donabedian Model was created with functionality in mind so that it may be used in a variety of contexts. To improve the flow or interchange of information or patients, the model may be used to make structural and procedural changes inside any healthcare service unit. The theoretical framework may be extended to systems and practices, which include detection and treatment of complications with the goal of reducing morbidity and mortality. The lack of customized care delivery procedures at the project site, for example, leads to an increase in the number of obstetrical hemorrhage cases in the community. The poor coordination and disparate nature of care for childbearing women, provides evidence linking healthcare system elements to

improved obstetrical hemorrhage outcomes, can be addressed, showcasing opportunities for process improvement through mechanisms such as the OHPSB (LoPorto, 2020; Voyce et al., 2015).

Incorporating the Model into Practice

Examining the present obstetrical hemorrhage care system at the project site revealed challenges which includes adhering to best-practice resulting in a hindrance of quality-of-care. An examination of hospital procedures and degrees of healthcare professional expertise in the prevention and management of obstetrical hemorrhage have revealed how unclear protocols/processes in care delivery for this population result in greater morbidity and death rates. The information generated through this DNP project in terms of obstetrical hemorrhage, healthcare professional knowledge and expertise, and the adaptation (or absence) of best practices such as, the OHPSB, will be used to improve performance and care establishing changes in practice to enhance health outcomes in the future.

The Donabedian Framework can be incorporated at the project site to evaluate the quality of care while integrating progression mechanisms across general practice, as a framework for better health outcomes and care quality from the project site standpoint. Because it assesses healthcare systems and implements solution using a multidimensional approach, the framework is extremely relevant to the project location. By enhancing multidisciplinary communications and workers' perception of quality of treatment, improvements in structure and process have the potential to improve healthcare outcomes. The United States Institute for Healthcare Improvement's 'Whole System Measures' covers the three ideas of the Donabedian paradigm from a contemporary care delivery viewpoint (Doolan-Noble et al., 2015). The three categories, according to the institute, are critical for nurse leaders and other stakeholders because they may

be utilized to produce information for analyzing performance of the organization and creating strategic and effective quality improvement strategies (Doolan-Noble et al., 2015; Elliott-Mainwaring, 2020). The processes can be used as a method for analyzing systemwide care levels of quality over timeframes, outcome measures compared to defined organizational goals, or in comparison to similar healthcare professionals, in addition to assisting in the quality improvement process for various healthcare institutions. As a result, the suggested OHPSB protocol may be used to execute these "Whole System Measures" utilizing the Donabedian Framework to enhance care outcomes at the project site.

OHPSB and the Donabedian Framework: Improving Outcomes to PPH

In the DNP project, the Donabedian model may be used as a change approach for avoiding and controlling obstetrical hemorrhage. According to the Journal of Obstetrics and Gynecology (2015), whereas the bundle components can be customized to match the needs of specific facilities, consistency within a single institution is strongly recommended. Despite the fact that the OHPSB has a lot of potential for standardizing quality of care at the project site, challenges may be apparent in restructuring current practice to best practice. Implementing the OHPSB at the project site will allow all healthcare workers to feel and work as effective members of the treatment team. A collaborative team approach might hasten the implementation of the OHPSB, which is designed to further improve the outcomes of PPH. The Donabedian ideas of excellent care delivery serve as a basis for this DNP project's effective implementation. To begin, the project site must include efficient and effective communication to daily organizational structure. Successful implementation of the OHPSB is dependent on the involvement of all members of the project site. While implementing the OHPSB at the project site necessitates intricate organizational challenges such as task adjustments, multidisciplinary

interaction, and modifications in communication; the OHPSB benefits are critical in the effective implementation of the proposed DNP project.

Major Tenets of the Theory

Structure

Structure is defined as the resources available for working on quality improvement, such as money and time (Kunkel et al., 2007). Structure is also aligned with management of quality of systems, such as routine documentation and employee assistance (Kunkel et al., 2007). Structure also includes adequate staffing, effective equipment, and supplies. Implementation of the OHPSB will require many elements of structure as it serves as the foundation to success. Money, time, and integrating multidisciplinary systems to the avail of positive outcomes and will benefit the implementation of the OHPSB.

Process

Process refers to the culture of the quality improvement and collaboration within and between professions (Kunkelet al., 2007). Any operations that manage and monitor the service supplied, solve new issues that may occur, collaborate with provider, and record data are included in the process (Rai & Wood 2017). In order for successful implementation of the OHPSB, it must undergo a process to determine its effectiveness and improvement in quality of care. It allows for the organization to evaluate and make changes as needed. The projects' goal is to change current practice to best practice through implementation of the OHPSB.

Outcomes

The term "outcome" refers to the assessment of goal attainment and the development of competence in the context of quality improvement (Kunkel et al., 2007). In order to assess the

healthcare concept, the outcomes must be measured (Greene, 2018). The outcome of this project will be measured according to the occurrence of PPH after implementation of the OHPSB.

Project Setting

The project site is a labor and delivery unit within a local community hospital located in the east Flatbush neighborhood of Brooklyn, New York. The hospital has over 627 beds and is well known for being a level 1 trauma center. It is in a low to middle socioeconomic neighborhood, which encompasses diverse populations such as African Americans and migrants from around the world. The project site is affiliated with the State University of New York, Downstate College of Medicine. The institution accepts a number of insurances, including Medicaid, Medicare, and private insurances, and the majority of patients have Medicaid managed insurance plans.

The labor and delivery unit has eight delivery suites, seven triage beds, two operating rooms, and a four-bed recovery unit. The obstetric department cares for childbearing women and has a director, assistant director, and a total of forty registered nurses (RN), who care for women who are having perinatal complications and placed on bedrest, laboring women, and women who have delivered offspring. The post-partum unit consists of forty-five beds and the care focuses on women who have already delivered their infants.

EPIC is the electronic health record system that is being used by the project site. It has a variety of capabilities, including real-time documentation, medication administration, and instant alerts. EPIC manages doctor's orders, as well as access to documentation written by healthcare workers from a variety of disciplines across the hospital's campus. EPIC also allows for the use of a single chart, which includes one medical record number, that can be followed for all aspects of care, and can be accessed through all healthcare institutions that utilize EPIC. This feature

minimizes discrepancies and promote accuracy in healthcare information. EPIC is instrumental in making it possible to facilitate nursing and patient education.

Population of Interest

The project site is staffed with forty registered nurses (RN) primarily educated with a Baccalaureate degree, ten percent of whom have a master's degree. Staffing at the project site also includes eight anesthesiologists, twelve attending Medical Doctors, four masters prepared midwives, and ten patient care technicians with the ability to function as scrub technicians. There are twenty RNs, and six patient care technicians on the postpartum unit. The same attending providers cover both the labor and delivery unit along with the postpartum unit. There are approximately one hundred deliveries each month. The RNs perform assessments, implement nursing interventions, administer medication, and care for childbearing women, and their newborns. Anesthesiologists provide pain management and respiratory support. The attending physician oversees the care of patients in the unit, deliver newborns, facilitate and perform surgical procedures, and prescribe treatments. The Nurse Midwives deliver patients defined as low risk, meaning the patient received adequate prenatal care, has no comorbidities, or a low risk for hemorrhage. Patient care technicians assist both RN's and MD's with providing patient comfort with activities of daily living and scrubbing in the operating room to prepare for assisting in surgical procedures.

The indirect population are women between the age of sixteen to forty-seven years who have just delivered a baby. These patients comprise a variety of ethnicities, have various religions, as well as cultures. Migrants from the Caribbean, Africa, Pakistan, and other countries seek care at the project site. The health of the patient population is diverse related to

comorbidities; the most common comorbidities diagnosed are diabetes, hypertension, and sickle cell disease.

Stakeholders

The nurse manager and nurse educator have given permission to use the project site (see Appendix B). An affiliation agreement is not required. The stakeholders at the project site include the Director of Nursing, Nurse Manger, Clinical Educator, RNs, physicians, patients, and their family members. The Director of Nursing, Nurse Manager, and Nurse educator serves as the point of resource by answering questions and addressing concerns regarding the implementation of the project. In addition, they will ensure the project is compliant with institution guidelines by drawing parallels to institutional policies and procedures. The physicians will ensure compliance with risk assessment and following through with medication orders, and escalating care as the patient presents. This will be monitored through chart audits and feedback. The patients and family members serve as indirect stakeholders as they will be affected by the practice change. The practice change will enable early identification and prevention of PPH; thereby, reducing the risk of hemorrhage, morbidity, and mortality. The stakeholders are in agreement with the project topic to implement the obstetrical hemorrhage patient safety bundle. In a personal communication the stakeholders believe the project will be beneficial in identifying childbearing women at risk and lowering the incident of postpartum hemorrhage. A plan was devised with the nurse manager, nurse educator, and physicians, to communicate progress on a weekly basis through a combination of in-person practice meetings, remote conferences, group emails, texts, and phone calls.

