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Evidence-Based Obstetric Emergency Team Training and Drills

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Evidence-Based Obstetric Emergency Team Training and Drills

by

Michelle R. Cox

A capstone project submitted to the faculty of
Gardner-Webb University Hunt School of Nursing
in partial fulfillment of the requirements for the
Doctor of Nursing Practice degree

Boiling Springs

2016

Submitted by:

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Date

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Abstract

Obstetrical emergencies occur in less than two percent of all pregnancies in the United States. These emergency situations are unanticipated and occur rapidly. According to the American Congress of Obstetricians and Gynecologists, the most common obstetric emergencies in the United States are postpartum hemorrhage and shoulder dystocia. When these emergency medical situations occur, the entire medical team should respond immediately with precision and confidence. There is evidence to support planning and collaboration of interdisciplinary teams with ongoing education and training, leading to prompt recognition and response to critical situations, which can ultimately mitigate poor outcomes during obstetric emergencies. This capstone project implemented a standardized training for obstetric emergencies, specifically postpartum hemorrhage and shoulder dystocia, to include didactic education, simulation lab skills check off, initial and ongoing drills, and an annual unit-based skills fair presentation. This project increased knowledge and prepared the labor and delivery team for competency validation, both initially and ongoing, when responding to obstetric postpartum hemorrhage and shoulder dystocia emergencies. The incidence of obstetric emergencies, specifically postpartum hemorrhage and shoulder dystocia, cannot be altered by this project; however, increased staff knowledge and competence should improve patient outcomes.

Keywords: obstetric, emergency, shoulder dystocia, postpartum hemorrhage, team training, drills, competency

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Evidence-Based Obstetric Emergency Team Training and Drills

Obstetrical emergencies occur in less than 2% of all pregnancies in the United States (Centers for Disease Control and Prevention, National for Health Statistics, 2013). These emergency situations are unanticipated and occur rapidly. When an emergency medical situation occurs, the entire medical team should respond immediately with precision and confidence. The exercise of practicing emergency drills must be ingrained in obstetric providers prior to the emergency to ensure optimal outcomes for the mother and her baby or babies. Strategic and deliberate communication, along with teamwork, are the foundation for preparedness.

Obstetrical and neonatal professional organizations acknowledge a great need to have procedures in place for an emergency, deeming it necessary to take the time to devise a plan that can make a difference in a patient outcome. The preparation and outcomes in a small, rural facility should be similar to those at a large, tertiary care center; same emergency, different location. Time and lack of resources are the primary barriers for small, rural facilities. A dedicated and focused team of key stakeholders is key to overcoming these barriers.

According to The Joint Commission (TJC), poor communication, lack of team work, and a chaotic organizational culture are the leading causes of perinatal death and injury (TJC, 2004). TJC has issued recommendations that all hospitals “review organizational policies regarding the availability of key personnel for emergency interventions” (TJC, 2004). Participant communication and execution of the plan is crucial in an emergency.

Justification of Project/Identified Need

As previously stated, the Centers for Disease Control and Prevention (CDC) (2004) notes the incidence of encountering an obstetrical emergency in the United States is less than 2%. At a rural hospital in southeastern North Carolina, the statistics showed the incidence of the obstetrical team encountering an obstetrical emergency has nearly doubled the national rate year after year. In 2012, 2013, and 2014, the incidence of emergency situations during labor was 4.33%, 3.47%, and 4.15% respectively (Southeastern Health, 2015). To further compound the severity of the problem, of the 32 registered nurses employed in the Labor and Delivery (LDR) unit, 34.2% have less than one year of labor and delivery experience and 15.8% have less than two years of experience (Southeastern Health, 2015). This translates to a total of 50.0% of the registered nurses with less than two years of experience. Currently, there is no standardized emergency preparation, education, or drills in place to prepare the staff for an obstetric emergency.

Problem Statement

In a facility that has nearly 1,500 births each year, a staff with 50% having less than two years of experience, with the incidence of obstetric emergencies twice the national average, and a lack of standardized emergency preparation, education, or drills, the implementation of evidence-based practice is warranted. The moment an obstetric emergency is identified is not the time to practice and work through the interventions needed to save a life. A team approach and appropriate reactions must be well rehearsed and hardwired to ensure that response is second nature.

