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The Use of Scorecards to Improve Documentation of Obstetrical Blood Loss

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Abstract

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MN, University of California, Los Angeles, 1979

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Proposal Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Obstetric hemorrhage is one of the most common causes of maternal morbidity and mortality. The measurement of quantitative blood loss (QBL) at delivery prevents clinicians from failing to recognize hemorrhage in healthy obstetric patients who initially compensate for excessive blood loss. The purpose of this project was to improve the compliance of labor and delivery nurses in a community hospital with consistent QBL measurement. Key theories that formed the basis for the project were Lewin's theory of planned change and homeostasis. The project question addressed was: Is the use of weekly scorecards to provide feedback to nurses with both blinded individual data and aggregate unit data associated with an increase in the percent of patients with blood loss at delivery documented as a QBL measurement over a 12-week period of time? A blinded scorecard of the percent of deliveries attended by each nurse that had QBL documented and an aggregate run chart of the percent of all deliveries with QBL documented were posted in the unit weekly. The postings included discussions of means to enhance facilitators of and decrease barriers to QBL measurement. Over 12 weeks, the percent of deliveries with QBL documented increased from 22.7% to 80.0%. This result is consistent with previous reports that clear and objective feedback from scorecards is associated with improvement in performance. Scorecard feedback may be explored to determine if it is associated with improvement of other nursing practices. This project has implications for positive social change as it may contribute to a reduction in preventable maternal deaths. Decreasing maternal morbidity and mortality supports the health of women in a population and influences the health of the next generation.

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Dedication

This work is dedicated to all of the women whose experiences with obstetric hemorrhage helped health care providers to learn better methods to prevent, recognize, and collaboratively manage the condition in order to decrease preventable maternal morbidity and mortality.

Acknowledgments

There are many people who provided inspiration and support to me on this journey. I thank all the dedicated clinicians with whom I practiced over the years who encouraged me to continue my education and explore means of increasing patient safety and quality of care. I thank my husband Randy, who although he did not understand why I needed to engage in this endeavor, served as my 24-hour technical support. I thank my clinical preceptor Dr. Rafael Rojas, who did his best to introduce me to Excel. I especially wish to thank my always-positive committee chairperson, Dr. Linda Matheson, and my supportive committee member, Dr. Karen Robson.

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Section 1: Overview

Introduction

Obstetric hemorrhage is one of the most significant causes of maternal morbidity and mortality in the United States and the rest of the world (Lyndon, Lagrew, Shields, Main, & Cape, 2015; World Health Organization [WHO], 2012). A critical issue influencing the outcome of obstetric hemorrhage is its prompt recognition leading to the timely implementation of evidence-based interventions that can limit morbidity and mortality (Lyndon et al., 2015). This recognition can be delayed since obstetric patients are generally healthy young women who may sustain a substantial amount of blood loss without demonstrating obvious signs of physiologic decompensation (Lyndon et al., 2015).

Accurate measurement of quantitative blood loss (QBL) of every patient at delivery provides a means of promptly identifying obstetric hemorrhage (Association of Women's Health, Obstetric, and Neonatal Nurses [AWHONN], 2015; Lyndon et al., 2015; Main et al., 2015). In addition, having a measurement of QBL at every delivery enables the registered nurse to effectively communicate the cumulative volume of blood loss to the physician and the other team members (Gabel & Weeber, 2012). Such accurate communication permits the mobilization of the team to implement interventions in response to specific levels of volume loss to control the bleeding and replace the blood products lost, thereby limiting preventable maternal morbidity and mortality (Lyndon et al., 2015).

Problem Statement

Measurement of QBL with every delivery has been recommended as an evidence-based practice by organizations such as the AWHONN (2015), the California Maternal Quality Care Collaborative (CMQCC) (Lyndon et al., 2015), and the National Partnership for Maternal Safety (NPMS) (Main et al., 2015) and has been adopted as the official policy by many healthcare institutions. However, Diaz, Abalos, and Carroli (2014) and Sloan, Durocher, Aldrich, Blum, and Winikoff (2010) revealed that the most common method of measurement of blood loss at delivery continues to be visual estimation by the delivering provider. This is a significant practice problem because numerous studies going back as far as 1959 have demonstrated that regardless of the profession of the clinician providing the estimate or the number of years of experience, visual estimation is inaccurate (see Diaz et al., 2014; Stafford, Dildy, Clark, & Belfort, 2008; Wilcox, Hunt, & Owen, 1959). It has casually been termed "a glance and a guess" (Main et al., 2015, p. 158). Estimation by delivering physicians is of particular concern because physicians tend to underestimate blood volume loss, especially when large volumes are involved (Al Kadri, Al Anazi, & Tamin, 2011; Patel et al., 2006; Stafford et al., 2008; Wilcox et al., 1959).

Underestimation of blood loss can result in delay of identification and treatment of obstetric hemorrhage. This delay can occur because the general good health of most obstetric patients and the physiologic adaptations of pregnancy enable women to compensate for significant amounts of blood loss without obvious physical signs. Obstetric patients can maintain relatively normal clinical signs while sustaining large

amounts of blood loss until the hemorrhage overcomes their ability to compensate for the decrease in blood volume (Diaz et al., 2014; Lyndon et al., 2015). Lawton et al. (2014) reviewed 98 cases of severe acute maternal morbidity in New Zealand, of which 44 involved blood loss greater than or equal to 2000 ml. Of these 44 cases, 34 (75%) were deemed preventable or warranted improvement in care. Factors associated with preventable cases included underestimating blood loss, failing to recognize signs of hypovolemia, and delaying the activation of or failing to activate massive transfusion protocols (Lawton et al., 2014). The clinical practice problem in the facility in which this project was conducted was that blood loss was not being accurately measured with every delivery, despite it being a system wide policy. Lawton et al. identified the failure of clinicians to follow policies and procedures as one of the most common system factors in cases of potentially preventable severe acute maternal morbidity.

Purpose Statement and Project Objectives

The purpose of this DNP project was to increase the percentage of patients with whom QBL was measured and documented at delivery in a suburban Southern California community hospital to enable the early recognition of obstetric hemorrhage. Although it has been the institutional policy that QBL be measured and documented with every delivery in support of patient safety since 2013, improvement in this practice had not been an area of focus in the unit since the implementation of the policy in 2014.

The need for this quality improvement project was confirmed through a review of 40 patient electronic health records (EHRs) in June 2016. Ten vaginal and 10 cesarean delivery EHRs were randomly selected from the day (7:00 a.m. to 6:59 p.m.) and night

(7:00 p.m. to 6:59 a.m.) shifts (totaling 20 records from each shift) for review of blood loss documentation. The records were reviewed both for documentation of any blood loss at delivery (regardless of method of measurement) and documentation of QBL. Although it was the failure of the documentation of QBL illustrated by this sample that established the need for the quality improvement project, examination of the documentation of any blood loss was also considered important. The lack of documentation of even an estimate of a patient's blood loss at delivery is a safety concern because it leaves the care team with no basis to identify if cumulative blood loss is excessive. Although QBL measurement is the standard, not documenting even an estimate creates a significant risk.

All (100%) of the 20 vaginally delivered patients and 19 (95%) of the 20 cesarean patients had blood loss documented (97.5% of the total). Although these rates of blood loss documentation were high, documentation of at least an estimate of every patient's blood loss provides a better opportunity for early recognition of hemorrhage. The database of the healthcare system of which the hospital is a member was used to compare the results of this sample to the blood loss documented in the hospital's EHRs of all delivered patients in the first quarter of 2016. The database revealed that in this facility, 92.3% of the delivery patient EHRs had blood loss documented in the first quarter of 2016.

Comparison of facility data to external benchmarks is recommended when planning quality improvement activities (Crisp, 2013; Donaldson, Bolton, Brown, Rutledge, & Aydin, 2005; Rhamy, 2013). In an attempt to establish an external

benchmark for documentation of blood loss at delivery, the blood loss documentation of all of the facilities in the healthcare system in which this hospital is a member was determined from the system's database. It was identified that 89% of the delivery patient EHRs in all of the facilities had blood loss documented in the first quarter of 2016; 11% of the EHR fields for blood loss were left blank. In comparison, 7.7% of the EHR fields for blood loss were left blank in the facility data from the first quarter of 2016.

The failure to document blood loss for any patient at delivery is a safety risk that can contribute to the delay of identification of hemorrhage. Although the documentation of blood loss in the facility for which this project was being planned did not meet an ideal 100% documentation rate, performance was better than in the system as a whole. Thus, an opportunity was identified to effect improvement of documentation of blood loss at delivery throughout the system with the dissemination of this project if it proved successful. A 100% facility documentation rate of any blood loss for a 12-week project was considered impractical, and the project objective was set at greater than or equal to 98%.

In addition to reviewing the facility sample of records for evidence of the documentation of any blood loss, regardless of method of measurement, the sample of 40 EHRs was reviewed for blood loss documented as QBL. None of the patient EHRs (0%) in the sample had a QBL measurement documented. One record of a vaginal delivery (2.5% of the total deliveries) noted the blood loss was estimated by the physician. The remainder of the records did not specify the method of measurement for the blood volume recorded.

Since it is the facility and the healthcare system policy that QBL be documented for each patient at delivery, the intent of this project was to stimulate the labor and delivery nurses' interest in and attention to improvement in their practice and documentation. The plan was to report the percent of EHRs with any blood loss at delivery documented and the percent with QBL documented to the nurses with scorecards. These scorecards were an example of the use of internal data to evaluate a current practice. Pugh (2014) stated that scorecards that provide information on performance can be used to stimulate improvement of that performance. The objectives of this project were to demonstrate an increase in the percentage of patient EHRs that have any blood loss recorded at delivery to greater than or equal to 98% and an increase in the percentage of patient EHRs that have QBL documented at delivery.

Significance/Relevance to Practice

Documentation of QBL with every delivery is the policy of the facility in which this project was conducted and the healthcare system of which the facility is a member. Measurement of QBL was instituted as a facility policy in 2013 due to its significance for patient safety. However, documentation of visual estimation of blood loss, commonly called estimated blood loss (EBL), was the usual practice in the facility.

The measurement and documentation of QBL is a collaborative effort between the registered nurse and the delivering physician (Gabel & Weeber, 2012), sometimes with the involvement of other team members such as the anesthesiologist and the surgical technician. The role of the labor and delivery nurse is essential since the nurse is usually the clinician performing the quantitative measurement and calculating the cumulative

volume loss (Gabel & Weeber, 2012). The nurse is, therefore, frequently the first clinician to identify the hemorrhage, initiate interventions, and mobilize a response from additional team members (Bingham & Jones, 2012). The ability of the nurse to clearly communicate using objective language can prevent unnecessary delay in patient management related to differences in subjective estimations of blood volume loss by various team members (Bingham, 2012). Lawton et al. (2014) named communication as one of the most common preventable system factors identified in a review of cases of severe acute maternal morbidity. This project could serve as a model for improvement in the consistent practice of QBL measurement in other facilities that find it challenging.

Project Questions

Two questions investigating the relationship between the use of scorecards and the documentation of blood loss at delivery were addressed in this DNP project. The first question addressed documentation of any blood loss, regardless of the method of measurement: Is the use of weekly scorecards to provide feedback to the labor and delivery nurses with both blinded individual data and aggregate unit data associated with an increase in the percent of patients who have any blood loss documented at delivery over a 12-week period of time? The second question addressed quantitative measurement: Is the use of these weekly scorecards associated with an increase in the percent of patients whose blood loss at delivery is documented as a QBL measurement over a 12-week period of time?