Intervention

The intervention will comprise of adopting the OHPSB during a four-to-five-week period. The DNP project will be instituted in March 2022. The proposal's foundational development was concluded in October 2021. A literature assessment, identification of the problem at the project location, and development of the project question and objectives were all part of the foundational work. To facilitate project implementation, a theoretical framework was chosen. In December 2021, the project's design was completed. Identifying and defining the target population, setting, and stakeholders were all selected to promote a quality improvement theme that would center on improving nursing practice in order to enhance patient care while also emphasizing the importance of leadership results. Research was conducted during the literature review to identify gaps between the literature and current practice at the project site as well as to find successful evidence-based policies, protocols, or guidelines that would be appropriate to use. Appropriate evidence-based best practices were discovered and authorization for their utilization in the protocol implementation was acquired. Participant education and knowledge evaluation before and after an educational program, as well as protocol compliance, will be evaluated and recorded.

This DNP project will be implemented in March of 2022. On February 21st, 2022, reminders were emailed to participants. In the first week of implementation, the project lead will conduct educational programs on both day and night shift to ensure all participants attend. A pretest will be administered and collected prior to initiating the educational program. Once the educational program is completed, a posttest will be administered and collected on week five, at the end of the final week of implementation. The OHPSB protocol will be implemented the second week of the implementation phase. The project lead will be present at the project site to

ensure smooth implementation, to answer any questions, address any concerns, and to provide support for participants. The implementation of the OHPSB protocol will continue from week two through week five. The project lead will be present to monitor progress, troubleshoot and address concerns if needed, meet with stakeholders, and to support participants throughout protocol implementation.

Tools

Several tools will be utilized throughout the implementation process. These tools were chosen by the project lead to assist in the execution of the practice change, to document findings through data collection, and to measure the outcomes to determine if the project objectives were achieved. In this section the specific tools chosen for this project will be introduced. The discussion will include who developed the tool, how the tool is validated, and if permission to utilize the tool is required and from whom.

Obstetrical Hemorrhage Patient Safety Bundle

The obstetrical hemorrhage and patient safety bundle (see Appendix C) promotes assessment and identification of childbearing women who are at risk for postpartum hemorrhage. The protocol provides standardization of care, which improves outcomes and care quality (Joseph et.al., 2020). The bundle includes the Association of Women's Health and Neonatal Nurse's, postpartum hemorrhage risk assessment tool. The risk assessment will be performed on all patients to determine their risk score as low, medium, or high. Risk assessments will be performed by doctors upon admission and will be followed up by nurses. The postpartum hemorrhage risk assessment will ask questions regarding patients' history and presenting status. The questions will be regarding cesarean history, vaginal delivery history, bleeding disorder

history, evaluation of placenta, fetal weight, and body mass index. The OHPSB will be incorporated in the Electronic Health Record.

Protocol Flowchart

The OHPSB protocol flowchart will be printed, and stakeholders will be given a copy to evaluate, determine its utilization, and whether modification would be necessary to fit the workflow at the project site. The flowchart will show the assessments and procedure step by step for quick referencing. (see Appendix D) Included in the flowchart will be drug management suggestions, blood loss measurement instructions, and a referral for hysterectomy for unresolved bleeding.

Quantification of Blood Loss Form

The quantification of blood loss form will be utilized by participants to measure blood loss accurately. The quantification of blood loss form will facilitate precise measuring of blood loss by detailing the dry weights of standard material used on the unit, which will provide ease when subtracting the dry weights from wet weight. (see Appendix E) The usefulness of the quantitative blood loss form measurements is beneficial to clinical outcomes. It has been shown that quantitative techniques of detecting obstetric blood loss are more accurate than visual estimate. According to research, the use of quantitative approaches increased the chance of identifying women who had a history of postpartum hemorrhage after giving birth (ACOG, 2019).

Pre and Post Test Tool

A pre-test tool is utilized to identify current practice and knowledge in recognizing patients at risk for PPH. This test will include ten-questions that are already developed, acquired from propofs.com. Training for Proprofs is not required. ProProfs is an online service that allows

users to take tests and obtain training. (see Appendix F) Proprofs is a platform that allows for the distribution of questions to participants. The identities of participants responses will not be revealed. Permission to utilize this test was not needed. This tool will be administered before implementation of the project and after project completion. The posttest will be obtained to determine if there is an increase in knowledge after implementation of the OHPSB. An increase in posttest scores in comparison to pre-test scores will demonstrate improved knowledge and understanding.

Chart Audit tool

A chart audit tool was developed to audit all patient charts starting on the first day of implementation of the project. The audit will be utilized to determine compliance of participants utilizing the OHPSB. (see Appendix G) The chart audit will be performed by the project lead to ascertain if the participant used the bundle correctly. The chart audit will determine if participants complied with screening their assigned patients, identified low, moderate, and high-risk patients, prioritize patients who scored moderate to high on the screening tool by notifying stakeholders of the potential PPH risk, and implement the OHPSB as instructed. Screening will be performed on patients who present to labor and delivery units. The patients will be identified as low, moderate, to high risk. Stakeholders will be alerted regarding patients identified as moderate to high risk. Stakeholders will be followed through for appropriate implementation of the OHPSB as demonstrated in the instructions. Chart audits will begin the day after the first group of participants has completed their training and will continue for a total of four weeks. Every week, 100 pregnant women are evaluated at the project location. An audit will be performed on a portion of the charts since the project lead is the only one gathering data. An agreement was established at a meeting between the project lead and stakeholders, the project

lead would examine 20 percent of the charts on a random basis. A variety of charts will be used to guarantee that all or as many participants as feasible can be tracked.

Education Presentation

A power point presentation and handouts will be produced to demonstrate the OHPSB and will be used by the project lead to educate the stakeholders. During the first week of the project, the educational training and presentation will be provided to participants. (see Appendix H) The goal is to train all personnel via power point presentation throughout week one. Those participants who cannot attend the live presentations will be required to join one of three open Zoom sessions offered. The recorded presentation will not be placed in the project site online educational program. Throughout the five weeks of implementation the project lead will remain on site the project lead will provide the option for participants to send emails and texts to address questions and concerns about the project.

Study of Intervention/Data Collection

The purpose of data collection and analysis is to determine whether this intervention has met the objectives. This section will discuss how data will be collected to measure the participants' compliance with the OHPSB protocol. As mentioned earlier, the participants will also be tested before and after the educational session. The data derived from the tests will be collected and analyzed to determine if the participants' knowledge regarding PPH and the OHPSB protocol has improved by comparison.

Chart Audits

A retrospective chart audit will be conducted after weekly implementation of the OHPSB protocol. The initial chart audit will be at the beginning of week three to capture compliance for week two of project implementation or week one of protocol employment. This audit will be

utilized as a formative evaluation of the participants by the project lead. The project lead should be able to ascertain if further education or observation is needed through this weekly audit during the implementation period. The chart audit will be a review of the EHR utilizing the chart audit tool designed by the project lead. All charts of patients admitted to the labor and delivery unit will be audited during the implementation period for protocol compliance. Data extracted will identify charts discovered as compliant and noncompliant.

The chart audit will not acquire any personal information about the patient or the participant. The information contained in the EHR is safeguarded by a unique password assigned to the participant. There will be no extraction of personally identifiable information, and Health Insurance Portability and Accountability Act (HIPAA) of 1996 will continue to be observed. The only information that will be collected during the audit will be how compliant participants were with the OHPSB; specifically, whether they followed the protocol, conducted risk assessments, and chose an appropriate intervention. The chart audit tool will be stored in secured locked filing cabinet. The location of the filing cabinet is in the file room only accessible by key. During implementation of project only project lead will have access to the key. Providers will be granted a unique number to maintain their confidentiality. Only the project leader will be aware of who the numbers correspond to.

The project lead will be present at the project site two to three times a week where, twenty percent of the total amount of charts will be subjected to a weekly audit. All data collected from weeks two through five will be utilized. The project lead will document compliance against non-compliance with the OHPSB protocol on the chart audit tool. The results will be determined by calculating an overall percentage with a 95% compliance interval for all participants that were audited.

Pre and Posttest

Participants will be allocated a number that corresponds to the number on the sign-in form in order to maintain their anonymity. Participants will use the same assigned number for both the pre and posttest and the chart audit; only the project lead will be aware of the allocated number which corresponds to the participant in the project. They will be given a pretest prior to the educational program and a posttest after the successful conclusion of the implementation phase. The exam will be labeled with the participant number that was issued to them. The results of the pre and post tests will be kept in a secure filing cabinet. Only the project lead has access to the cabinet, which is locked from the outside. The test will not include any personally identifiable information about patients or participants. Increased participant education and uniformity of treatment has the potential to enhance patient healthcare outcomes such as, a reduction in maternal morbidity and death (Collier &Molina 2019). Only the project lead will be aware of the correlation between the participant and the assigned number. The exam will assess the participants' understanding of PPH. The test scores prior to implementation and post implementation will be compared to determine improvement in participants knowledge The results of the exam will be kept confidential by being stored in a locked filing cabinet.