Literature Review

A literature review was conducted using a variety of online and digital resources. The databases Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed were utilized. Key words used to search included obstetrics, emergency, and training. The literature review revealed a wealth of research and information related to obstetric emergencies and preparation.

Obstetric Emergencies

The Institute for Healthcare Improvement (IHI) (2012) released a how-to guide stating childbirth is the number one reason for hospital admission in the United States. This guide has gained national and international attention, calling for improved maternity and labor care for all women.

Over a decade ago, TJC released Sentinel Event Alert #30 (The Joint Commission, 2004), that discussed prevention of infant death and injury during delivery. The report recommended training in perinatal areas, focusing on staff communication and team work. The report highlights that high-risk conditions such as shoulder dystocia, emergency cesarean births, and postpartum hemorrhage should be practiced via clinical training and drills in order to evaluate and improve team performance. Clear guidelines will be established and shared with staff through education.

According to the American Congress of Obstetricians and Gynecologists (ACOG) (ACOG Committee Opinion #487, 2011), the most common obstetric emergencies in the United States are postpartum hemorrhage and shoulder dystocia. The report suggested creation of emergency plans that are practiced during ongoing drills, with the opportunity

to debrief team members after a drill or actual emergency event. Debriefing allows for recognizing things that went well, along with things that could be improved. These deliberate and coordinated measures increase communication and team work.

Acknowledging that a crisis can occur at any time, ACOG lists initiatives for managing obstetrical emergencies: availability of needed emergency supplies, development of protocols that include clinical triggers, standardized communication and debriefing huddles, and the implementation of emergency drills and simulations (ACOG Committee Opinion #590, 2014). Planning and collaboration of interdisciplinary teams, including ongoing education and training, can lead to prompt recognition and response to critical situations, which can ultimately mitigate poor outcomes during obstetric emergencies.

Postpartum Hemorrhage

Postpartum hemorrhage is the leading cause of maternal death worldwide (Smith & Brennan, 2012). ACOG defines a postpartum hemorrhage as blood loss of 500mL or greater after a vaginal delivery and 1000mL or greater following a cesarean birth (ACOG Practice Bulletin #76, 2006, reaffirmed 2015). Quantity of blood lost after birth has been, and continues to be, an inexact science. Pritchard, Baldwin, Dickey, and Wiggins (1962) stated that blood loss after a delivery is a subjective estimation based on the delivery attendant's judgment, and thought to be inaccurate by way of gross under judgment. More recently, Schorn (2010) notes that this fact remains true, stating that "the higher the blood loss, the larger the underestimation tends to be and it becomes even more inaccurate in the case of severe hemorrhage" (p.339). A 10% drop in hematocrit is

indication that a postpartum hemorrhage has occurred (Habel, 2006). This lab value is an after-the-fact note, not an active postpartum hemorrhage indicator (Gabel & Weeber, 2012).

In 2003, postpartum hemorrhage complicated four to 6% of all pregnancies worldwide, with 140,000 maternal deaths each year, equating to one death every four minutes (AbouZahr, 2003). Of all maternal deaths, nearly one-half occurred within 24 hours of delivery (AbouZahr, 2003).

Fast forward to 2014, postpartum hemorrhage remains the leading factor in maternal deaths worldwide, despite the establishment of treatments and interventions (Say et al., 2014). Accounting for 19.7% of worldwide maternal deaths, postpartum hemorrhage is the leading direct cause of maternal mortality (Say et al., 2014). In the United States, postpartum hemorrhage complicates approximately 2.9% of all births, an increase of 26% between 1994 and 2006 (Callagan, Kuklina, & Berg, 2010).

Risk factors for postpartum hemorrhage include: prolonged, augmented, or rapid labor; history of postpartum hemorrhage; episiotomy; preeclampsia; operative delivery; Asian or Hispanic ethnicity; chorioamnionitis; over distention of the uterus due to macrosomia, polyhydramnios, or multiple gestation (Schorn & Phillippi, 2014). Although these risks have been associated with postpartum hemorrhages, often there is no warning prior to the onset of excessive bleeding.