Evidence-Based Significance of the Project

The State of California has been instrumental in establishing an evidence base for the value of QBL measurement as a tool to reduce preventable maternal morbidity and mortality related to obstetric hemorrhage. The State Health Department contracted with the CMQCC to form a panel of experts in maternal-child public health and perinatal quality improvement, named the California Pregnancy-Related Maternal Mortality Review (CA-PAMR), which was charged with the review of maternal deaths. After completing a review of maternal deaths in California in 2002 and 2003, the CA-PAMR committee concluded that there was a good to strong chance to have altered the fatal outcome in seven of the ten cases (70%) involving obstetrical hemorrhage (California Department of Public Health [CDPH], 2011).

The CA-PAMR panel created a composite case study that illustrated common elements of the maternal deaths reviewed. A major factor was the failure of prompt recognition of maternal hemorrhage (Bingham, Lyndon, Lagrew, & Main, 2011). Bingham (2012) described this failure to identify obstetric hemorrhage in the early stages as a skill-based error that can be associated with an inadequate response to this critical problem. Evidence-based interventions to manage maternal hemorrhage, such as those promoted by the CMQCC, are designed with identified responses to specific volumes of blood loss for optimal effectiveness (Lyndon et al., 2015). Decisions are based on the volumes of blood loss measured and reported (Gabel & Weeber, 2012). Communication of cumulative QBL, an objective measurement of blood loss, rather than the use of an imprecise subjective statement facilitates the situational awareness of the team members

providing care to the patient. This supports the rapid initiation of interventions to identify and treat the cause of bleeding and prevent further deterioration of the patient's condition (Bingham, 2012).

Implications of the Project for Social Change in Practice

The accurate measurement of blood loss at delivery is an evidence-based practice associated with decreasing preventable maternal morbidity and mortality (Lyndon et al., 2015; Sloan et al., 2010). Decreasing maternal morbidity and mortality is important to society because the health of mothers, infants, and children affects the health and well-being of the generation to come and influences future healthcare needs (U.S. Department of Health and Human Services [DHHS], 2016). Quantitative measurement of blood loss at delivery contributes to social change by preventing maternal morbidity and deaths, resulting in improved health for the population of women.

Providing tools to communicate objective data on obstetric blood loss through the measurement of QBL at every delivery empowers the nurse to effectively mobilize appropriate members of the health care team to respond efficiently to the patient's needs using evidence-based interventions (Bingham, 2012). Using a scorecard to provide feedback to clinicians on their performance has been associated with improvement in performance (see Blake et al., 2016; Gibb, Hill, Chorel, & Brant, 1997; Phommarath, 2014; Pugh, 2014; Yilla, Nam, Adeyemo, & Karbo, 2014). A survey of key nurse informants in Northern and Central California hospitals revealed that the respondents believed the measurement of QBL led to more prompt responses to patient problems and better patient outcomes. In addition, reporting a specific QBL measurement enhanced the

nurses' confidence in communicating with obstetric care providers about patient concerns (Gabel & Weeber, 2012).

Increasing the practice of the measurement of QBL contributes to social change in nursing practice by enhancing the role of the nurse as an effective member of the healthcare team in the prevention, identification, and management of obstetric hemorrhage. Improvement of team performance in managing hemorrhage is associated with decreasing preventable maternal morbidity and mortality (Lyndon et al., 2015). Preventing deaths and serious illnesses of mothers benefits society by influencing the health and well-being of the next generation (U.S. DHHS, 2016).

Definition of Terms

Estimated blood loss (EBL): Measurement of blood loss through a determination of visual observation of volume loss (Lyndon et al., 2015).

Quantitative blood loss (QBL): For the purposes of this project, the accurate measurement of blood volume loss obtained by volume measurement with graduated containers and through gravimetric or weight measurement of blood-soaked dry materials on a scale (Lyndon et al., 2015).

Scorecard: A report on a particular metric or set of metrics being measured, often for quality improvement purposes. A scorecard reflects measure of the past rather than real-time performance (Pugh, 2014).

Assumptions and Limitations

Although there are numerous methods of assessing QBL, including photospectometry (Patel et al., 2006), changes in patient laboratory hemoglobin levels

(Atukunda et al., 2016; Larsson, Saltvedt, Wiklund, Pahlen, & Andolf, 2006), and the use of electronic tablet-monitoring devices to measure hemoglobin levels in blood loss (Sharareh, Woolwine, Satish, Abraham, & Schwarzkopf, 2015), many methods described are cumbersome and costly (Lyndon et al., 2015). It was assumed for the purpose of this project that the only practical means for use in the facility in which the project was conducted were volume measurement through the use of graduated containers and gravimetric measurement through weighing blood-soaked dry materials on a scale and subtracting the dry weight of the materials. The usual conversion of one gram of weight is equal to one milliliter of volume was assumed (AWHONN, 2015).

It was also assumed that the purpose of measuring blood loss is not to obtain a perfectly precise numeral for the volume of blood loss since the volume and weight measurements are not perfectly accurate for a variety of reasons (e.g., blood spilled on the floor, blood soaked into patient clothing for which there is no comparable dry weight). However, the purpose of measuring blood loss is to obtain the most accurate measurement via practical means, involving the least amount of unquantified estimation (Lyndon et al., 2015).

Summary

The documentation of QBL at delivery is an evidence-based practice to enhance the prompt identification of obstetric hemorrhage and improve communication among caregivers regarding blood volume loss. Feedback on performance using scorecards has been associated with performance improvement. The intent of this DNP project was to support QBL measurement through providing weekly feedback to labor and delivery

nurses using scorecards to report blinded individual and unit aggregate data on the percentage of patient EHRs in which QBL was documented at delivery.

Section 2: Review of Scholarly Evidence

Introduction

The purpose of this literature review was to investigate methods of blood loss measurement at delivery to identify the most appropriate, accurate, and practical methods for use in clinical practice for early recognition of obstetric hemorrhage. Another purpose was to investigate the use of scorecards as a means of feedback for quality improvement. This section will review the evidence base which supports the quantification of blood loss at delivery, the plan for increasing the frequency of its practice in a facility, and the theories that underlie the evidence base and the change intervention.

The databases searched for the review of the literature included CINAHL, the Cochrane Database of Systemic Reviews, Dissertations and Theses, the Joanna Briggs Institute, MEDLINE, Science Direct, and the WHO. The search criteria included the following keywords and Boolean search strings: *blood loss and measurement and childbirth*, *blood loss and measurement and delivery*, *blood loss and measurement and quality improvement*, *obstetric hemorrhage and recognition, postpartum hemorrhage and recognition*, *quantification of blood loss*, *quality improvement and scorecard*, and *scorecard*. The searches were limited to English language full-text articles published between January 2000 and December 2016. Articles on the management of hemorrhage were excluded. The lists of references in articles and resources obtained were searched for additional materials of interest.

Specific Literature

The most useful document identified for the purpose of this project was the toolkit developed by the CMQCC, *Improving Health Care Response to Obstetric Hemorrhage,* now in its second edition. This document was developed with federal Title V block grant funding from the California Department of Public Health, Maternal, Child and Adolescent Health Division, and Stanford University. The first edition of this toolkit was developed in response to the conclusion of the CA-PAMR panel of experts that not only was obstetric hemorrhage the most common cause of maternal mortality in California from 2002 to 2003, but approximately 70% of the cases of maternal death related to obstetric hemorrhage were likely preventable (CDPH, 2011). The CMQCC toolkit was developed as an evidence-based resource to enable healthcare facilities that provide obstetric services to create standardized protocols for the prevention, recognition, and management of obstetric hemorrhage, design and carry out emergency drills for practice, and institute quality improvement reviews to monitor the effects of these interventions on staff performance and patient outcomes. The content for each topic was based on the best available evidence, and a rating of the level of the evidence, with an explanation of the rating, was provided with the recommendations for each topic. The toolkit reviewed the evidence of the importance of QBL measurement for the early recognition of obstetric hemorrhage and provided evidence-based interventions for four progressive stages of hemorrhage based on increasing volumes of cumulative blood loss.

Another significant resource recommending the measurement of QBL to prevent delay in the recognition of obstetric hemorrhage related to underestimation of blood loss

by visual estimation is the practice brief on quantification of blood loss produced by the AWHONN. This document reviewed studies on the inaccuracy of visual estimation of blood loss at delivery compared to quantitative measurement and provided guidelines to the nurse to conduct QBL measurement accurately. This practice brief contains a much stronger recommendation for the measurement of QBL compared to estimation of blood loss, based on the evidence reviewed, than the 2009 AWHONN monograph on obstetric hemorrhage (Harvey & Dildy, 2009). That monograph recommended accurate estimation or quantitative measurement and stated only that some sources recommended QBL measurement with every delivery. The position of the AWHONN clearly changed between the publications of the two documents. Quantification of blood loss became a major component of the AWHONN's postpartum hemorrhage project in which the organization engaged facility leaders to implement a program on the preparation for, recognition of, and management of obstetric hemorrhage (AWHONN, 2014).

The inclusion of the recommendation to measure QBL and maintain a cumulative record of all blood loss for every woman during labor and delivery in the consensus statement by the NPMS was an important endorsement of the practice, especially for the physician groups that participated (Main et al., 2015). Although this was a consensus statement and not research evidence, it was based on a review of current research.

Schorn (2010) conducted a review of the literature that supported QBL measurement as an evidence-based practice. The author reviewed 46 articles on methods of measurement of blood loss that could be used for patients with vaginal delivery. The methods described were divided into visual estimation, direct (volume) measurement,

gravimetric (weight) measurement, photometry/photospectometry, and miscellaneous. The conclusion of this literature review was that although photometry is considered the most accurate method of measurement of blood loss, it is too expensive, technically complex, and time-consuming for routine clinical use. This was also the conclusion of Patel et al. (2006), who compared estimation of blood loss by the delivering physician, volume measurement of blood loss using an under buttocks drape, and blood loss measurement via photospectometry. The researchers randomized 123 vaginally delivered patients regarding estimation of blood loss or volume measurement using an under buttocks drape and compared a sample of 10% of the drape measurements to photospectometry measurements. The results were that the EBL volumes by the delivering physicians were 33% lower than the blood loss volumes measured in the under buttocks drapes. The Pearson correlation coefficient of the drape volume measurements and the photospectometry measurements was 0.928. The conclusion of Patel et al. was that the delivering physicians underestimated blood loss, consistent with reports of previous studies, that the measurement of blood loss using an under buttocks drape was highly correlated with the gold standard of blood volume measurement by photospectometry, and that blood loss measurement using an under buttocks drape was more practical and economical for clinical use than photospectometry. Considering all the methods of measurement of blood loss used at delivery, with surgery, and during simulation activities, Schorn's conclusion from the literature review was similar to that of Patel et al. that quantitative measurement using a combination of volume and weight is the most accurate method that is practical for clinical use.

The greatest concern for patient safety related to the inaccuracy of EBL, the most common method of measurement of blood loss, is the evidence demonstrating the increased underestimation of blood loss with patients who lose large volumes of blood. This creates the greatest risk for the failure of clinicians to recognize and treat significant blood loss (Stafford et al., 2008). Underestimation of large volumes of blood loss has been reported by Stafford et al., who compared EBL volumes to blood volume losses derived from calculations of maternal blood volume and changes from predelivery to postdelivery hematocrits in 677 patients. The researchers found that EBL measurements were significantly lower than the calculated blood loss for spontaneous vaginal deliveries, operative vaginal deliveries, and cesarean deliveries. In addition, the underestimation of blood loss was greatest with blood loss volumes exceeding 1000 ml. Toledo, McCarthy, Hewlett, Fitzgerald, and Wong (2007) obtained similar results regarding underestimation with large volumes in a study in which clinicians visually estimated volumes of simulated blood loss. The authors found no differences in the accuracy of estimations of blood loss between obstetricians, anesthesiologists, and nurses and no associations of accuracy with years of experience. The underestimation of blood loss was greatest at higher volumes with a range of 16% underestimation at 300 ml to 41% at 2000 ml.