Privacy and Confidentiality

The privacy and confidentiality of both participants and patients shall be rigorously observed. According to Collaborative Institutional Training Institution (CITI), the best method to secure research data is to avoid collecting any information that may be used to identify individuals themselves (CITI, 2022). The collection of direct identifiers, such as names or email addresses, as well as indirect identifiers, defined as information that might be used to derive the identity of people, should be avoided at all costs (CITI, 2022). The project lead will avoid any

damages that may occur from a breach of confidentiality, including but not limited to loss of employment and insurance coverage. The contact lists and recruiting records will be dismantled by placing documents in a shredder when no longer necessary for the project. When collecting data, the names of patients and participants will not be collected. Data collected will illustrate participants who are compliant and noncompliant with OHPSB. Compliance will be determined by notation of risk assessments, documentation of Quantification of Blood Loss (QBL), Active Management of Third Stage Labor (AMTSL), and recordings of debriefings. All participants will be issued a number for the audit, as well as for the pre- and post-test, by the project lead, and the allocated numbers will be written on the paper charts as well. Participants' numbers will be assigned based on their sign-in sheet, which will be numbered. When giving the pretest, the project leader will use numbers that correspond to the numbers on the sign-in sheet. When delivering the post-test, the project leader will write the number on the test and hand it out to the participant who correlates to the number on the exam.

The same given number is used on both the audit and the test. The participant will place a sticker on the chart with his/her number. Upon completion of the chart audit, the sticker is removed from the chart. There will be no extraction of protected health information (PHI) since all data gathered will be in compliance with the Health Insurance Portability and Accountability Act (HIPAA). The audit tool will be kept safe in a locked drawer that will only be accessed by the project lead. Only the project lead will be aware of the results of the pre and posttest.

Ethics/Human Subjects Protection

The DNP project will adhere to the American Nurses Association's Code of Ethics for Nurses, which serves as a foundation for ethical ideals and reasoning in nursing (2017). This will ensure the ethical execution of the project as well as the protection of human beings. The successful

completion and certification of the Collaborative Institutional Training Initiative (CITI Program) aided the project lead with knowledge acquisition of ethical data collecting processes. It is important that data for the DNP project be gathered in a scientific and rigorous way to ensure there is no deviation from the data collection strategy outlined in the proposal. The project team has given their approval to all of the materials that will be used. The information will be gathered and kept in a secured drawer that will only be accessed by the project lead the data collected will be stored for 4-5 weeks during the implementation period.

The project site does not have an IRB committee or a quality improvement oversight committee; therefore, the Touro University of Nevada (TUN) process alone will be followed. All Institutional Review Board (IRB) materials such as project tools, including the proposal, will be submitted and evaluated by the project team to determine the type of project being proposed. In an organization or institution, an IRB oversees and monitors the ethical, moral, and scientific integrity of every research study undertaken inside the organization or institution (Kim, 2012). The IRB mission is to offer supervision of research involving human people. A Project Determination Form (PDF) will also be submitted to the project team for assessment and determination of whether an IRB review at Touro University Nevada is necessary for the project (TUN, 2022). The PDF is an attestation of the project's content and design. When the project team completes their review, each project team member will sign off on the PDF and will communicate with the student regarding the decision if IRB review is required. Since this DNP project was designed as a quality improvement project (QI), there is a high probability it will be exempt from IRB evaluation.

There are no perceived hazards for the participants or patients in this activity. Because this is a quality improvement practice change unit wide, there will be no monetary remuneration

for those who participate. Participation in project will not follow special treatment or compensation.

Measure/Plan for Analysis

Once the project lead has completed the data collection process and compiled the data, the data will be recorded into an Excel spreadsheet as a codebook, which will then be transferred to the Statistical Package for Social Sciences (SPSS) statistical program for further analysis. It will be necessary to do a paired t-test to compare the participants' scores on the pre- and post-test to conduct a statistical analysis of the data.

Over the course of four weeks, all participants will be subjected to a chart audit to determine their overall compliance with the protocol. The dependent variable is participants compliance, and the independent variable is the protocol which will be recorded as the number of compliance and the number of charts for each participant, respectively, for the sake of analysis. A participant who is partially compliant with the OHPSB protocol will be classified in the audit as non-compliant with the OHPSB protocol. After the fact, the reasons for partial compliance will be investigated, and participants will be re-educated if it is deemed necessary.

Analysis of Data

A paired t-test was employed to evaluate for statistical significance of the pre and post test scores. The pretest tool is applied to determine current practice and knowledge in detecting individuals at risk for PPH. This test had ten previously designed questions obtained from propofs.com (See Appendix F).

The key assumptions were considered to be valid in order to use the paired t-test to look for variations across paired measured data:

- Respondents need to be autonomous. The results of one participant's measurements have no bearing on any other participant's measurements. In this case, independence was established by ensuring that participants took both the pre-test and post-test independently and interfered by other participants. Therefore, the results of an individual could not be influenced by the results of any of the other individuals.
- There must be a single subject for each of the two metrics. In this case, the participants who participated in the pre-test are the same in the post-test. To maintain anonymity, test results were matched by a unique non-identifiable ID that did not disclose the participant's identity
- The observed variations follow a bell-shaped distribution. The assumption is that the differences under measurement follow a normal distribution.

All thirty-five participants in the DNP project maintained a high total score on knowledge and competence. In the first section of the data analysis, results from the pre-test and post-test were compiled into an excel file. Results belonging to the same participant were then matched alongside their unique ID. The data was checked for completeness and there were no missing entries. Afterwards, summary statistics were obtained and a comparison on these statistics described below.

As indicated in Table 1, participants improved at least ten points from the pre-test to the post-test. Pre-test scores ranged from 60% to 80% out of 100%. Post-test scores reached the 80% to 100% range. The participants earned a high overall score on the post-test, with some scoring 100. The most extraordinary improvement was one participant’s score rose forty points from the pre to post-test The overall score for providers remained high for all providers on both the before and post-tests. None of the providers had a comparable score before and after testing

(Table 1). Each provider score showed significant improvement with no similarity to pretest score.

Table 1

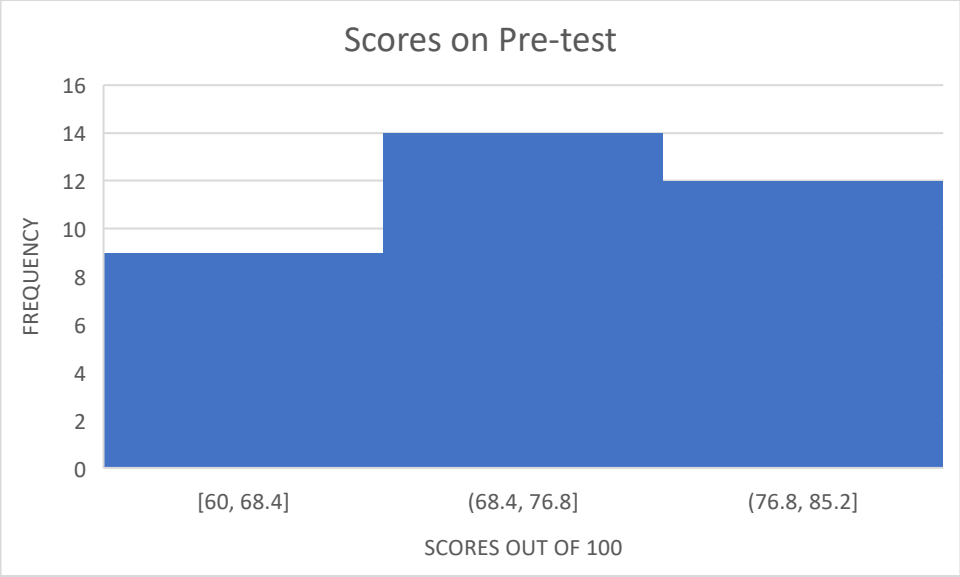
Table showing the Pre-test and Post-test Scores of Participants

ID	PRE-TEST	POST-TEST
1	70	100
2	80	100
3	70	80
4	60	80
5	80	100
6	70	80
7	80	100
8	60	90
9	60	90
10	80	100
11	60	100
12	60	80
13	80	100
14	60	90
15	70	100
16	80	100
17	60	90
18	70	90

19	70	100
20	80	100
21	70	100
22	70	90
23	80	100
24	80	90
25	70	80
26	70	90
27	70	100
28	60	90
29	80	90
30	70	80
31	70	100
32	80	100
33	70	80
34	80	90
35	60	100

Figure 1

Participant Response Frequencies on Pretest



The above figure illustrates the results of the pre-test scores and the frequency of the results occurring. As shown, nine participants scored between 60 and 68.4. Fourteen participants scored between 68.4 and 76.8. Twelve participants score between 76.8 and 85.2.The graph also shows that the assumption of normality was met given that majority of the respondents had average scores.