Uterine atony, the failure of the uterus to contract after delivery, is the primary etiology of a postpartum hemorrhage, accounting for nearly 80% of cases (Bateman, Berman, Riley, & Leffert, 2010). Other causes include retained placenta, defects in maternal coagulation, and uterine inversion (Cunningham et al., 2014).

When excessive bleeding is identified and routine management interventions are not decreasing blood volume loss, prompt decision making with life-saving interventions must be commenced without hesitation. The World Health Organization (WHO) (World Health, 2012) acknowledges postpartum hemorrhage is an ongoing issue in both developed and developing countries. A trending increase in procedures due to postpartum hemorrhage indicates that the incidence is increasing in developed nations (Schorn & Phillippi, 2014). Symptoms of hypovolemia may not be exhibited until a woman loses up to 25% of their blood volume; therefore, failure to rescue a woman suffering from an active postpartum hemorrhage can lead to shock and multisystem organ failure, and ultimately death (Schorn & Phillippi, 2014). The WHO (2012) recommends and outlines initiatives for the prevention and treatment of postpartum hemorrhage including the development and use of formal protocols, use of simulation for staff in-services, and ongoing team training. Emergency preparation is key to decreasing poor outcomes in these situations.

Shoulder Dystocia

ACOG (ACOG, 2013) defines a shoulder dystocia as an event that occurs during a vaginal delivery, when extra maneuvers are required to deliver the fetal shoulders. Another commonly quoted definition is the “inability to birth the shoulders of the infant whether it be anterior, posterior, or both, after the head has been delivered” (Collins & Collins, 2001). Entrapment of the fetal body is an emergency condition that is associated with maternal and neonatal morbidity. Maternal perineal trauma and postpartum hemorrhage, along with neonatal brachial plexus injury or mortality, are among the

greatest risks associated with shoulder dystocia (Cohen & Jaspan, 2015). According to ACOG (ACOG, 2002, reaffirmed 2015), the overall incidence of shoulder dystocia ranges from 0.2 to 3%, with an average of 1.4% for all vaginal deliveries. Normal birth weight infants account for 48% of shoulder dystocia cases (Jenkins, 2014). Shoulder dystocia ranks among the top four litigation claims against obstetricians (Shimmel, 2013).

Known risks factors for shoulder dystocia include: abnormal pelvic anatomy, gestational diabetes, post-term gestation, previous shoulder dystocia, short stature (less than five feet), obesity (greater than 200 pounds), previous large infant (greater than 4,000 grams), excessive weight gain, operative vaginal delivery, protractive active phase, prolonged second stage, precipitous delivery, and suspected fetal macrosomia of present pregnancy (ACOG, 2002, reaffirmed 2015). However, no reliable method is available to predict and, therefore prevent, a shoulder dystocia (Grobman & Stamilio, 2006).

The infrequent and unpredictable nature of a shoulder dystocia leaves teams lacking real-life experience to learn to handle this emergency. Lack of consistent protocols and training can lead to confusion, variation in patient care, and possibly poor outcomes. To alleviate this emergency, teams must communicate promptly, effectively, collaboratively, and seamlessly. Timely and proper identification is the key that will signal a sequence of coordinated events by the obstetric team that will lead to appropriate management. ACOG (2014) recommends standardized protocols, which are practiced in a controlled environment that is ongoing and routine. Department-wide education, simulation training, competency checkoff, and emergency drills have been cited by many

resources as best practices for shoulder dystocia, as well as other emergency situation preparation.

Emergency Preparation

Knowledge and confidence perception after course. Walker, Fetherston, and McMurray (2013) used a prospective repeated-measures survey design study to examine the changes in confidence and perceived increase in knowledge, as well as the retention of knowledge and confidence, for doctors and midwives when responding to an obstetric emergency after attending an Advanced Life Support in Obstetrics (ALSO) course. The study took place in Australia with 165 participants. Those asked to participate were from rosters of ALSO courses in Western Australia, New South Wales, Victoria and Queensland during a six-month time period. Participants took a pre-test, post-test, and followed up with a six-week questionnaire. In addition, a Likert scale was used to measure perceptions of knowledge and confidence. The results revealed an increase in perceptions of knowledge and confidence from the pre-test to the post-test that were sustained at six weeks after the course. However, when discussing retention of knowledge and confidence at six weeks, a majority of the participants had not encountered a situation in which their ALSO course knowledge could be applied, making the results inconclusive. The conclusion indicated that perception of confidence and knowledge was noted to be positive, however, there was no way to measure long-term retention of information gained through the ALSO course. The strengths of this study were the demonstrated positive effect on confidence and knowledge perceptions. The weakness was directly linked to the low percentage of obstetric emergencies. The

participants did not have the opportunity to practice knowledge gained and demonstrate their confidence. The researchers indicated that further research could be done to measure the effect on patient outcomes after their care provider attended an ALSO course.