Habak et al. (2016) investigated if there was a difference in volumes of blood loss at delivery by method of measurement. The authors retrospectively compared the mean QBL measurement of 100 records of low risk vaginal delivery patients to the mean EBL measurement of 94 records of low risk vaginal delivery patients. The mean QBL measurement was 324 ml and the mean EBL measurement was 309 ml. Although this

difference was not statistically significant, the variance in the QBL measurement group was significantly greater ($p < .0005$). Of the patients in the QBL group, 11% (11/100) demonstrated blood loss greater than or equal to 500 ml, compared to 2.1% (2/94) patients in the EBL group. However, of the two patients in the EBL group with blood loss greater than or equal to 500 ml, one demonstrated vital signs changes and one was transfused, while of the 11 patients in the QBL group with blood loss greater than or equal to 500 ml, two demonstrated vital signs changes and one was transfused. Nine of the patients in the QBL group with blood loss greater than or equal to 500 ml demonstrated no abnormal signs. Although the numbers of patients were small, Habak et al. suggested that these findings supported the idea that hemorrhage is identified sooner with QBL measurement, enabling prevention of clinical deterioration.

General Literature

The use of scorecards to improve the performance of clinicians has been reported in the literature. Phommarath (2014) used monthly scorecards to provide individual and group feedback to laboratory technicians on the accuracy of their data entry by displaying error count percentages identified through audits. Over a three-month period, the transcription error rate decreased from 12.6% to 2.2%. The use of the scorecards enabled leaders in the laboratory department to identify technicians who benefitted from retraining. Gibb et al. (1997) provided feedback on one year's worth of data on blood culture contamination to phlebotomists both as a facility aggregate and privately on individual performance. There was improvement in contamination rates in the 12-month period following the feedback.

Scorecards have also been used to support quality improvement efforts in large projects. They were used by a facility improvement team in Sierra Leone to provide feedback to hospitals on their progress toward establishing key functions to enable the provision of emergency obstetric and neonatal care (Yilla et al., 2014). Blake et al. (2016) reported their use to provide feedback to coalitions of healthcare providers and community groups in Ghana on the conditions present in health facilities affecting their ability to provide emergency obstetric and neonatal care.

Bingham and Main (2010) recommended providing feedback on group aggregate and individual performance data via trend charts as a quality improvement strategy for maternity units. The authors suggested posting aggregate trend charts on the unit and discussing the data at staff meetings. They provided case studies of quality improvement projects they stated were based on evidence. However, they did not provide any evidence of the success of the use of data as feedback to staff nurses in performance improvement.

Theoretical Frameworks

Two primary theories formed the basis for this project. The first was Lewin's theory of planned change, which guided the plan for the implementation of the practice change to consistent measurement and documentation of QBL at delivery. The second was the theory of homeostasis, which explained the need to quantify blood loss at delivery to permit the early recognition of obstetric hemorrhage.

Lewin's Theory of Planned Change

Lewin's theory of planned change was based on a framework termed force field analysis, which is used to identify the forces that influence a situation or a behavior

(Lewin, 1938; Shirey, 2013). Based on Lewin's theory, when one is planning to implement a change such as a change in a practice on a nursing unit, it is helpful to identify the factors that will affect the process of the implementation of that change. Influencing factors can be facilitators (driving forces) or obstacles (restraining forces). These factors may ultimately determine the success or failure of the implementation of the change but may be manipulated to enhance the chance of success (Shirey, 2013).

The influence of driving and restraining forces is seen during Lewin's three-stage process for the implementation of change. Although described as separate events, these stages are fluid as different forces exert an influence on the progress of the change implementation. In order for a change to be implemented, an unfreezing of the current state must occur, which Lewin identified as the first stage of the change process. For a practice change to be implemented on a nursing unit, some type of motivation or urgency to move away from the current state or practice must occur to set up the opportunity for change to take place. Shirey (2013) stated this preparation for change can occur with a nursing leader identifying a gap between the current and the expected practice on a unit and creating a motivation among the stakeholders to address the gap. Discussing the importance of making the change and engaging others to commit to making the change can create a sense of urgency for change. This sense of urgency unfreezes the current state and prepares the unit for the change. A plan for the change is then formulated, which includes identifying the driving and restraining forces. To enhance the chance of success of the implementation of the change, means to strengthen the driving forces and weaken the restraining forces are also planned (Shirey, 2013).

In the next stage, which Lewin termed the moving or transitioning stage, the plan is implemented. The driving and restraining forces continue to be identified and strengthened or weakened as possible. The stakeholders involved in the change are coached and supported to assist them to cope with the uncertainty that change brings (Shirey, 2013).

If a change is to be sustained, it is essential that it be incorporated into the usual unit practices and adopted as part of the corporate culture. Lewin called this hardwiring of a change into a system and the resulting creation of a new normal practice the refreezing, or third stage of change. Refreezing completes the change process. It creates a new stable state in which the driving and restraining forces are balanced and the change is part of the usual activities (Shirey, 2013). The activities of this DNP project were focused on the unfreezing and transitioning stages of the change process. This student expects to follow through to the completion of the process through refreezing in her role as the perinatal clinical nurse specialist of the facility as a follow-up to this DNP project.

Homeostasis

The importance of the measurement of QBL to permit the prompt recognition of obstetric hemorrhage in order to limit maternal morbidity and mortality is based on the physiologic theory of homeostasis. Homeostasis explains that the body has feedback mechanisms that identify diversions from a state of equilibrium and activate compensatory mechanisms to restore that equilibrium (McEwen, 2014). The body constantly assesses the stability of its processes and parameters (such as vital signs and pH level) within their optimal range. To the best of its ability the body makes

adjustments to any influencing factors that threaten that steady state. If influencing factors drive the parameters too far outside their normal range, there can be detrimental effects on the functions of the body, resulting in morbidity or mortality. Although all systems are interrelated, the feedback and compensatory mechanisms of different organ systems can be examined separately (McEwen, 2014).

Some systems have larger ranges within which the body strives to maintain its parameters than others. The circulatory system, for example, has a relatively large range within which the body attempts to maintain blood volume (McVicar & Clancy, 1998). Moreover, through mechanisms such as redirecting blood flow to major organs, most healthy people can compensate for large volumes of blood loss temporarily (Lyndon et al., 2015). The compensatory mechanisms of people such as healthy obstetric patients can adapt to blood losses of 20 to 25% of their total blood volume before clinical signs associated with hypovolemia, such as tachycardia, hypotension, and pallor, become obvious (Lyndon et al., 2015). By the time these clinical signs of hypovolemia are apparent, the patient may have progressed so far into critical complications such as decreased tissue perfusion and abnormal acid-base balance that interventions may not be successful in restoring homeostasis. Death or severe permanent morbidities may result (Lyndon et al., 2015).

In a review of the literature, Pacagnella et al. (2013) was unable to identify clinical signs that were reliably associated with levels of blood loss with either obstetric or non-obstetric populations. Therefore, most obstetric patients, who as healthy young women appear to maintain clinical stability despite significant blood loss until their

compensatory mechanisms fail, require a means other than the assessment of clinical signs to identify hemorrhage. This is the basis for the quantification of blood loss to identify obstetric hemorrhage (Lyndon et al., 2015). The most generally accepted blood loss estimates with vaginal delivery, repeat cesarean section, and repeat cesarean section with hysterectomy were calculated by Pritchard, who used methods such as labelling the red blood cells of subjects with chromium during pregnancy, delivery, and the postpartum period (Lyndon et al., 2015; Pritchard, 1965; Pritchard, Wiggins, & Dickey, 1960). Although the techniques used resulted in what were believed to be accurate measurements, the studies would not be replicated with the current guidelines for the protection of human subjects. Pritchard (1965) identified that the average blood loss of 75 patients from vaginal delivery to approximately three hours postpartum was about 505 ml, although 7% of the patients lost 1,000 ml or more. The average blood loss of the 40 patients who underwent repeat cesarean section was 930 ml from the start of the surgery to approximately three hours postpartum. However, 23% of the cesarean delivery patients lost between 1,000 ml and 1,500 ml of blood, and 8% lost greater than 1,500 ml.

Based largely on Pritchard's work, the American College of Obstetricians and Gynecologists (ACOG) endorsed the following definition of early postpartum hemorrhage: "cumulative blood loss of greater than or equal to 1000 ml or blood loss accompanied by signs/symptoms of hypovolemia within the first 24 hours after delivery" (ACOG, 2012, p. 2). This definition was developed during a consensus conference of the ACOG that was designed to improve definitions of maternal indicators of comorbidities and complications to improve data collection. It was further noted that total blood loss of

between 500 ml and 999 ml in itself is an indication for increased monitoring and the potential institution of interventions (ACOG, 2012; Main et al., 2015). Using blood loss levels as indicators for specific assessments and interventions to identify and manage maternal hemorrhage is the basis of the evidence-based toolkit developed by the CMQCC as a resource for clinicians and facilities (Lyndon et al., 2015).

Relevance of the Project to Nursing Practice

The relevance of this project to improve the measurement and documentation of QBL at delivery to nursing practice is that although the measurement of blood loss is a collaborative effort between the nurse and the delivery care provider, the nurse is most often the clinician weighing and measuring the blood loss, calculating the cumulative amount, and communicating that information to the other team members (Gabel & Weeber, 2012). Therefore, the nurse is often first clinician to recognize that hemorrhage is occurring. When the nurse has an objective value to report to the other team members, it prevents miscommunication that can occur with subjective descriptions of blood loss. Such miscommunication can result in delays in response to hemorrhage (Bingham, 2012). In addition, evidence-based protocols have been established to define specific responses to different volumes of cumulative maternal blood loss (Lyndon et al., 2015). The measurement of QBL and the adoption of a hemorrhage management protocol by a facility empowers the nurse to promptly identify excessive blood loss, initiate interventions based on the volume lost, and activate the other team members to manage the hemorrhage (Bingham & Jones, 2012).

Local Background and Context

The concept of measuring QBL was not new to the labor and delivery unit of the facility in which this project was conducted. Within a relatively short period of time in 2012, the clinicians on the unit cared for a cluster of patients who experienced obstetric hemorrhages. The experience of providing care to these patients created a desire within the multidisciplinary team to review the identification and management of obstetric hemorrhage. This situation created an openness to change, which Lewin described as unfreezing in the theory of planned change (Shirey, 2013).

Cooperative efforts among the nurses, obstetricians, anesthesiologists, women's health leadership team members, administrators, and ancillary staff led to a number of practice changes and a revised policy and procedure to address obstetric hemorrhage. These changes occurred throughout 2013, during what Lewin would describe as a moving or transitioning period (Shirey, 2013). A series of educational activities led by the perinatologist, nurse educator, and clinical nurse specialist were offered for all team members. The nurses all demonstrated competence in the technical skills involved in the measurement of QBL for vaginal and cesarean deliveries, and the interventions included in the revised policy and procedure were practiced in multidisciplinary simulation activities.

However, in time the sense of urgency shifted to other major changes in the unit. The implementation of a new EHR system and a move toward Baby Friendly designation required major effort and resources. Attention was diverted away from addressing obstetric hemorrhage, and the refreezing phase for the changes which had been instituted

occurred before the practice of QBL was hardwired into daily care. The practice of the consistent measurement and documentation of QBL suffered from what Kotter (1995) described in the classic article on change implementation failure as "declaring victory too soon" (p. 66). Team members were able to perform the technical skills required for QBL measurement, but it was not, as Kotter described, anchored into the corporate culture.