Figure 2

Participant Response Frequencies on Post-test

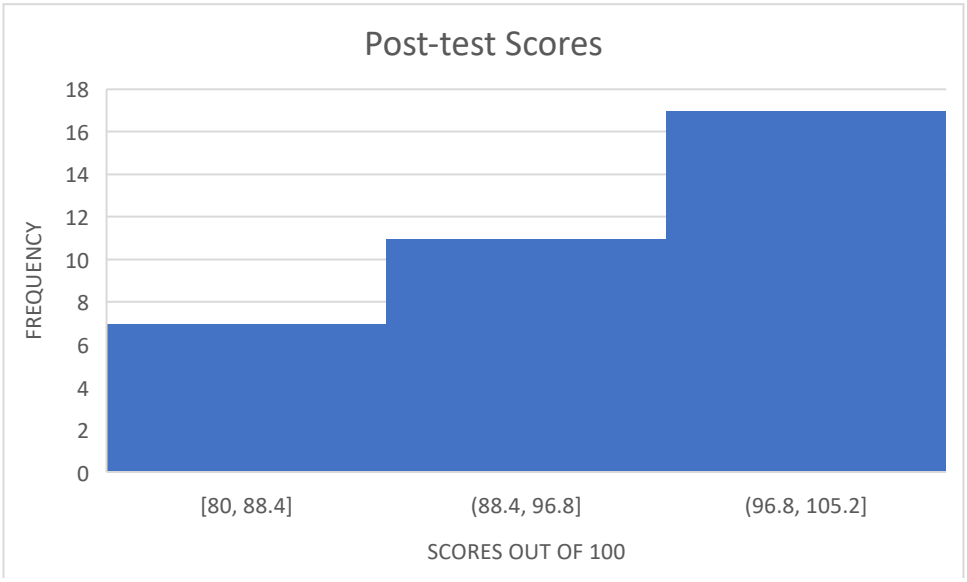


Figure 2 depicts the outcomes of the post-test scores as well as the frequency with which the results were obtained. As seen in the table, seven participants had scores between 80 and 88.4. Eleven participants received scores ranging from 88.4 to 96.8. Seventeen participants scored between 96.8 and 100 points.

A paired t-test is used when we are concerned with the consistency or inconsistency between two variables for the same matter (Kim, 2015). Once the pre-test and post-test scores were compiled on excel, a paired t-test analysis was done on Excel 2013 from the data analysis tool pack The results are detailed below:

The results indicate the mean for the Pretest is 70.8571428, and for the Posttest, it is 92.85714. If the p-value is smaller than the significance threshold, the difference between means is statistically significant and should continue with the two-tailed outcome (Wilkerson, 2008). To determine the findings, use P(T<=t) two-tail, which is the p-value for the two-tailed variant of

the t-test. The null hypothesis may be rejected because the p-value (1.48338E-16) is smaller than the conventional significance threshold of 0.05 (95% confidence level). The Posttest mean is bigger than the Pretest mean, to be precise.

The project's implementation took five weeks and resulted in the achievement of all three of its objectives. The goal of this project is to reduce the incident of maternal morbidity and mortality by promoting early identification of postpartum hemorrhage with utilization of the OHPSB. The project implementation demonstrated successful completion of the objective as illustrated in the declining rates of patients diagnosed with PPH after the project execution. The second objective for the project was to implement a multidisciplinary staff education to the OHPSB. The project implementation established success of the staff education as participants were able to include and effectively utilize the bundle routinely. The third objective to assess staff proficiency and OHPSB compliance utilizing the pre and posttest was also successfully established. The data from the chart audit was used to determine whether or not the participants were in compliance with the OHPSB. The project's goals were fulfilled in their entirety.

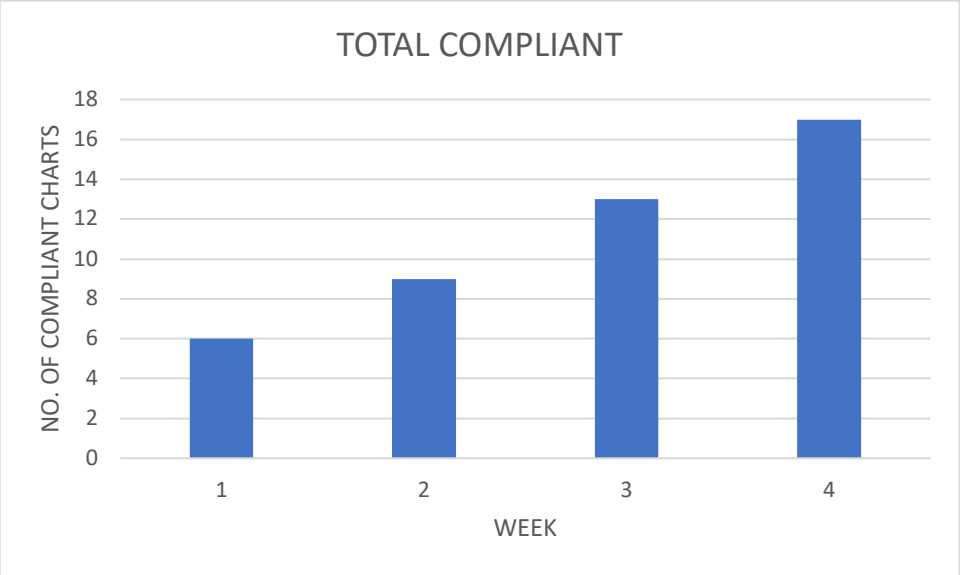
As a result of the projects implementation the diagnosis of PPH declined from 20 % to 15% over the five-week period. The project question, “In a Community Hospital, will implementation of an OHPSB compared to current practice reduce the risk of maternal morbidity and mortality over a 4–5-week period?” was addressed. The project implementation clearly demonstrated early identification, prevention, and management of PPH to the nature of lowering the rates of maternal morbidity and mortality.

Across the board, compliance reached a high point in week five, with 17 out of 20 compliant charts, or an 85 percent compliance rate. Between week two and week 5, there was a continuous rise in the number of participants which demonstrated chart compliance (Figure 3).

The average weekly total chart compliance rate remained average, with a mean compliance rate of 11.25 out of 20 audited charts every week, or a weekly compliance rate of 56.25 percent on average, according to the data.

Figure 3

Weekly Chart Audit of Compliance



Compliance with the chart is seen in Figure 3. Weekly chart audits were done as the project's implementation progressed through its various stages. Weekly improvements in chart documentation are reported as a result of the incremental improvement.

Discussion

The project execution took five weeks and achieved all three objectives: an evidence-based OHPSB was used, which was tailored to the demands of the project site, and the project was completed on time. Prior to implementing the OHPSB, interdisciplinary staff members were educated and trained in accordance with established procedures. The OHPSB was used to assess the competence and compliance of the staff. Participant compliance was measured by chart audit

each week to determine if reinforcement or reeducation was necessary. The most often reported cause for non-compliance by participants was a lack of time to complete the necessary paperwork with patients during their scheduled sessions. A discernible shift in compliance, with a significant increase in compliance from week two to week five demonstrating a favorable trend. The engagement of stakeholders and project lead in reinforcement and reeducation was shown to be associated with an increase in compliance. The project question was answered as evidenced by a decrease in the diagnosis of PPH was seen as a result of a general improvement in compliance with the bundle. This revealed, the educational intervention was associated with a decrease in the rate of PPH cases.

It was anticipated by the project lead that obstacles would arise in converting current practice to best practice even though the OHPSB has a great deal of promise for standardizing the quality of care at the project site. Obstacles included difficulty in changing the present practice paradigm because of opposition and criticism from colleagues, as well as a lack of confidence in evidence or research. However, none of these obstacles were noted during implementation. It was also anticipated by the project lead that implementing the OHPSB at the project site would enable all healthcare personnel to feel and function as valuable members of the treatment team. A collaborative team approach proved more effective in hastening the adoption of the OHPSB, which proved to enhance PPH results even more.

The Donabedian principles of outstanding care delivery serve as the foundation for the successful execution of this DNP initiative (Reavy, 2016). Starting with the project site, efficient and effective communication with the daily organizational structure was established. The participation of all members of the project site was critical to the successful implementation of the OHPSB. In addition to complex organizational challenges, including activity modifications,

interdisciplinary engagement, and interaction adjustments, implementing the OHPSB at the project site resulted in significant positive outcomes which include an increase in knowledge of of participants from 60 -100%, improvement in compliance, and the reduction in the diagnosis of PPH. The OHPSB benefits may also be critical in potential financial savings. When women are diagnosed with PPH, provider productivity is increased by performing emergent care such as frequent examinations, implementation of additional therapies, and prolonged hospital stays in order to properly treat people who have encountered the adverse event which can be extremely costly.