In situ versus off-site simulation. Sorensen et al. (2013) used a single-center, investigator-initiated, computer-randomized trial to examine the impact of the location on the effects of knowledge gained through simulation training. The researchers defined “in situ” training as simulation training that occurred in the actual patient care area, such as in the delivery room. “Off-site” training was training that occurred in a classroom or another area away from the patient care area. The team hypothesized that the “in situ” training would demonstrate more effectiveness. The study took place in Rigshospitalet, Copenhagen University Hospital, a facility which performs greater than 6,000 births per year. The sample size included 100 obstetrics department health-care employees that consented to participate in the study. The full-day trainings used the same exercises in both settings, which included lecture, videos, case study discussion, and simulation drills. The intervention period spanned three months. Every session was followed with an immediate questionnaire, with a repeat questionnaire at two months post training. The primary outcome was assessed using a multiple choice question test. Exploratory outcomes were assessed using The Safety Attitudes Questionnaire, the State-Trait Anxiety Inventory, a Likert scale, the Intrinsic Motivation Inventory, and the Team Emergency Assessment Measures tools. It was concluded although “in situ” created a more realistic scene within patient care areas, possibly increasing the fidelity for “in situ”

simulation training, however, there were no differences in outcomes. Weaknesses included a small sample size, one facility, and the inability to blind the participants or researchers. The group indicated that this study brings more information on potential options with simulation aside from the traditional stationary training labs. Bringing the training to the point of care has the potential to increase team work and communication in the event of an obstetric emergency according to the researchers.

Optimizing competency. Monod, Voekt, Gisin, Gisin, and Hoesli (2014) indicated that team communication, self-confidence, handling of emergency situations, and knowledge of algorithms are important in an obstetric emergency. They sought to investigate if simulation training had an effect on the listed abilities during an emergency obstetric situation. This study was conducted at the Swiss Center for Medical Simulation, located at the University Hospital of Basel, Switzerland. Using an observational study, the team examined six obstetrical training courses that were held between November 2010 and March 2012. The sample size included 168 participants from all of the six courses. Immediately after the training, course participants were asked to complete a self-assessment questionnaire using a Likert scale addressing team communication, self-confidence, handling of emergency situations, and knowledge of algorithms during an obstetric emergency. A second Likert scale questionnaire was given immediately to measure the participants' overall feeling related to simulation. Three months after the trainings, the same surveys were sent to the participants via an online survey tool, containing the same inquires as the immediate surveys. The immediate questionnaires about their experience were returned by 156 participants, with

74 completing the three-month follow-up survey. Overall, the immediate and three-month surveys demonstrated the same results, concluding that simulation training for obstetrical emergencies was useful. They agreed that they liked the group training sessions versus training alone. The general consensus was that this type of training would improve the overall safety of patients through the strengthening of staff competencies. In conclusion, all four of the abilities needed to respond to an obstetric emergency were shown to be enhanced through simulation training per the participants' self-perceptions. A strength noted was that nearly all of the participants who returned the three-month survey had the opportunity to use the skills they learned during training to respond to an obstetrical emergency. An obvious weakness was the low number of participants who completed the three-month survey. Also, this study focused on self-perceptions not improvement of skill learned. The researchers recommended that improved skill competency be examined in future studies.