Although the entire healthcare system of which the facility is a member adopted the measurement of QBL as part of a system wide policy on obstetric hemorrhage, its documentation was not selected as a quality metric for implementation of the policy. Therefore, the implementation of the new system wide practice guidelines also did not create an emphasis on QBL measurement. With the attention of the facility leadership and the labor and delivery nurses focused on other activities in the unit, the nurses and physicians generally reverted to their former practice of the delivering physician providing an estimation of the volume of blood loss at delivery. This return to former practice is similar to that described by Cameron, Roberts, Bell, and Fischer (2007) in their implementation of a postpartum hemorrhage policy. Despite the presentation of the evidence base for the new policy, the authors observed nurses returning to familiar practice patterns, which they described as "entrenched practices" (p. 171).

Using Lewin's theory of planned change, to create an environment in which the practice change of QBL measurement could be successfully implemented required another unfreezing of the current state. Unfreezing would involve the stimulation of a state of urgency for change (Shirey, 2013). It would have been undesirable for that stimulus for change to again come from patient hemorrhages. Another means to create a

sense of urgency for change is to demonstrate to clinicians the gap between the current and desired state (Shirey, 2013). This DNP student used scorecards at weekly nursing huddles to demonstrate the percentage of patients who had any blood loss recorded at delivery and the percentage of patients who had blood loss recorded as a quantitative measurement. These scorecards illustrated the gap between the current state of documentation of blood loss at delivery and the desired state identified in the institutional and system policy and supported by evidence. This information was also presented to the obstetricians and anesthesiologists at their department meetings to stimulate their desire for change.

Summary

This project focused on improving the measurement and documentation of QBL at every delivery through the use of scorecards to provide feedback to labor and delivery nurses on the percent of obstetric patients with any blood loss documented at delivery and on the percent whose blood loss at delivery was documented as QBL. The scorecards presented both unit aggregate and blinded individual nurse data and demonstrated the gap between the evidence-based practice of QBL measurement outlined in the facility and the healthcare system policy and the actual practice in the facility. The purpose of the illustration of this gap was to motivate the labor and delivery nurses to reintroduce QBL measurement into their practice for the safety of patients and to improve their communication with other clinicians. The following section will describe the data collection plan and the use of the scorecards to focus the attention of the nurses on the evidence-based practice of QBL measurement.

Section 3: Collection and Analysis of Evidence

Introduction

The plan for this project was to provide the labor and delivery nurses with feedback on their individual and group performance in the documentation of QBL at delivery. It was anticipated that illustrating the gap between the current practice and the expected consistent documentation of QBL would stimulate interest in improving the performance of this evidence-based practice. Scorecards reporting the current documentation of QBL at delivery were planned to provide this feedback.

Project Design/Methods

The setting for this project was the labor and delivery service of a suburban community hospital in Southern California. This facility is a member of a multistate healthcare system. Many of the facility's policies, procedures, and practices, including the policy of measuring QBL with every delivery, are consistent with system wide guidelines. The project design was quality improvement using Lewin's theory of planned change as a model for implementation. The project focused on improving performance related to the incorporation of existing evidence rather than generating new knowledge with a research study.

Weekly scorecards displaying blinded individual and unit aggregate data of the labor and delivery nurses' documentation of blood loss at delivery were prepared from a review of the EHRs of all delivered patients over a 12-week period. The scorecards illustrated the percent of patients who had any blood loss documented at delivery (whether identified as QBL or EBL, or with no method of measurement specified) and

the percent of patients whose blood loss at delivery was documented as QBL. The scorecards were devoid of any identifying nurse or patient information. The preparation of the scorecards and their presentation to the labor and delivery nurses is described later in this section.

Population and Sampling

The target population of this project was the registered nurses practicing in labor and delivery who attend deliveries in the hospital in which this project was conducted. This included both permanent staff and traveling nurses. Each of the nurses was assigned a confidential code number, including those who joined the staff during the data collection period. Each nurse's documentation of blood loss at delivery was included in the weekly blinded individual and unit aggregate scorecards.

Data Collection

Data for the scorecards were collected from the EHRs of all patients delivered in the facility during the 12-week period between April 30, 2017 and July 22, 2017. The data collection period for each weekly scorecard was from 12:00 a.m. on Sunday through 11:59 p.m. on the following Saturday. The date and time of delivery designated on which scorecard the data from a specific delivery were included. Data from all deliveries during this time period were accessible from the EHR, and all records were included in the scorecards.

Review of Patient Records

Data were collected from the patient EHRs by the DNP student. The student had access to patient records as an employee of the institution. The student received

permission to conduct the project from the Institutional Review Board (IRB) of Walden University, IRB approval number 04-25-17-0549264. The IRB of the facility in which the project was conducted determined that it fell under the quality improvement category and was not research. The committee members referred the student's IRB application to the facility Director of Quality. The Director of Quality gave approval for the student to collect the data listed below and conduct the project in the facility.

The data collected from each patient EHR were:

- Date and time of delivery, to identify the week of data collection.
- Postpartum hemorrhage risk assessment on admission (low/medium/high/not performed).
- Mode of delivery (vaginal/cesarean).
- Blood loss recorded at delivery (yes/no).
- If blood loss recorded at delivery, volume recorded in ml.
- If blood loss recorded at delivery, method of measurement recorded (QBL/EBL/not specified).
- If the blood loss recorded at delivery was recorded by the anesthesiologist (yes/no).
- If the patient received any blood products during the period from delivery to discharge (number of units).
- Identification of the labor and delivery registered nurse who provided care for the patient at delivery, recorded as a random confidential code number assigned by the DNP student for the project.

The first labor and delivery nurse listed in the delivery record in the EHR was identified as the delivery nurse for the scorecard preparation. No identifying data were collected from any patient EHR. The data were recorded in a log book and entered into an Excel spreadsheet maintained by the student and secured in accordance with the facility's guidelines for privacy of patient information.

Assignment of Code Numbers to Labor and Delivery Nurses

Each labor and delivery registered nurse was assigned a confidential code number that was displayed in the weekly scorecards of blinded individual data. Each individual nurse's code number was provided in person in a sealed envelope by the student. The code numbers were not provided to the women's health management team or to any other hospital or healthcare system employees. The student assigned the numbers randomly by placing folded papers marked with numerals in a container and randomly drawing a number to correspond to the name of each labor and delivery nurse. The list of code numbers was secured in the same manner as the patient data collected. Fifty more papers with code numerals were included in the container than the number of labor and delivery nurses on staff when the code numbers were assigned. The unused numerals were stored securely and used to assign code numbers to the nurses who joined the staff during the course of the project.

Protection of Rights of the Labor and Delivery Nurses

The data collection carried out for this project was consistent with data collection for quality improvement activities that are carried out in this facility by this DNP student in her role as the perinatal clinical nurse specialist. The student has no supervisory or

administrative responsibilities in relation to the labor and delivery staff nurses. One of the student's roles in the facility is to provide feedback to the nursing staff on their performance based on data collected for quality improvement. This feedback is not part of the nurses' employee performance review, which is conducted by the nursing management staff. The collection of data for this project on the nurses' documentation and the feedback that was provided on the confidential blinded scorecards was consistent with the student's quality improvement activities as part of the clinical nurse specialist's role functions.

The nurses' documentation of QBL measurement is required according to facility and healthcare system policy. No activities outside of the expected roles of the labor and delivery nurse were requested of the nurses during this project and the feedback that was provided to them on the confidential blinded scorecards was consistent with feedback provided with unit quality improvement activities. Therefore, no written consent for inclusion in the project was obtained from the nurses on the unit. The DNP student verbally explained the project to each nurse and offered each individual the opportunity to opt out of inclusion in the blinded individual scorecards posted on the unit. Each nurse was assured that the nursing management staff would not have access to the code numbers assigned by the student. Each nurse was also informed the documentation reflected in the scorecards would not be used for the employee performance review as either positive or negative input. The facility women's health unit-based council of staff nurses reviewed and approved the student's project to be conducted in labor and delivery.

Preparation of Scorecards and Graphs

The student prepared four weekly scorecards from the data collected as follows:

- Blinded scorecard of the percent of deliveries attended by each individual nurse that had any blood loss recorded.
- Blinded scorecard of the percent of deliveries attended by each individual nurse that had QBL recorded.
- Run chart of the weekly percent of all deliveries that had any blood loss recorded.
- Run chart of the weekly percent of all deliveries that had QBL recorded.

In addition, the original plan was that three graphs comparing the patient blood loss volumes by method of measurement would be updated weekly. However, this task was more challenging than anticipated and the student was only able to produce one set of three graphs for weeks one through five of the data collection period. The graphs compared blood loss volumes measured quantitatively to estimated blood loss volumes for vaginal deliveries, cesarean deliveries, and total deliveries.

Presentation of Scorecards and Graphs

The blinded scorecards and run charts were presented to the labor and delivery nurses at the regularly scheduled weekly huddles on both shifts whenever the unit workflow permitted. On several occasions the unit was too busy for the nurses to gather for a formal huddle. In those instances the student met with as many nurses as possible individually during the shift. The scorecards and run charts were posted on the unit quality improvement board for nurses who did not attend the weekly huddle to view.

Bingham and Main (2010) recommended discussing unit performance data at staff meetings and posting trend charts of individual and group performance to stimulate improvement.

Measurement of QBL was a collaborative effort involving the delivering physician, and often with cesarean deliveries, the anesthesiologist. To communicate the progress in QBL measurement, the run charts of the percent of deliveries that had QBL recorded were presented to the members of the department of obstetrics and gynecology and the members of the department of anesthesia at their regularly scheduled meetings. The presentation of the run charts provided an opportunity to reinforce the importance of physician participation in QBL measurement.

Data Analysis

The analysis of data was designed to examine two aspects of documentation of blood loss at delivery: documentation of any blood loss (regardless of method of measurement) and documentation of QBL. The questions to be answered were whether the use of weekly scorecards to provide individual feedback to the labor and delivery nurses would be associated with an increase in the percent of patients who had any blood loss documented at delivery and whether the scorecards would be associated with an increase in the percent of patients whose blood loss at delivery was documented as a QBL measurement over a 12-week period of time. Run charts demonstrating the weekly percentages of total patients with any blood loss documented at delivery and the weekly percentages of total patients whose blood loss was documented as QBL were followed for evidence of increases in the percentages over the course of the data collection period.

In addition to observation of blood loss documentation, a comparison of quantitative and estimated blood loss volumes was performed. This comparison was planned to determine if there was a difference in the volumes by method of measurement as identified in the literature (Patel et al., 2006; Stafford et al., 2008; Toledo et al., 2007). Blood volume measurements with no method of measurement specified were excluded from the comparison. An independent samples *t* test was used to compare the mean QBL and EBL blood volumes for total deliveries and for vaginal deliveries. The comparison was not made for cesarean deliveries due to the low number of cesarean deliveries with EBL measurements.

Lastly, as a balancing measure to the anticipated increase in the percentage of patients with QBL measurements, the number of patients who received blood products during the data collection period and the number of blood products received were tracked. The original plan was to produce run charts of the number of patients who received blood products and the number of blood products received to determine if an increasing percentage of patients with QBL measurements was associated with an increasing administration of blood products. The potential for increased administration of blood products related to higher blood volume losses recorded with QBL measurement as compared to estimates of blood loss had long been a concern to the obstetricians. However, there were too few patients who received blood products during the data collection period to produce the run charts.

Project Evaluation Plan

The objectives of this project were to demonstrate an increase in the percentage of patient EHRs that had blood loss recorded at delivery to greater than or equal to 98% and an increase in the percentage of patient EHRs that had QBL documented at delivery in compliance with the facility and healthcare system policy. Run charts demonstrating the weekly percentage of patients with any documented blood loss and the percentage of patients with documented QBL were examined to determine if there were increases over the course of the data collection period.