The project lead decided to design a chart audit tool that would be used to audit all patient charts beginning on the first day of the project's deployment. Patients who scored moderate to high on the screening tool were prioritized by notifying stakeholders of their potential PPH risk. Participants were evaluated on their compliance to include skills such as screening for risk factors, identifying low, moderate, and high-risk patients, and implementing OHPSB as instructed.

Overall compliance of the OHPSB bundle, in addition to pretest and posttest scores, increased from before to after the intervention, indicating a successful outcome. Therefore, the project objectives were achieved. An OHPSB has proved to reduce the risk of maternal morbidity and mortality. During the five weeks of implementation, there was no PPH crisis noted. It is advised that further analysis be conducted with a larger sample size and an extended timeframe for data gathering.

The fact that the OHPSB protocol was implemented continuously from week two through week five may have contributed to the rising participant compliance rate. Similarly, the project lead was on hand to monitor project implementation, identify and resolve issues, and answer

concerns. The project lead also assisted participants throughout the protocol implementation process.

An overall improvement in compliance with the bundle resulted in a reduction in the diagnosis of PPH, as seen in the project results. The availability of the OHPSB protocol aided physicians in developing strategies and interventions to assist the healthcare team in treating and reducing postpartum hemorrhage. Congruent with observations by De Meester et al. (2013), it is possible to avoid and lessen crises by following a procedure that includes interventions in conjunction with provider judgment. The OHPSB bundle emphasizes the need for interdisciplinary collaboration to be successful in minimizing the frequency of maternal morbidity and mortality associated with PPH. According to the research, the deployment of an OHPSB is successful in terms of prevention and management. When safety bundles are employed, the quality of patient care is increased (Sleutel et al.,2021). A safety bundle is a methodical approach to enhancing the quality of treatment and the outcomes of patient care.

Significance

Nursing professionals will benefit from this project since it did enhance standards of care while treating postpartum patients. The OHPSB employs evidence-based practice (EBP) to detect, and manage the patients' risk for PPH and to treat the PPH if needed, using a standardized protocol to enhance patient safety. It is important to the nursing profession in a larger sense because it employs EBP and guidelines to adopt preventive, cost-effective, and patient-centered treatments to enhance patient care outcomes.

Limitations

Data Recruitment

There are certain limitations associated with the project, including a small sample size and methods used to collect data. The project was based on one project site, which had a total of 35 participants. A small sample size might be subject to imprecise results because it limits certain relationships between the participants (Deziel, 2019). Furthermore, it might be challenging to assume that a sample size based on one community health facility might represent the entire population. Due to the lack of a larger sample size or different facilities, the statistical results might not be generalized to reflect the larger population. (Deziel, 2019)

Provider Bias

The post-test scores of participants improved when compared to their pretest values. Due to the fact that participants were professional colleagues of the project lead previous to and during the quality improvement project, it is impossible to rule out participant bias. Participants may have wished for a favorable impact (such as an increase in skill and adherence) in order to emulate the practice and the project lead.

Data Collection

The method used to collect data can serve as a constraint when analyzing the project. For instance, the DNP project lacked consideration of personal attributes when conducting a paired t-test aimed to evaluate the statistical significance of the pre and post-test scores after the educational program. Determining personal attributes such as culture and attitudes towards teamwork during project implementation would have helped the project lead understand why one participant would showcase a 40% improvement while another 20%.

Project Design

The OHPSB was implemented over five weeks due to the timeframe of the DNP program. Thus, the data collected does reflect only short-term improvements. Long term results could not be measured but would potentially hold interest for the stakeholders.

The short timeframe also impacted how data was collected to measure reduced diagnosis of PPH in relation to the OHPSB. The reduction in the diagnosis of PPH was monitored only during the implementation period and compared with the diagnosis of PPH data collected only one month prior to implementation. This data collection method only produced a snapshot of data, not necessarily a cause-and-effect relationship between protocol usage and reducing PPH at the project site.

Areas of Further Study

The project lead suggests further research to identify the impact of the OHPSB program and the extent of the OHPSB uptake in American hospitals. Furthermore, depending on the identified contribution and extent of the use of OHPSB in practice, more research can be performed to ensure all physicians, residents, nurse midwives, and registered nurses nationwide are appropriately equipped. Lastly, the project lead proposes a longitudinal study to underpin the results identified effectively. A longitudinal study involves an extended period that employs continuous measures to larger sample sizes in entirely different locations in order to achieve a reliable and correct sequence of events (Caruana et al., 2015).

Project Sustainability

Project sustainability involves three crucial areas; community sustainability meaning the population both in and outside the hospital, financial sustainability, and organizational sustainability. The project lead discussed above aims to bring together all community hospital

members in the fight against PPH-related morbidities and mortalities. The nursing professionals and the entire maternity care team involved in the project will be better positioned to use the care bundle after they complete the training and project implementation. Similarly, all the participants involved will possess knowledge of critical information on PPH and the importance of an early diagnosis of hemorrhage risk factors. The collaboration between the professionals and the patients will ensure the community hospital attains ownership of the project. Demonstrating the project's significance to the community will help finance the project through participatory methods. Sustainability refers to maintaining project performance and delivering benefits to the target population when support from a source has been exhausted (Community Toolbox, 2022). Moreover, the project will be sustained with continued involvement of stakeholders, reinforcement, and routine evaluation for effectiveness.

The project lead proposes an integrative funding approach for project sustainability. This means that financial sources will continue to be funded by the hospital to ensure the survivability of the project. In regard to organizational sustainability, since the project site is predicted to still be there in 10 years and more, the facility will continue to include items in the organization’s budget to ensure the sustainability of the positive outcomes demonstrated by implementing the care bundle.

Dissemination

The outcomes of the project were communicated to the stakeholders in person beginning in the fifth week of the project's implementation phase. The results of the audit were discussed with each participant personally, and suggestions for improvement were made based on their input. Areas that require more remediation include reinforcement using QBL, completion of risk

assessments, and completion of documentation. The enhanced collaboration between participants and the patients identified as moderate to high risk for PPH was positively received by all.

As a result, the current document can be presented PPH conferences and events by liaising with the community hospital's communication team (NIHR, 2019). Additionally, several channels can be used to address the information dissemination and ensure the message reaches the target audience, including websites, social media, reports to funders, and physical meetings with the stakeholders. The project will be disseminated with a digital poster presentation. The stakeholders will be provided with official information on the project. In addition to the project being uploaded to the DNP repository, it will also be presented orally to members of the TUN faculty and peers via virtual meeting.

Conclusion

The implementation of an OHPSB at a community hospital as part of a quality improvement initiative had the overarching goal of reducing the number of women who experienced postpartum hemorrhage. In addition to this, the project lead wanted to incorporate preventative evaluations and a procedure that was based on quality research in order to assist participants with decision making and therapeutic interventions that would potentially lead to a reduction in the risk of postpartum hemorrhage. All objectives for this DNP project was successfully accomplished.

The risk of postpartum hemorrhage can be reduced, and preventative measures can be taken, provided that one follows the most recent recommendations and EBR. Although postpartum hemorrhage can never be completely avoided, it is possible to enhance the care of patients who present with risk by increasing provider competence, implementing collaborative measures, and adding procedures.

In general, the OHPSB helped participants become more compliant, competent, and confident in their treatment of patients who had a risk for postpartum hemorrhage. Participants applied risk assessments more accurately, and the OHPSB assisted with overall management by providing a protocol and raising participants' levels of awareness.

References

AAFP. (2022). Advanced Life Support in Obstetrics (ALSO). *American Academy of Family Physicians*.

American Nurses Association (ANA). (2017). American Nurses Association: Ethics and human rights statement. Retrieved from https://www.nursingworld.org/coe-view-only

Andrikopoulou, M., & D'Alton, M. E. (2019). Postpartum hemorrhage: Early identification challenges. *Seminars in Perinatology*, *43*(1), 11–17. https://doi.org/10.1053/j.semperi.2018.11.003

Association of Women's Health, Obstetric and Neonatal Nurses. (2015). Quantification of blood loss: AWHONN practice brief number 1. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 44*(1), 158–160. doi:10.1111/1552- 6909.12519

Bazirete, O., Nzayirambaho, M., Umubyeyi, A., Uwimana, M. C., & Evans, M. (2020). Influencing factors for the prevention of postpartum hemorrhage and early detection of childbearing women at risk in Northern Province of Rwanda: Beneficiary and health worker perspectives. *BMC pregnancy and childbirth*, *20*(1), 1-14.