The ultimate evaluation of the change to consistent QBL measurement at delivery will be the determination of whether the practice becomes incorporated into the unit culture. This adoption of QBL measurement as the new normal is where failure previously occurred. Continued feedback on a regular basis beyond the project will be required to sustain and continue the course of improvement. This student plans to provide monthly reports on the percent of patients with QBL documented from the healthcare system data base to the nursing and medical staffs to maintain the focus on the topic and the momentum for improvement generated by this project. This continued feedback is beyond the scope of this DNP project but is an appropriate quality improvement activity for the student as the perinatal clinical nurse specialist of the facility.

Summary

The primary objective of this project was to increase the percentage of patients with whom QBL is measured and documented at delivery in compliance with the facility

and healthcare system policy. Weekly individual blinded scorecards and unit aggregate run charts demonstrating the percentage of patients with QBL documented at delivery were used as feedback to stimulate discussion of the practice and improvement in performance. These activities were consistent with recommendations by Bingham and Main (2010) to stimulate improvement in perinatal units by discussing performance data and posting charts of individual and group performance.

Section 4: Findings and Recommendations

Introduction

The purpose of this project was to determine if the use of weekly scorecards demonstrating both blinded individual nurse data and aggregate unit data would be associated with an increase in the percent of patients with any blood loss documented at delivery and an increase in the percent of patients with quantitative blood loss documented in a community hospital over a 12-week period of time. Although QBL measurement with every delivery had been a facility policy since 2013, previous attempts to implement the practice change for consistent QBL measurement had been unsuccessful. Since the use of scorecards to provide individual and group feedback had been associated with improvements in performance in published quality improvement projects (see Gibb et al., 1997; Phommarath, 2014) and since Bingham and Main (2010) recommended providing group and individual performance data charts as a quality improvement activity in perinatal units, this project was conceived to improve the practice of QBL measurement in the facility. Blinded scorecards of the documentation of QBL measurement by individual nurses at delivery and run charts of unit aggregate QBL documentation were presented weekly.

Findings and Implications

There were 522 total deliveries in the facility during the 12-week data collection period from April 30, 2017 through July 22, 2017. All patient records were accessible and reviewed for the project. Of the 522 deliveries, 350 (67.0%) were vaginal deliveries and 172 (33.0%) were cesarean deliveries.

Documentation of Any Blood Loss

Patient records were examined for evidence of documentation of any volume of blood loss at delivery. This documentation included blood volumes measured quantitatively, estimated volumes, and volumes with no method of measurement recorded (no indication of how the measurement was obtained). Blood loss was documented for 518 (99.4%) of the total deliveries. This was a 1.9% improvement over the 97.5% baseline of the sample of records reviewed in June 2016. It was a 7.1% improvement over the 92.3% documentation of blood loss in the facility's deliveries in the first quarter of 2016 obtained from the healthcare system database. Of the 522 deliveries, the only three deliveries with no blood loss documented occurred during weeks two and three (see Figure 1). There were 70 deliveries during this time period, 36 cesarean and 34 vaginal. One cesarean delivery during week two and two vaginal deliveries during week three had no blood loss documented. All (100%) of deliveries during weeks four through 12 had blood loss documented. Therefore, the project objective of achieving a percentage greater than or equal to 98% patient EHRs with any blood loss recorded at delivery was met.

This improvement in documentation is consistent with actions in the transitioning stage as Lewin described in the theory of planned change. People become engaged in attempting a change when the difference between the desired and the current state is revealed (Shirey, 2013). In this project, the scorecard feedback served to illustrate the gap between the desired and current states of blood loss documentation, likely serving as

a motivator for change. In addition, the discussions during huddles helped strengthen the facilitators of and weaken the barriers to consistent documentation of blood loss.

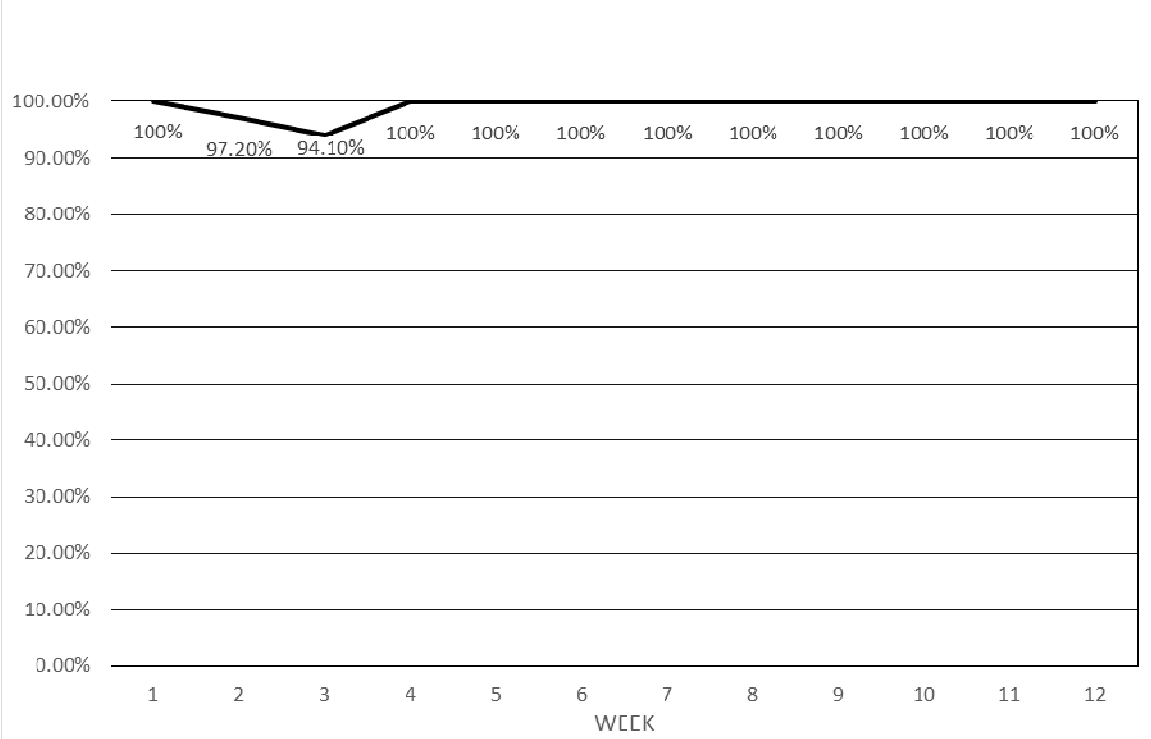

Figure 1. Percent of patients with any blood loss documented at delivery

An additional factor that likely influenced this outcome was that there was a major change in the delivery summary of the EHR several months prior to the start of this project. In February 2017, a field was added to the delivery summary in which the method of measurement of blood loss is documented by checking either quantitative blood loss or estimated blood loss. This change was made in the EHRs of all facilities throughout the healthcare system. This field did not exist in the EHR in June 2016 when the baseline for this project was established. Up until the change to the EHR in February 2017, the only means to identify the method of measurement of blood loss was to insert a

comment with the blood volume entry. The addition of this field may have served as an additional reminder to clinicians to document blood loss and may have been associated with improvement in documentation. In February through April of 2017, the percentage of patients in the facility with any documented blood loss was 97.0%. The percentage of patients in the entire healthcare system with any documented blood loss had increased to 93.2% during that time period from 89.0% in the first quarter of 2016. These increases in the percentages of documentation of blood loss occurred prior to the start of this DNP project and without any other changes throughout the healthcare system.

Method of Measurement of Blood Loss

In addition to improving the percentages of patients with any blood loss documented at delivery (regardless of method of measurement) the focus of this project was to increase the percentage of patients with blood loss documented as a quantitative measurement. Of the 522 total deliveries during the 12-week data collection, 320 (61.3%) had QBL documented, 150 (28.7%) had EBL documented, and 52 (10.0%) of the records had no method of measurement identified (see Table 1). The 52 records with no method of measurement identified included the three records with no blood loss recorded at all and 49 records with a blood volume recorded but a blank EHR field for method of measurement. Of the 350 vaginal deliveries, 177 (50.6%) had a QBL measurement documented and of the 172 cesarean deliveries, 143 (83.1%) had a QBL measurement documented.

Table 1

Method of Measurement of Blood Loss

	n	QBL	EBL	Not specified
Total deliveries	522	320 (61.3%)	150 (28.7%)	52 (10.0%)
Vaginal	350	177 (50.6%)	139 (39.7%)	34 (9.7%)
Cesarean	172	143 (83.1%)	11 (6.4%)	18 (10.5%)

Participation of the Nurses

Sixty-seven nurses were identified from the EHRs as the delivery nurse for the 522 deliveries during the 12-week data collection period. Each nurse received a confidential code number from the DNP student that was used to create the weekly blinded scorecards of the percent of each nurse's deliveries with QBL documented. The number of weekly deliveries attended by each nurse during the data collection period ranged from zero to four. The total number of deliveries for which each nurse served as the delivery nurse during the data collection period ranged from one to 25.

The blinded scorecard feedback was well-received by the nursing staff. No nurse refused to be included in the project. The nurses stated they did not find the weekly blinded feedback threatening, and many waited eagerly to check their weekly result. Several nurses requested a cumulative scorecard of their documentation of QBL measurement throughout the 12-week data collection period, which the student prepared and posted for all the nurses. A disadvantage of the need to maintain the confidentiality of the scorecards was that the student was not able to publicly acknowledge the nurses who performed QBL measurement consistently or showed improvement in their practice of QBL measurement over the data collection period.

Documentation of QBL

The review of patient records revealed that the weekly discussion and posting of the blinded individual scorecards and the run chart of the unit aggregate percentage of deliveries with QBL documented was associated with an increase in the percentage of patients with QBL documented over the 12-week data collection period (see Figure 2). As the percent of patient records with QBL documented increased from 22.7% to 80.0%, the percent of patient records with EBL documented decreased from 45.5% in week one to 28.7% in week 12. In addition, the percent of patient records with no method of measurement of blood loss documented decreased from 31.8% in week one to 10.0% in week 12.

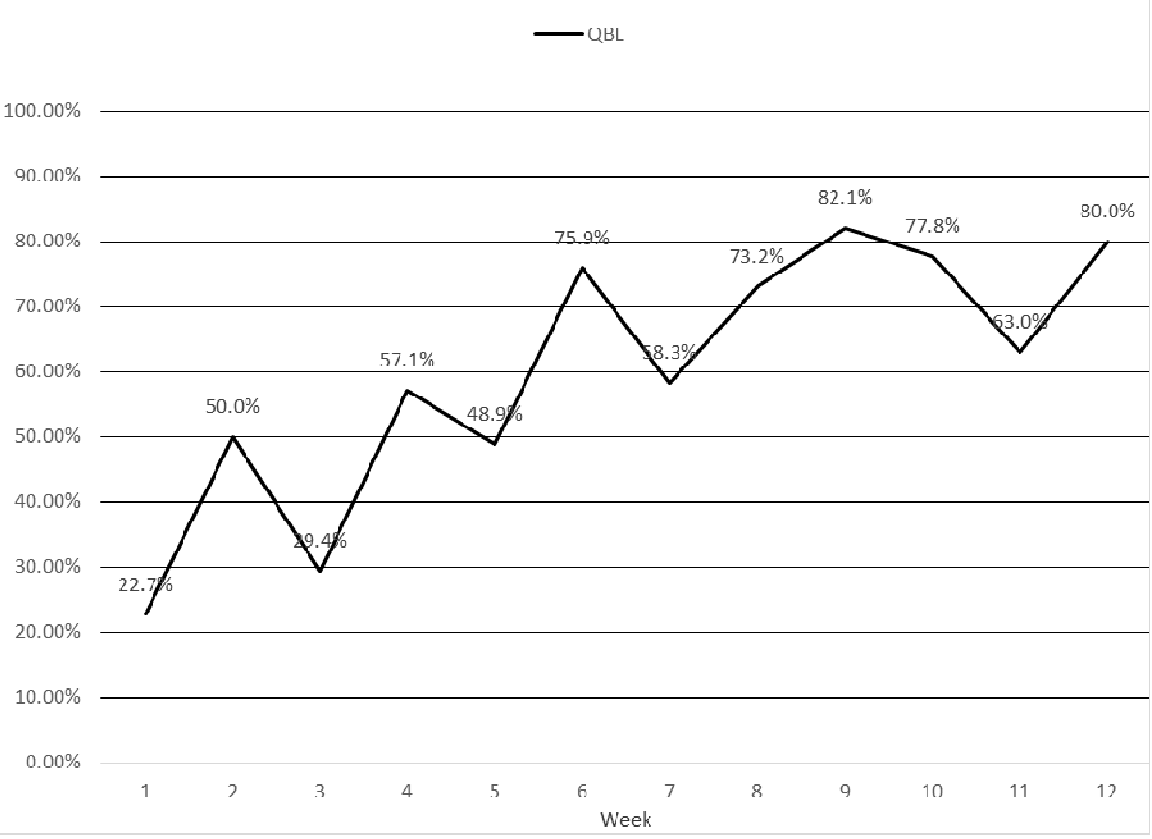

Figure 2. Percent of patients with QBL documented at delivery

Comparison of QBL and EBL Measurements

The project also investigated if there was a difference between the mean QBL volume measurement and the mean EBL volume measurement. An independent samples *t* test was used to determine if there was a difference between the mean QBL and the mean EBL volume measurements for total deliveries. The blood volume measurements with the method of measurement not specified were excluded from this analysis. This yielded a total of 470 patients: 320 patients with a QBL measurement and 150 patients with an EBL measurement. The independent samples *t* test revealed that there was a significant difference between the mean QBL measurement (M = 482.20 ml, SD = 358.03) and the mean EBL measurement for total deliveries (M = 313.15 ml, SD = 211.91), t (443.57) = 6.39, $p < 0.001$. The 2-tailed p was < 0.05; consequently, the difference between the means is significant. The Levene's test for equality of variances demonstrated a p of < 0.001 indicating that there was not equal variation between the QBL and the EBL volume measurements. For total deliveries, the mean QBL measurement was higher than the mean EBL measurement. This finding is consistent with previous reports of quantitative blood loss measurements being higher than estimated measurements (Al Kadri, Al Anazi, & Tamin, 2011; Patel et al., 2006; Toledo et al., 2007). Of the 320 patients with whom QBL was reported, 19 (5.94%) demonstrated a blood loss that met the ACOG (2012) definition of early postpartum hemorrhage of greater than or equal to 1000 ml, while two (1.33%) of the 150 patients with whom EBL was reported had a blood loss of greater than or equal to 1000 ml. Although these numbers are too small for conclusions to be drawn, they are consistent

with previous reports of greater underestimation of blood loss with larger volumes (Toledo et al., 2007). Figure 3 illustrates the QBL and EBL volumes of the patients for whom a method of measurement of blood loss was recorded.

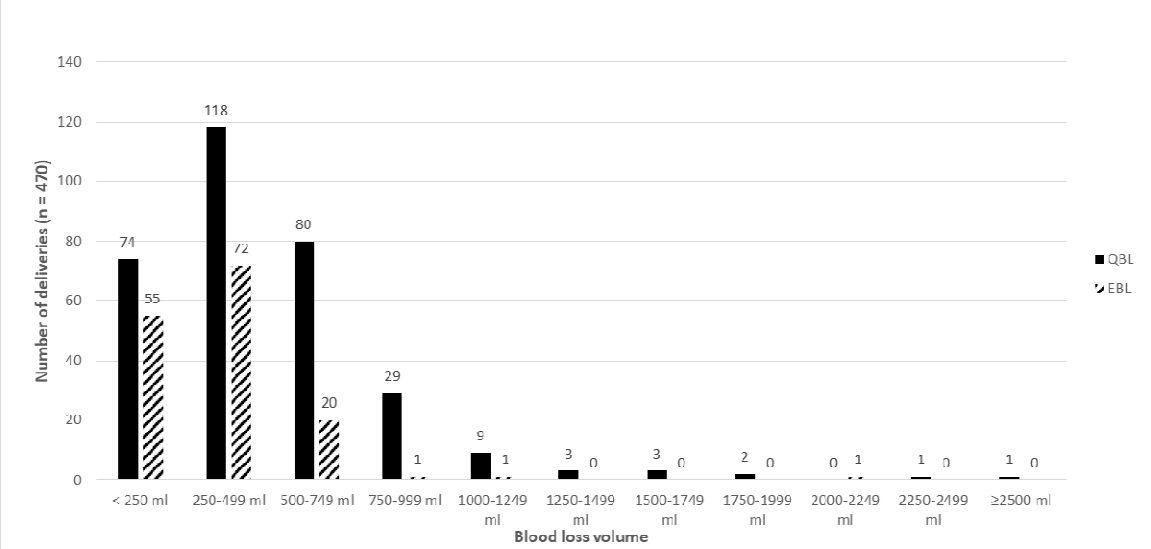

Figure 3. Comparison of QBL and EBL volumes for all deliveries

An independent samples *t* test was also used to determine if there was a difference between the mean QBL and the mean EBL volume measurements for vaginal deliveries. The blood volume measurements with the method of measurement not specified were also excluded from this analysis. This yielded 177 vaginally delivered patients with a QBL measurement and 139 vaginally delivered patients with an EBL measurement. The independent samples *t* test revealed that there was no significant difference between the mean QBL measurement ($M = 328.19$ ml, $SD = 251.97$) and the mean EBL measurement of vaginally delivered patients ($M = 289.52$ ml, $SD = 197.32$), $t\ (313.10) = 1.53$, $p = 0.127$. The 2-tailed p was > 0.05; consequently, there was no significant difference. This

finding is consistent with that of Habak et al. (2016) who found no significant difference between the mean QBL and EBL measurements of vaginally delivered patients in a retrospective cohort study. The mean QBL and EBL measurements were also similar to those in the study by Habak et al. in which the mean QBL volume of the sample population was 324 ml and the mean EBL volume was 309 ml. Consistent with the finding in the comparison of the blood volume measurements of the total deliveries, the *p* value of the Levene's test for equality of variances was 0.018, indicating that there was not equal variation between the QBL and the EBL measurements of vaginally delivered patients. Habak et al. also found that there was not equal variance between QBL and EBL measurements among vaginally delivered patients. Figure 4 illustrates the QBL and EBL volumes of the vaginally delivered patients for whom a method of measurement of blood loss was recorded.

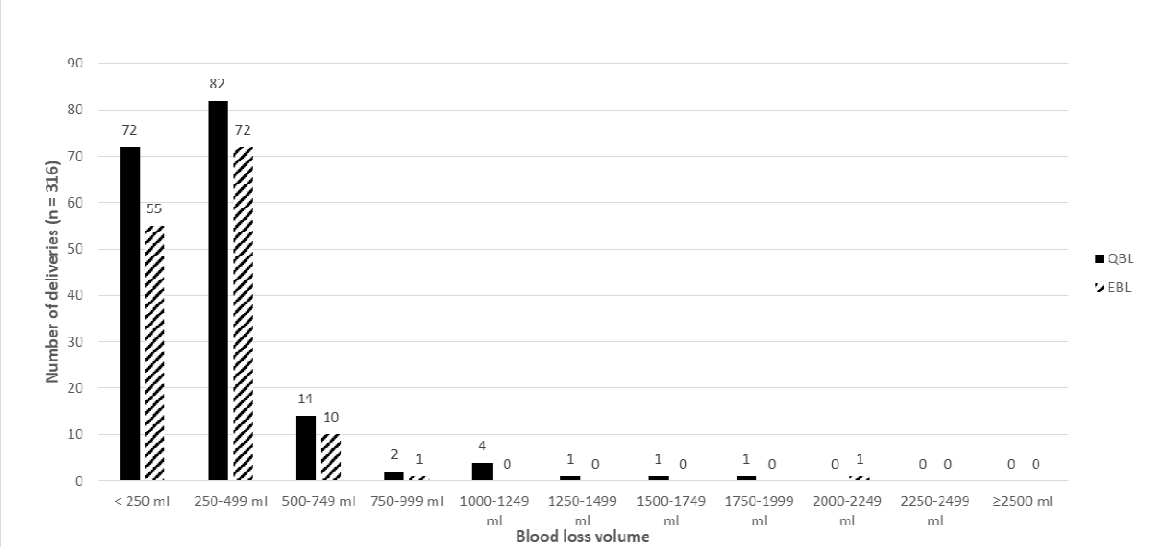

Figure 4. Comparison of QBL and EBL volumes for vaginal deliveries

When the blood volume measurements with the method of measurement not specified were excluded for cesarean deliveries, this yielded 143 patients with a QBL measurement and 11 patients with an EBL measurement. The mean QBL measurement of patients delivered by cesarean section was 672.83 ml (*SD* = 378.31) and the mean EBL measurement of patients delivered by cesarean section was 611.82 ml (*SD* = 161.01). Due to the small number of patients with EBL measurements, an independent samples *t* test to compare the means was not conducted. Figure 5 illustrates the QBL and EBL volumes of the patients delivered by cesarean section for whom a method of measurement of blood loss was recorded.

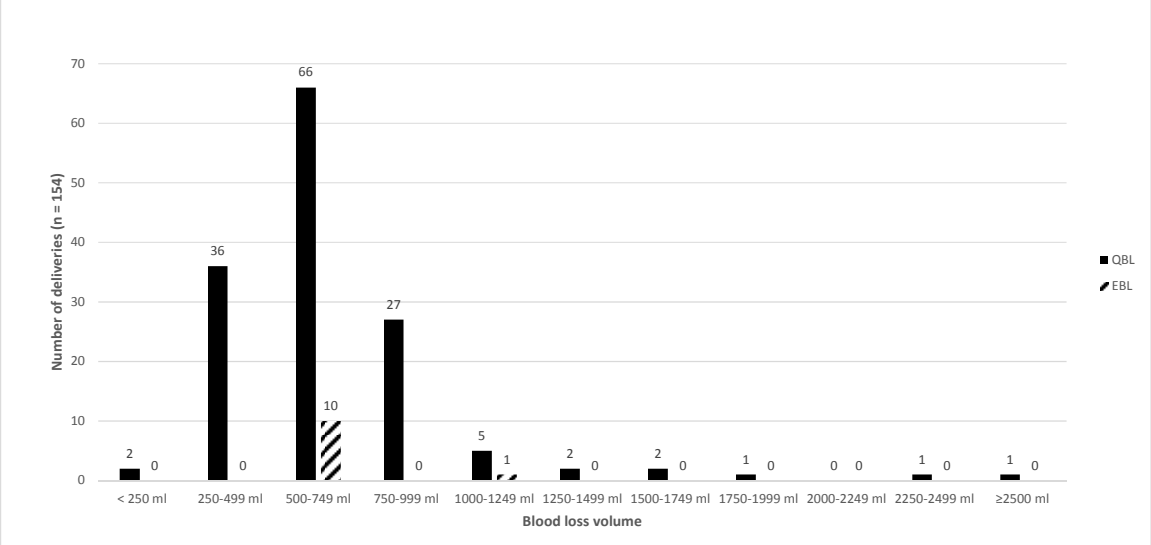

Figure 5. Comparison of QBL and EBL volumes for cesarean deliveries

This comparison of mean QBL and EBL volumes was of interest to the student because published data compared quantitatively measured blood loss volumes to visual estimations of blood loss, either at actual deliveries or in simulation exercises. However,

the student identified that many obstetricians and anesthesiologists provided a quote for an EBL measurement with no apparent visual inspection of the volume of blood loss at delivery. When asked about technique for blood loss estimation, the physicians acknowledged that they quoted EBL volumes they had either memorized from medical school or that had been published in a journal. The student, therefore, desired to determine how these EBL volumes compared to QBL volumes in the facility. The anesthesiologists in particular acknowledged that they documented an EBL volume for cesarean delivery that had been published in a popular journal. This often created a problem when the anesthesiologist entered an EBL volume into the EHR during a cesarean delivery before the nurse had an opportunity to finish measuring the QBL volume. Some of the nurses were too intimidated to ask the anesthesiologist to delete the EBL entry, and if both were entered, the EHR added them together. This created a risk of overestimation of blood loss for the patient.