Berwick, D., & Fox, D. M. (2016). "Evaluating the quality of medical care": Donabedian's classic article 50 years later. *The Milbank Quarterly*, *94*(2), 237-241. https://doi.org/10.1111/1468-0009.12189

Browne, M. (2021). Current trends in postpartum hemorrhage treatment. *Journal of Legal Nurse Consulting*, 44–48.

Carroll, M., Daly, D., & Begley, C. M. (2016, September 5). The prevalence of women's emotional and physical health problems following a postpartum hemorrhage: A systematic review. *BMC Pregnancy and Childbirth*. Retrieved September 10, 2021, from https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-016-1054-1.

Caruana, E. J., Roman, M., Hernandez-Sanchez, J., & Solli, P. (2015). Longitudinal Studies. *Journal of Thoracic Disease, 7*(11), e537-40.

Collier, A.-R. Y., & Molina, R. L. (2019, October). *Maternal mortality in the United States: Updates on trends, causes, and solutions*. NeoReviews. Retrieved February 15, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7377107/

Deziel, C. (2019, March 2). *The effects of a small sample size limitation*. Sciencing. Retrieved May 16, 2022, from https://sciencing.com/effects-small-sample-size-limitation-8545371.html

De Meester, K., Verspuy, M., Monsieurs, K. G., & Van Bogaert, P. (2013). SBAR improves nurse–physician communication and reduces unexpected death: A pre and post intervention study. *Resuscitation*, *84*(9), 1192-1196.

De Tina, A., Chau, A., Carusi, D. A., Robinson, J. N., Tsen, L. C., & Farber, M. K. (2019). Identifying barriers to implementation of the National partnership for maternal Safety Obstetric Hemorrhage bundle at a Tertiary Center *Anesthesia & Analgesia*, *129*(4), 1045–1050. https://doi.org/10.1213/ane.0000000000003451

Donabedian, A. (1966). Evaluating the quality of medical care. *The Milbank Memorial Fund Quarterly*, *44*(3), 166-206. https://doi.org/10.2307/3348969

Donabedian, A. (1980). *The definition of quality and approaches to its assessment*. Health Administration Press.

Doolan-Noble, F., Lyndon, M., Hau, S., Hill, A., Gray, J., & Gauld, R. (2015). How well does your healthcare system perform? Tracking progress toward the triple aim using system level measures. *New Zealand Medical Journal*, *128*(1415), 44-50. https://assets-global.website-files.com/5e332a62c703f653182faf47/5e332a62c703f639642fd64e_Doolan-Noble1415.pdf

Elliott-Mainwaring, H. (2020). Can health care managers learn to lead? *Midirs Midwifery Digest*, *30*(3), 319-323. https://www.researchgate.net/profile/Helen-Elliott-Mainwaring-2/publication/344058883_Can_health_care_managers_learn_to_lead_Midwifery_Education/links/5f500900299bf13a3198ead7/Can-health-care-managers-learn-to-lead-Midwifery-Education.pdf

Eniola, F., Nack, A., Niles, P., Morton, C., & Searring, H. (2020, December). *Women's Experiences with Severe Maternal Morbidity in New York City: A Qualitative Report*.

E.K. Main et al., (2015). "National Partnership for Maternal Safety: Consensus Bundle on obstetric hemorrhage."*Journal of Obstetric, Gynecologic & Neonatal Nursing*, *44*(6). https://doi.org/10.1111/1552-6909.12765

Evensen, A., Anderson, J. M., & Fontaine, P. (2017, April 1). Postpartum hemorrhage: Prevention and treatment. *American Family Physician*. Retrieved September 10, 2021, from https://www.aafp.org/afp/2017/0401/p442.html.

Gams, B., & Manning, W. (2021). Quantification of Blood Loss: AWHONN Practice Brief number 13. *Nursing for Women's Health*, *25*(4). https://doi.org/10.1016/j.nwh.2021.04.005

Greene, F. L. (2018). Distal pancreatectomy in the community setting: Application of the Donabedian principles. *Surgical Oncology*, *27*(3). https://doi.org/10.1016/j.suronc.2018.07.003

Hire, M. G., Lange, E. M. S., Vaidyanathan, M., Armour, K. L., & Toledo, P. (2020). Effect of quantification of blood loss on activation of a postpartum hemorrhage protocol and use of resources. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, (*49,*2, pp.137–143). https://doi.org/10.1016/j.jogn.2020.01.002

Jiranee Panyapin, Wanee Deoisres, Nujjaree Chaimongkol, & Poonpong Suksawang. (2021). Factors explaining Nurses' implementation of evidence-based practice for postpartum Hemorrhage Management. *Pacific Rim International Journal of Nursing Research*, *25*(3), 421–436.

Kim, T. K. (2015). T test as a parametric statistic. *Korean journal of anesthesiology*, *68*(6), 540.

Kim, W. O. (2012, January). *Institutional Review Board (IRB) and ethical issues in clinical research*. Korean journal of anesthesiology. Retrieved February 15, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3272525/

Kunkel, S., Rosenqvist, U., & Westerling, R. (2007). The structure of quality systems is important to the process and outcome, an empirical study of 386 hospital departments in Sweden. *BMC Health Services Research*, *7*(1). https://doi.org/10.1186/1472-6963-7-104

Liu, C., Yu, F., Xu, Y., Li, J., Guan, Z., Sun, M., Liu, C., He, F., & Chen, D. (2020). Prevalence and risk factors of severe postpartum hemorrhage: A retrospective cohort study. https://doi.org/10.21203/rs.3.rs-61698/v1

LoPorto, J. (2020). Application of the Donabedian quality-of-care model to New York State direct support professional core competencies: How structure, process, and outcomes impacts disability services. *Journal of Social Change*, *12*(1), 40-70. https://doi.org/10.5590/JOSC.2020.12.1.05

Lu, M. C., Highsmith, K., de la Cruz, D., & Atrash, H. K. (2015). Putting the "M" back in the Maternal and Child Health Bureau: reducing maternal mortality and morbidity. *Maternal and child health journal*, *19*(7), 1435-1439.

Lutgendorf, M. A., Spalding, C., Drake, E., Spence, D., Heaton, J. O., & Morocco, K. V. (2017). Multidisciplinary in situ simulation-based training as a postpartum hemorrhage quality improvement project. *Military Medicine*, *182*(3). https://doi.org/10.7205/milmed-d-16-00030

Mcdonald, K. M., Sundaram, V., Bravata, D. M., Lewis, R., Lin, N., Kraft, S. A., & Owens, D. K. (2007). Conceptual frameworks and their application to evaluating care coordination interventions. In *Closing the Quality Gap: A Critical Analysis of Quality Improvement*

Strategies (Vol. 7: Care Coordination) (pp. 109-130). Agency for Healthcare Research and Quality (US). https://www.ncbi.nlm.nih.gov/books/NBK44008/

Nagase, S., Ohta, T., Takahashi, F., Enomoto, T., & 2017 Committee on Gynecologic Oncology of the Japan Society of Obstetrics and Gynecology. (2019). Annual report of the committee on gynecologic oncology, the Japan Society of Obstetrics and Gynecology: annual patients report for 2015 and annual treatment report for 2010. *Journal of Obstetrics and Gynaecology Research*, *45*(2), 289-298.

Neuendorf, K. A. (2018). Content analysis and thematic analysis. In *Advanced research methods for applied psychology* (pp. 211-223). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315517971-21/content-analysis-thematic-analysis-kimberly-neuendorf

Quantitative blood loss in obstetric hemorrhage. (2019). *Obstetrics & Gynecology*, *134*(6), 1368–1369. https://doi.org/10.1097/aog.0000000000003565

Rai, G. K., & Wood, A. (2017). Effectiveness of community pharmacies in improving seasonal influenza uptake—an evaluation using the Donabedian framework. *Journal of Public Health*, *40*(2), 359–365. https://doi.org/10.1093/pubmed/fdx078

Reavy, K. (2016). *Inquiry and leadership: A resource for the DNP project*. FA Davis.

Sheldon, W. R., Blum, J., Vogel, J. P., Souza, J. P., Gülmezoglu, A. M., & Winikoff, B. (2015). Postpartum hemorrhage management, risks, and maternal outcomes: Findings from the

World Health Organization Multicountry Survey on Maternal and Newborn Health. *Obstetric Anesthesia Digest*, *35*(1), 25-26.

Section 1. strategies for the long-term sustainability of an initiative: An overview. Chapter 46. Planning for Sustainability | Section 1. Strategies for the Long-Term Sustainability of an Initiative: An Overview | Main Section | Community Tool Box. (n.d.). Retrieved May 27, 2022, from https://ctb.ku.edu/en/table-of-contents/sustain/long-term-sustainability/overview/main

Simpson, K. R. (2018). Update on evaluation, prevention, and management of postpartum hemorrhage. *MCN: The American Journal of Maternal/Child Nursing*, *43*(2), 120–120. https://doi.org/10.1097/nmc.0000000000000406

Sleutel, M. R., Newcomb, P., Elling, C., Beaverstock, L., & Peron, T. (2021). Effect of an obstetric hemorrhage bundle on clinical outcomes and clinician perceptions. *Nursing for Women's Health*, *25*(4), 248–256. https://doi.org/10.1016/j.nwh.2021.05.003

Talboom-Kamp, E., Tossaint-Schoenmakers, R., Goedhart, A., Versluis, A., & Kasteleyn, M. (2020). Patients' attitudes toward an online patient portal for communicating laboratory test results: Real-world study using the eHealth impact questionnaire. *JMIR Formative Research*, *4*(3), 1-10. https://doi.org/10.2196/17060

The Joint Commission Division of health care improvement. (2019, October). *Proactive prevention of maternal death from hemorrhage*.

Tsolakidis, D., Zouzoulas, D., & Pados, G. (2021). Pregnancy-Related hysterectomy for Peripartum hemorrhage: A literature Narrative review of the diagnosis, management, and techniques. *BioMed Research International*, *2021*, 1–17. https://doi.org/10.1155/2021/9958073

Voyce, J., Gouveia, M. J., Medinas, M. A., Santos, A. S., & Ferreira, R. F. (2015). A Donabedian model of the quality of nursing care from nurses' perspectives in a Portuguese hospital: A pilot study. *Journal of Nursing Measurement*, *23*(3), 474-484. https://doi.org/10.1891/1061-3749.23.3.474

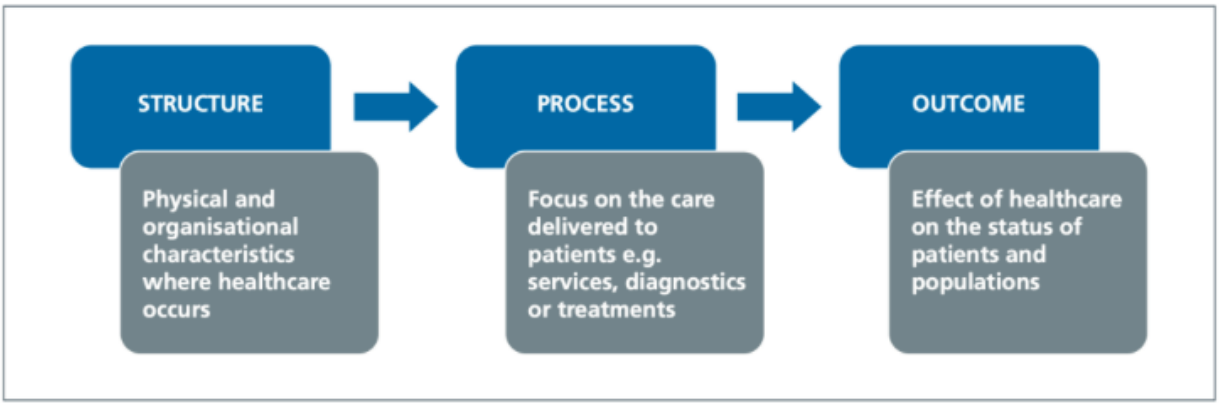
Wieners, E. (n.d.). Develop a sustainability plan in a project proposal. *ProposalsforNGOs*.

Wilkerson, S. (2008). Application of the Paired t-test. *XULAneXUS*, *5*(1), 7.

Appendix A

Theoretical Framework

Figure 1: The Donabedian model for quality of care



Appendix B

Project Site Permission Letter

KINGS COUNTY
HOSPITAL CENTER

To Whom It May Concern:

Tempest Pyram will be using this site as her Project site to deliver her Doctor of Nursing Practice Project. This letter serves as an affiliation agreement waiver. If you have any questions feel free to contact me, Sheila Hyppolite-Francis at 718-245-3131or 347-401-2298.

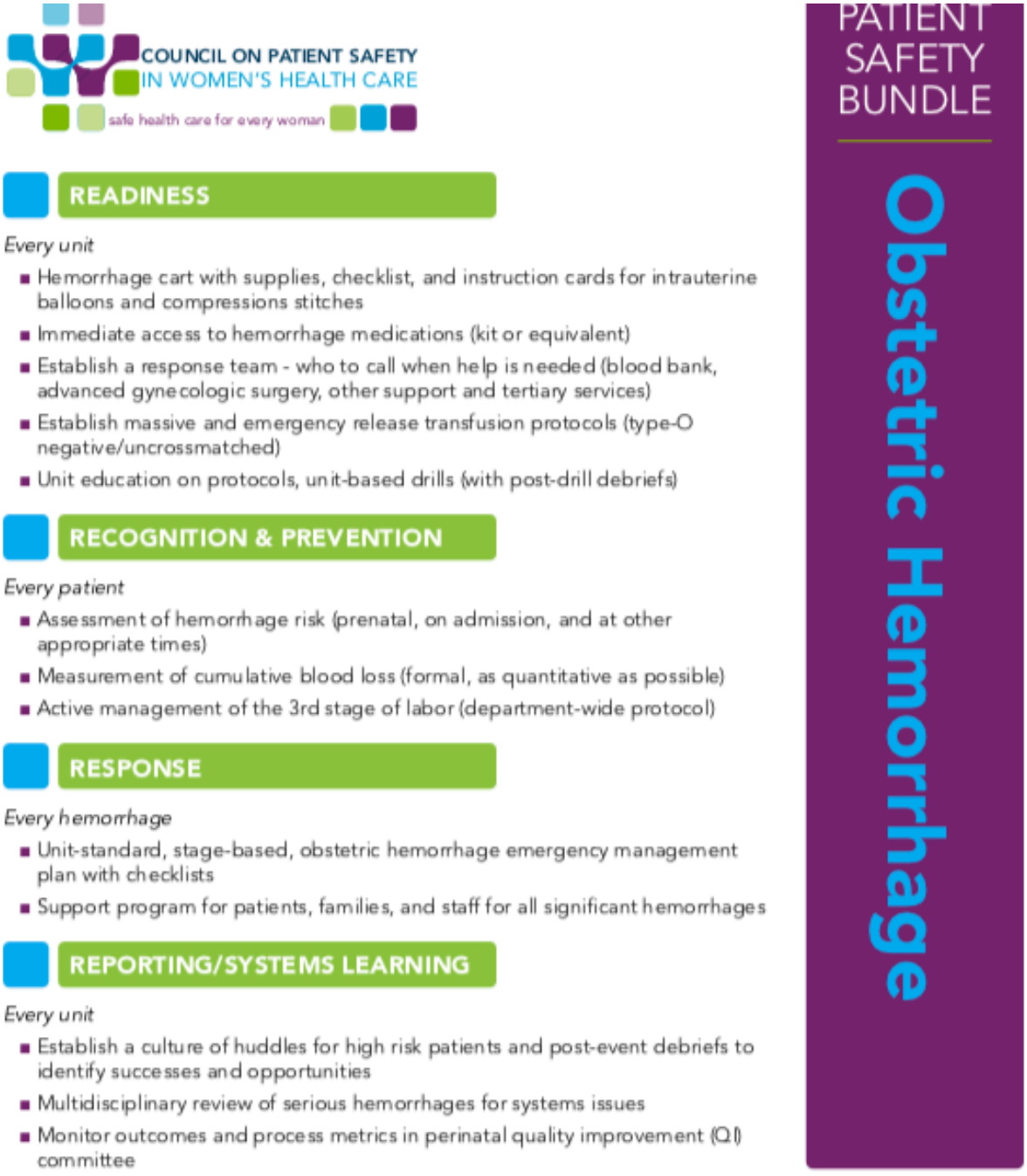
Kind Regards,

Sheila Hyppolite-Francis, RN MSN ED

Sheila.Hyppolite-Francis@nychhc.org

Appendix C

Obstetrical Hemorrhage Patient Safety Bundle



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POSTPARTUM HEMORRHAGE (PPH) RISK ASSESSMENT TABLE • 1.1

CLINICIAN GUIDELINES:

- Each box ❑ represents ONE risk factor. Treat patients with 2 or more medium risk factors as high risk.
- Prenatal risk assessment is beyond the scope of this document, however performing a prenatal hemorrhage risk assessment and planning is highly recommended. Early identification and management preparation for patients with special considerations such as placental previa/accreta, bleeding disorder, or those who decline blood products will assist in better outcomes.
- Adjust blood bank orders based on the patient's most recent risk category. When a patient is identified to be at high risk for hemorrhage verify that the blood can be available on the unit within 30 minutes of a medical order.
- Plan appropriately for patient and facility factors that may affect how quickly the blood is delivered to the patient. For example,
  - Patient issues: Pre-existing red cell antibody
  - Facility issues: Any problems at your facility related to the blood supply and obtaining blood