The student presented this issue to the members of the department of anesthesia at their regular meeting along with a report of the weekly percentage of patients with QBL documented. This first department of anesthesia meeting during the data collection period occurred at the beginning of week three. The student requested that the department members support the hospital policy of QBL measurement at all deliveries and assist with the practice of quantitative measurement. The department members decided that the anesthesiologists would no longer document blood loss at delivery but would instead cooperate with the nurse in obtaining the QBL measurement. This practice change virtually eliminated the problems of the nurse having to ask the anesthesiologist

to delete an EBL volume entry and of an inaccurate blood loss measurement from double documentation. There was rarely an EBL volume entry by an anesthesiologist after that department meeting. Most gratifying was a statement by one of the anesthesiologists several weeks later. He said he had come to appreciate QBL measurement as a clinical parameter that he could actually use to manage the patient rather than a number entered into the EHR merely to fill a documentation field.

Administration of Blood Products

The original plan of the project was to track the number of patients who received blood products and the number of units of blood products administered over the data collection period to determine if there was an increase in blood product administration associated with QBL measurement. This had been expressed in the past as a concern by the obstetricians. Several obstetricians had voiced concerns that increased blood loss volumes reported with QBL measurement would result in increased transfusions.

Patient records were reviewed at or following discharge to identify any blood products administered during the admission. During the 12-week data collection period, seven of the 522 patients (1.34%) received blood products. Six of the patients who received blood products had QBL documented; one patient had EBL documented. The transfused patient with EBL documented was delivered by cesarean section. Of the six transfused patients with QBL documented, three were delivered by cesarean section and three were delivered vaginally. The range of the number of blood products administered per patient was from one to seven units. The patient who received seven units of blood products was recorded as having an EBL measurement. However, the blood volume loss

recorded was 1007 ml. This precise measurement begs the question of whether this was a misidentified QBL measurement. The range of blood loss recorded for patients with QBL recorded who received blood products was 650 ml to 3300 ml. Patients were transfused during weeks one, two, four, eight, 10, and 11 of data collection, so there was no apparent association between the increasing percentage of patients with QBL documented and an increase in patients receiving blood products.

Hemorrhage Risk Assessment

Data were also collected on the patient hemorrhage risk score upon admission to determine if QBL measurement was being practiced more consistently with high risk patients than with lower risk patients. Based on assessment criteria, patients were assigned risk scores of high, medium, or low risk for obstetric hemorrhage. The risk score was available for 443 patients. Of the 443 patients with risk scores available, 31 (7.00%) were classified as high risk, 210 (47.40%) were classified as medium risk, and 202 (45.60%) were classified as low risk. Of the 31 high risk patients, 22 (70.97%) had QBL documented at delivery. Of the 210 medium risk patients, 141 (67.14%) had QBL documented at delivery and of the 202 low risk patients, 120 (59.40%) had QBL documented at delivery. Therefore, although a higher percentage of patients identified as high risk had QBL documented, there is still more work to be done to ensure that QBL is measured with patients at high risk of obstetric hemorrhage.

Recommendations

The findings of this project suggested potential changes on the unit which could support QBL measurement and quality patient care, as well as future projects to further explore the utility of scorecard feedback on quality measures to nurses.

Recommendations for Practice

This project revealed practice changes on the unit that could be implemented to support the measurement of QBL. Fortunately, the student is the clinical nurse specialist of the unit and will, therefore, be able to work with the staff and the leadership to consider these factors to continue the change implementation process.

Use more nurses at deliveries. One of the factors that the student had not appreciated even after having worked alongside these labor and delivery nurses for many years was for how infrequently each of them served as a delivery nurse on a weekly basis. When one is incorporating a practice such as QBL measurement into the workflow at delivery, it is challenging to master this change with four or fewer opportunities to perform the skill during a week. The maximum number of births per week for which any nurse served as the delivery nurse during the data collection period was four. Many nurses did not provide care for a patient at delivery for an entire week. Although the nurses help each other during deliveries, the few opportunities that nurses had to serve as the delivery nurse illustrated the importance of each nurse assisting at deliveries. Taking extra opportunities to practice QBL measurement and manage it within the delivery workflow would appear to help the nurses become proficient in the practice. Therefore, a practice recommendation from this project would be that the nurses consistently

collaborate in planning for more staff to attend deliveries when available. Communication with the charge nurse could identify if there are additional nurses who could assist with an impending delivery while ensuring coverage of the other patients on the unit. In addition to providing each individual nurse more opportunities to become proficient in QBL measurement, having more nurses assisting when possible can provide a team approach to incorporating QBL measurement into the workflow. Incorporating QBL measurement into the workflow at delivery was what the nurses reported as being most challenging with the practice change.

Verify competency of traveling nurses in measuring QBL. A small number of traveling nurses were included among the labor and delivery nurses during the project. Each of these nurses received a confidential code number and weekly scorecard report for deliveries attended. Traveling nurses usually are contracted for 12-week assignments on the unit and receive three days of orientation with an experienced permanent labor and delivery nurse (preceptor). Each preceptor follows a standardized competency checklist with the traveling nurse being oriented. However, during the unit discussions with the scorecard presentations, it was revealed that one of the traveling nurses was using incorrect technique with QBL measurement, and one privately revealed to the student that she had never learned how to perform QBL measurement. In discussing this issue with some of the preceptors and the unit nurse educator, it was discovered that verification of competency in QBL measurement of a traveling nurse can be missed during the orientation period, among all the activities that are covered in the three-day period. Since all the traveling nurses are experienced labor and delivery nurses, some preceptors

reported asking the travelers if they knew how to perform QBL measurement if there was not an opportunity to directly observe the practice during the orientation period and accepting a positive response.

A recommendation for the unit is that traveling nurses should be directly observed in the demonstration of competency in QBL measurement before assuming that responsibility independently. Although many traveling nurses have practiced in facilities where QBL measurement is a consistent practice, others have not. The student accompanied the experienced traveling nurse who reported that she had never learned how to perform QBL measurement until the nurse demonstrated competency in the practice. When that nurse completed her contract assignment and was leaving the facility, she thanked the student for supporting her development in this important area.

Ensure QBL measurement with high risk patients. Another practice recommendation from this project is for every nurse who assesses a patient to be at high risk for obstetric hemorrhage to ensure that the patient's plan of care includes QBL measurement and that this plan and the patient's risk status are communicated during each handoff report. Although QBL measurement and risk status communication should already be occurring, of the 31 high risk patients identified in the project, only 70.97% had QBL documented at delivery.

Review QBL measurement with staff in main operating room. When a patient is assessed as having a high potential of requiring a hysterectomy with a cesarean delivery, such as when a placenta accreta is suspected, the cesarean section is performed in the main operating room (OR) rather than in the labor and delivery OR. Labor and

delivery staff provide care to the mother and infant during the cesarean section, and the main OR staff provide support and assume the scrub responsibilities if a hysterectomy is necessary. There were several of these deliveries in the weeks leading up to and during the project. The labor and delivery staff were challenged with measuring fluid levels in the suction canisters in the main OR because they are different than those in labor and delivery. When the OR staff were asked how to measure QBL using their system, they had no idea what was being asked of them. It is not the practice in the main OR to measure QBL during surgery, and the OR staff were quite interested in observing the process. The labor and delivery staff did their best to measure QBL using the main OR canisters until the student could learn the correct technique from the OR nurse educator and review it with them. A practice recommendation is that all the labor and delivery staff be trained in using the main OR canisters to measure QBL and that the student consult with the OR nurse educator to train the OR staff in QBL measurement for support with these challenging cases.

Continue feedback on QBL measurement to maintain focus. The final practice recommendation is that a monthly report of the percent of patients for whom QBL was documented at delivery be presented and posted in the unit as a quality measure that will maintain a focus on QBL measurement. The student is able to obtain this information from the healthcare system database in her role as the perinatal clinical nurse specialist. Although the data are several months old when posted in the database, it would appear that this continued feedback and the discussion generated with its presentation would help maintain the momentum for change to consistent QBL

measurement the unit demonstrated during the project. This will hopefully prevent the failure to incorporate QBL measurement into the unit culture that the staff experienced in the past. This incorporation of QBL measurement into the unit culture will be essential for the sustainability of this practice change and to the unit's movement through Lewin's third phase of the change process, refreezing (Shirey, 2013).

Recommendations for Future Projects

Although other factors may have influenced the increase in the documentation of QBL measurement during the project, the improvement is consistent with positive associations between scorecard feedback and performance improvement reported in the literature. For example, Zygourakis et al. (2017) demonstrated a decrease in surgical supply costs associated with the use of scorecards to provide feedback to surgeons on the costs of the supplies they used for the procedures they performed. It is interesting that reports in the literature of the use of scorecards to provide feedback to nurses is minimal. In the discussion of the use of scorecards to decrease the cost of surgical supplies, Zygourakis et al. postulated that the savings may have been greater if cost report scorecards had also been provided to other clinicians who use supplies, such as nurses and surgical technicians.

Although scorecards have been used to provide feedback for performance improvement to a variety of healthcare stakeholders, including physicians (Socol, Garcia, Peaceman, & Dooley, 1993), laboratory staff (Gibb et al., 1997; Phommarath, 2014), coalitions of healthcare workers and community representatives (Blake et al., 2016), and healthcare policymakers (Yilla et al., 2014), their use with nurses remains largely

unexplored. Edmonds, O'Hara, Clarke, and Shah (2017) calculated the cesarean delivery rates of low risk patients of labor and delivery nurses. The authors stated that the nurse who provides care to a woman in labor may influence the patient's ability to achieve a vaginal delivery. The cesarean section rates of the patients of the 72 nurses in the sample ranged from 8.3% to 48.0%. This study was performed retrospectively and the data were not used to provide feedback to the nurses. However, the authors concluded that providing nurses with the cesarean birth rate of the patients for whom they provided care could contribute to lowering the cesarean section rate in a facility. Opportunities exist to provide individual feedback on a variety of outcomes nurses influence, such as breastfeeding rates and catheter-associated urinary tract infection rates, to determine if such feedback is associated with performance improvement.

Strengths and Limitations of the Project

A strength of this project is that the findings are consistent with that of previous reports of the use of scorecards as feedback to individual clinicians being associated with improvement in performance (Gibb et al., 1997; Phommarath, 2014; Zygourakis et al., 2017). Of particular importance is that it expanded the evidence of scorecard feedback with other clinicians to its use specifically with nurses. Since nurses play such an important role in patient care and in achieving quality outcomes, it would appear that engaging in activities designed to improve performance of nurses could contribute to improved patient care.

Another strength of the project is that the implementation of QBL measurement brought all team members together in a collaborative effort. The surgical technicians

were very supportive in their roles, such as helping the nurses to identify the optimal times to check the suction canister fluid levels during cesarean deliveries. The perinatal medical director, the chief of obstetrics, and several other physicians emerged as champions for QBL measurement. They clearly communicated to the obstetricians at department meetings during the student's presentation of the run charts that physician cooperation with QBL measurement was expected. Some of the obstetricians had been resistant to the implementation of QBL measurement with every delivery and had been barriers. The finding that increases in the percentage of patients with QBL measurements did not result in increasing transfusion rates appeared to reassure the skeptical obstetricians. In addition, the effectiveness of the use of QBL measurement to identify several hemorrhages early and to guide blood volume replacement helped several physicians to appreciate its value and to support its use.

It is difficult to separate the influence of the scorecard feedback to the labor and delivery nurses on the improvement in QBL documentation from other factors that supported the practice change. However, the momentum generated in the implementation of the change to consistent QBL measurement was related to the DNP project and contributed to the strength of the project. One strong factor influencing the improvement of QBL documentation was the enthusiastic support of the project by the members of the women's health unit-based council. This support of the implementation of QBL measurement and the influence of the staff nurse unit champions who emerged from this council demonstrated the strengthening of driving forces toward change as described by Lewin in the theory of planned change (Shirey, 2013).

In observance of facility policy, the student presented the project plan to the unit-based council prior to its implementation for the approval and support of the members. The members voiced their appreciation of the importance of QBL measurement and selected improvement in this practice as one of the unit goals for 2017. However, the group expressed concern about how well QBL measurement could be incorporated into the workflow at delivery. As a result, the council set a unit goal of documentation of QBL with 30% of all patients, with a stretch goal of 45%. The council members were surprised and pleased when the project was implemented and the run charts demonstrated QBL documentation rates that far exceeded these goals.

An additional action by the unit-based council that supported the project and strengthened it was the adoption by the members of the documentation of QBL measurement as the clinical competency demonstration for the labor and delivery staff for 2017. The council set a requirement that each permanent registered nurse on the unit submit documentation of having performed QBL measurement for one vaginal delivery patient and one cesarean delivery patient during the second, third, and fourth quarters of the year. The nurses had submitted this documentation in 2014 but with the number of new staff members the council determined that a repeat of the competency demonstration was appropriate. This requirement served as a motivator for the nurses to perform QBL measurement that could not be separated from any motivation generated by the scorecard reporting of performance. To enhance the discussions during the presentations of the scorecards and graphs and to serve as constant reminders to the nurses the council members created posters with slogans such as *QBL is the new EBL* with images of

superheroes. With the council and unit leadership approval the student was able to have pens made that read *Empower yourself—Measure QBL* as additional reminders for all the nurses. This support was likely also associated with improvement in the practice of QBL measurement and could not be separated from the influence of the scorecard feedback.

A final support of the project and the practice change was the discussions of the run chart of the unit aggregate of the percent of patients with QBL documented at the weekly huddles on both shifts. These discussions assisted with problem-solving in the implementation of QBL measurement and provided an opportunity to answer questions and clarify procedures. The student created scripting examples to use in situations in which the nurses had expressed challenges communicating about QBL. These situations included explaining QBL measurement to patients and families, communicating to the delivering physician that QBL would be measured prior to a vaginal delivery, including the plan to measure QBL in the two times-out with the surgical team members at the beginning of a cesarean section (prior to the administration of anesthesia and prior to the first incision), and communicating to the team members that a patient had a volume of blood loss that identified moving to the next stage of hemorrhage in the standardized protocol. Role-playing in use of the scripting and group problem-solving of challenges nurses experienced with QBL measurement likely further supported improvement in its practice.

A limitation of the project is that it depended entirely upon the accuracy of the documentation in the EHR. Any inaccuracies in the medical record were reflected in the data and thereby in the scorecards and graphs. For example, several blood volumes that

were labeled as EBL measurements or that had no method of measurement recorded were very specific volumes, such as 416 ml. It is unlikely that anyone would estimate a blood volume in one-milliliter increments; therefore, these were likely mislabeled QBL measurements. There were only a few of these recordings, and as the nurses become more familiar with the documentation of QBL in the EHR accuracy should improve.

Another likely inaccuracy in the recorded blood volumes occurred a few times during the first weeks of the project when the nurse documented a QBL measurement and the anesthesiologist documented an EBL measurement for a cesarean delivery, or both documented the same QBL measurement. In these situations the EHR system automatically added both entries together. It is unlikely that the clinicians intended both entries to be counted, which resulted in a probable over-estimation of the patient's blood loss. No evidence of this problem was found after the department meeting in which the anesthesiologists agreed to stop documenting blood loss and to depend upon the nurse at delivery to document the QBL measurement. However, the early likely inaccurate volumes were reflected in the data.

The last inaccuracy of documentation serving as a limitation of the project is that it was not possible for the student to verify from the EHR who the nurse primarily responsible for the mother at each delivery was. The student informed the staff at the start of the project that the first labor and delivery nurse listed in the EHR would be identified as the delivery nurse. However, the student noted while attending deliveries that the nurses sometimes exhibited a cavalier attitude about the order in which the nurses present at the delivery were listed in the delivery record. There were several deliveries

for which nurses who primarily practice in postpartum and who attend deliveries mainly to assist with the infant were listed first in the EHR. Since the student had no other means by which to identify the nurse primarily responsible for the care of the mother (and therefore for the measurement of blood loss), the scorecard reports for some deliveries may have been credited to the wrong nurse. This inconsistency in listing the nurse primarily responsible for the patient at delivery first in the EHR was an interesting practice discovery during the project. For accuracy of the record, the student will continue to reinforce with the staff and the unit leadership that the primary delivery nurse should be clearly identified in the delivery summary.

Section 5: Dissemination Plan

Although there are reports of facilities that achieved great success with implementation of QBL measurement with what are described as relatively simple efforts (see Alvarez-Ramirez, Trial, Hoff, & Scott, 2015; Jones, 2015), this student has heard from colleagues across the country that many facilities that are still struggling with the practice. Through conferences and publication, the student plans to disseminate the findings and recommendations from this project as widely as possible to generate discussion with representatives of facilities that have still not achieved consistent practice of QBL measurement. It is often difficult for nurses to acknowledge that a facility in which they practice is struggling when representatives of other facilities are reporting high success rates after what appear to be minimal interventions.

An abstract was submitted for consideration for a presentation at the 2018 AWHONN National Convention. This large convention attracts nurses from all areas of the country and all types of facilities. An opportunity to present either a workshop or a poster at the convention would provide an opportunity to personally discuss QBL measurement challenges and the potential use of scorecard feedback with a wide variety of colleagues. Whether or not this student is selected to present at the AWHONN convention, an additional dissemination plan is to submit a clinical article based on the project to AWHONN's practice-focused journal, *Nursing for Women's Health.* This journal is widely read by both staff nurses and nurses in leadership positions in obstetric care. This group would be the target audience to disseminate information on QBL measurement and scorecard feedback for performance improvement with nurses.

In addition to disseminating information about the project to obstetric nurses, this student plans to submit abstracts for presentations at conferences which showcase evidence-based practice and quality improvement projects of all specialties. This will provide an opportunity to discuss scorecard feedback for performance improvement with nurses in a variety of specialties and identify new measures with which to explore strategies. The healthcare system in which the student practices holds an annual regional research/evidence-based practice/quality improvement conference and a similar quarterly system wide videoconference. The student plans to submit applications to present this project at both of those events to generate more interest in the use of scorecards with nurses.

The student also feels a responsibility as a system leader to monitor QBL measurement throughout the entire healthcare system. Data on QBL measurement from all facilities are available on the system wide database. The student plans to use this database to provide continued feedback to the nurses with whom she practices on the practice of QBL measurement in that facility. Continued monitoring of outcomes was recommended by Parsons and Cornett (2011) to support sustainability of a change. In addition, the student calculated the monthly rates of QBL documentation in the healthcare system as a whole with the data that are currently available for 2017. These data were submitted to the chairpersons of the multidisciplinary system wide obstetric care task force with a request to discuss them during the next teleconference. The student presented an introduction to the DNP project to this task force via a videoconference prior to the start of data collection. At that time, the first quarter 2016 system wide data

were presented. These were the data that revealed that only 89.0% of the patient EHRs in the system had any blood loss documented at delivery, regardless of method of measurement. This information generated much discussion and supported the request to add a field with check box options to the EHR to specify the method of measurement of blood loss. This field was added in February 2017 and now enables calculation of the percent of all patient EHRs with QBL documented, according to system wide policy. The student hopes that a presentation of the current system wide data will support a request that QBL measurement be monitored as a system quality measure.

Analysis of Self

This project assisted the student to focus her development as a scholar-practitioner throughout the Walden DNP program into a cohesive effort to address a practice problem that had been a concern for a number of years. Preparation for this project during the practicum experiences enabled her to examine in a systematic way reasons sustainment failed with previous implementation attempts. With the cooperation of system leadership and staff members, a long-range plan for a more successful change process was created. Identifying a practice change as the new normal rather than as a project early in an implementation process prevents disruption from new priorities (Crisp, 2013). This shift in priorities had been an issue with previous QBL measurement implementation. With this change implementation, the student stressed to the staff and leadership that incorporation of a change into a unit culture takes years, as described by Kotter (1995). This DNP program and project enabled the student to translate evidence into practice in a very practical way.

As a Scholar-Practitioner

This student entered the DNP program confident in the ability to present evidence from the literature to support change in the facility in which she practiced. She grew in ability to use performance data she gathered to generate discussions about healthcare systems. Working on this project also helped her to develop in the ability to plan and execute a quality improvement, evidence-based practice, or research project. This has made her a more valuable member of the hospital's research council and enabled her to provide guidance and support to other nurses with their projects.

As a Project Developer

Self-reflection during this program revealed to the student that her independent spirit and desire to carry out projects according to her own vision sometimes prevented her from utilizing others as resources and likely limited effectiveness. In discussing how to address facilitators of and barriers to QBL measurement with staff members, the student was pleased with the ideas generated and the enthusiasm for change that ensued. The student improved her ability to gather input from and engage staff members in a project throughout this program. Engagement of staff is required to successfully implement a change and hardwire a practice into a unit culture (Parsons & Cornett, 2011).

The student also developed her ability to envision long-range plans for a project in order to support it through incorporation into the unit culture. One of the factors which likely undermined previous attempts at establishing QBL measurement in this facility was the diversion of attention of the staff to other projects before the practice was firmly

in place. Kotter (1995) warned that newly implemented changes are easily disrupted if efforts to support them are not maintained until the change is firmly imbedded into the corporate culture. The student is now able to more effectively negotiate with facility leadership to introduce changes in a more orderly fashion to prevent the disruption of recent efforts.

As a Professional

This student appreciated the opportunity this DNP program afforded her to comply with the recommendation of the 2004 position statement of the American Association of Colleges of Nursing that the DNP "be the graduate degree for advanced nursing practice preparation, including but not limited to the four current APN [advanced practice nurse] roles: clinical nurse specialist, nurse anesthetist, nurse midwife, and nurse practitioner" (2004, p. 13). This practice-focused degree was truly the perfect fit to enhance her skills and prepare her to continue to meet the multifaceted needs of the population in the changing healthcare environment. The student perceives that this program and her DNP project prepared her to help fulfill the need of the nursing profession to translate evidence into practice more effectively and efficiently. Moreover, she was pleased to contribute to the achievement of the Institute of Medicine (IOM, 2011) goal to "double the number of nurses with a doctorate by 2020" (p. 13) by engaging in lifelong learning, a personal goal that is also in alignment with the IOM recommendations.

Summary

The student plans to disseminate the findings of this DNP project through podium and poster presentations and publication for both obstetric and general nursing audiences. Dissemination of the findings may assist staff in facilities who are challenged with the implementation of QBL measurement to be successful in instituting this practice change. Discussing the findings with nurses in other specialties can stimulate further exploration of the use of scorecard feedback for performance improvement in nursing, an area of largely untapped opportunity. Conducting this project and completing the DNP program enhanced the knowledge and practice of this experienced nurse in her pursuit of lifelong learning.

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