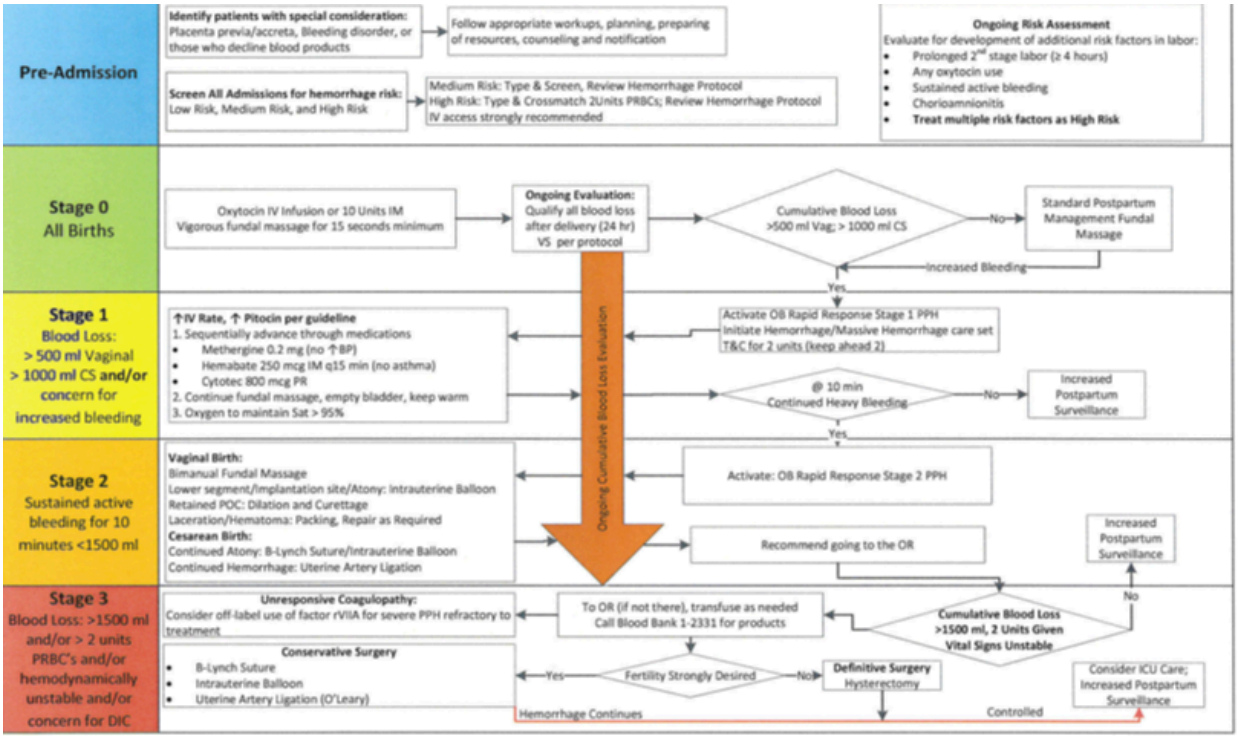
RISK CATEGORY: ADMISSION			
	Low Risk	**Medium Risk** (2 or More Medium Risk Factors Advance Patient to High Risk Status)	**High Risk**
	❑ No previous uterine incision	❑ Induction of labor (with oxytocin) or Cervical ripening	❑ Has 2 or More Medium Risk Factors
	❑ Singleton pregnancy	❑ Multiple gestation	❑ Active bleeding more than "bloody show"
	❑ ≤4 Previous vaginal births	❑ >4 Previous vaginal births	❑ Suspected placenta accreta or percreta
		❑ Prior cesarean birth or prior uterine incision	❑ Placenta previa, low lying placenta
	❑ No known bleeding disorder	❑ Large uterine fibroids	❑ Known coagulopathy
	❑ No history of PPH	❑ History of one previous PPH	❑ History of more than one previous PPH
		❑ Family history in first degree relatives who experienced PPH (known or unknown etiology with possible coagulopathy)	❑ Hematocrit <30 AND other risk factors
		❑ Chorioamnionitis	❑ Platelets <100,000/mm3
		❑ Fetal demise	
		❑ Polyhydramnios	
Anticipatory Interventions Monitor patient for any change in risk factors at admission and implement anticipatory interventions as indicated.			
❑ **Blood Bank Order:** Change blood bank orders as needed if risk category changes	❑ **Clot Only (Type and Hold)**	❑ **Obtain Type and Screen**	❑ **Obtain Type and Cross (See Clinical Guidelines)**
		❑ Notify appropriate personnel such as the Provider (OB MD/CNM), Anesthesia, Blood Bank, Charge Nurse, Clinical Nurse Specialist	❑ Notify appropriate personnel such as the Provider (OB MD/CNM), Anesthesia, Blood Bank, Charge Nurse, Clinical Nurse Specialist
			❑ Consider delivering at a facility with the appropriate level of care capable of managing a high risk mother

To access the full 3 page Risk Assessment Tool, users may visit www.AWHONN.org and enroll in the Postpartum Hemorrhage online education course.

Appendix 2. Reprinted with permission from The AWHONN Postpartum Hemorrhage Project. Postpartum hemorrhage (PPH) risk assessment table 1.0. Available at: https://mygnosis.com › assets › pdfs › PPH_Risk_Assessment_Table-7-17-15. Retrieved September 18, 2019. The authors provided this information as a supplement to their article.

Appendix D

Postpartum Hemorrhage Flowchart



Appendix E

Quantification of Blood Loss

ITEM	Dry weight (grams)	Number used (per category)	Total dry weight: All per category	Total wet weight: All per category	Wet weight-dry weight: blood loss in ml.
Blue chux	45				
Light blue chux	20				
Green chux	70				
Peach chux	100				
Ray-tek sponge	5				
Lap sponge	20				
Blue towel	60				
Green towel	80				
Peach/pink peri-pad	30				
White peri-pad	10				
White "old fashioned" peri-pad	15				
Cloth bed pad	345				
Large linen towel	360				
Washcloth	35				
Graduated drape volume	Subtract pre-delivery fluids	Subtract urine, irrigation after delivery			
				TOTAL QBL→	

Appendix F

Pre and Post Test

1. **To be considered a PPH, what would the estimated blood loss have to be for a C-section?**

   A. < 550 ML

   B. > 600 ML

   C. > 1000 ML

   D. < 900 ML

2. **What types of trauma during labour and birth would lead to PPH risk?**

   A. Instrumental assisted birth (vacuum or forceps)

   B. C-Section

   C. Lacerations of the cervix or vaginal wall

   D. All of the above

3. **Atonic bleeding is due to a lack of tone in the uterus.**

   A. True

   B. False

4. **In which of these cases could you diagnose PPH following vaginal delivery: 1. > 500 blood loss over 24 hrs 2. hypotension 3. tachycardia**

   A. 1 & 3

   B. 2

   C. 3

4. **In which of these cases could you diagnose PPH following vaginal delivery: 1. > 500 blood loss over 24 hrs 2. hypotension 3. tachycardia**

   A. 1 & 3

   B. 2

   C. 3

   D. 1

5. **The 4 "T's" of PPH are: 1. Trauma 2. Toxins 3. Travel 4. Tissue 5. Threads 6. Thrombin 7. Tears 8. Tone**

   A. 1, 4, 6 & 8

   B. 1, 5 7 & 8

   C. 1, 2, 3 & 6

   D. 3, 4, 5 & 6

6. **If continued bleeding occurs during the third stage with a contracted uterus, the cause is most likely to be:**

   A. Cervical and perineal Lacerations

   B. Placental abruption

   C. Uterine atony

   D. Cervical Polyp

7. **What are four risk factors for PPH (arising during pregnancy)?**

7. **What are four risk factors for PPH (arising during pregnancy)?**

   A. Previous PPH; polyhydramnios; multiple pregnancy; anaemia conditions

   B. Abruptio placenta; mollydominos, grand multi; iron deficiency

   C. Intrauterine death; abracadabra placenta, previous pph, iron deficiency.

   D. Placenta praevia; polyhydramnios, outeruterine death, hyroplanes

   E. A & C

8. **_____ and _____ are the two most common causes of primary PPH. (Tissue, Tone, Trauma, Thrombon)**

9. **The normal blood flow through the placental site each minute is 500-800 mls per minute.**

   A. True

   B. False

10. **Which of these implantations would most likely cause excessive bleeding?**

    A. Increta & Percreta

    B. Normal & Accreta

    C. Accreta & Increta

    D. None of the above

Appendix G

PowerPoint presentation

Appendix H

Obstetric Hemorrhage Patient Safety Bundle Audit Tool

Date	Total charts Audited	Total Compliant	Total Noncompliant