Change in knowledge following training. Crofts et al. (2013) used a prospective randomized-controlled trial to determine if actual knowledge was changed after obstetrical emergency training was completed. To examine further added value, they also inquired about the length of the training course (one day versus two days) and location of the course (on site versus off site), determining if these variables contributed to knowledge gained and self-perceptions about the trainings. The study took place in six hospitals in the region of South West of England, United Kingdom, as well as at the Bristol Medical Simulation Centre, United Kingdom. There were a combination of doctors and nurse-midwives included in the sample size of 140 participants. The group

was randomized into four groups: one-day training at the hospital, one-day training at the simulation center, two-day training at the hospital, and two-day training at the simulation center. The course content was the same for all four groups, with the exception of a chapter on teamwork in the two-day courses. A multiple choice questionnaire containing 185 questions was given one - three weeks before the course to examine baseline knowledge of the participants, and then repeated with the same questions in a different order at three weeks, six months, and 12 months after the course to test change in knowledge. The results demonstrated an overall increase in knowledge after the training. The results also indicated there was not a statistical difference between the one- or two-day course and the location of the training. This concluded that there was an increase in knowledge after the training regardless of the four interventions or groups. A limitation of the study was that the participants took the same 185-question multiple choice test on four different occasions, leading some to suggest that this could skew the results. The researchers recognized that further study could examine patient outcomes after provider participation in the course. This study justified that all obstetrical personnel should undergo standardized training annually on obstetrical emergency preparation and response due to the knowledge gained through such training.

Strengths and Limitations of Literature

Each of the research articles reviewed demonstrated an increase in self-perception of confidence and knowledge, with one indicating an increase in knowledge. The greatest strength noted in these studies was organized training for obstetric emergency preparation. Each presented limitations as well. Walker et al. (2013) noted that their

participants did not have the opportunity to use the skills or knowledge gained through the training due to the limited number and low frequency of obstetric emergencies. Although the participants' self-perception of knowledge and confidence were increased after the training, they had no first-hand experience to test their skills, also there were no measures in place to directly evaluate their reaction to an emergency situation. Sorenson et al. (2013) concluded their weaknesses included a small sample size, one facility, and the inability to blind the participants or researchers, making these results non-generalizable. Monod et al. (2014) had a weakness in their study due to the low number of participants that were lost to follow up by not returning their three-month survey. Only 36.3% of the original group completed the study, making the results difficult to interpret and non-generalizable. They also identified that actual knowledge gained was not studied, only a self-perception of knowledge gained, which could have yielded very different results. Crofts et al. (2013) faced a possible limitation due to the fact that the participants were exposed to the same 185 questions on the four different occasions during the yearlong study. The question was proposed whether there was a possibility that the questions had been memorized, which would have skewed the results. As demonstrated, each study had limitations allowing an opportunity for further research and application to practice in preparation for obstetric emergencies.

Literature Review Summary

This literature review demonstrated that there is a great need to implement a standardized obstetric emergency training program to prepare teams in advance of an emergency. The evidence indicated that obstetrical emergency training increases self-perception of confidence and knowledge after training. These research findings validated the need to create a capstone project at a rural medical center in southeastern North Carolina, where an obstetrical emergency training program does not exist at present. This capstone project was used to increase knowledge through organized and standardized training and competency validation, which will lend itself to positive patient outcomes through care delivered by a well-prepared team to respond to an obstetrical emergency.

Needs Assessment

Population

This capstone project took place in a rural health system located in southeastern North Carolina (NC). This organization operates as an independent, nonprofit health system that is governed by a local volunteer board of trustees. The system is licensed for a 452-bed capacity, employs over 2,400 people, has 134 active medical staff, operates 40 specialty and primary care clinics, and functions with an annual operations budget topping \$300 million. Annually, the system is host to 16,000 inpatient stays, 76,000 emergency room visits, and nearly 1,500 births. The system is accredited by The Joint Commission (TJC) and is Magnet designated ("Southeastern Health," 2015).

The Labor Delivery and Recovery (LDR) unit is the location for the 1,500 births per year. The staff is comprised of 32 registered nurses (RN), one licensed practical nurse (LPN), six certified surgical technologists (CST), six unit clinical assistants, four certified registered nurse anesthetists (CRNA), nine OB/GYN medical physicians (MD), and six certified nurse-midwives (CNM).

The unit milieu is made up of eight LDR suites, one triage room, one operating room, and one recovery room. The LDR is located in the original building structure that was built in 1953-all other care areas having been moved to new areas in different parts of the medical center.

Project Sponsor

The Chief Nursing Officer (CNO) for the organization served as sponsor for this capstone project. As a 24-year employee and critical care nurse, the CNO has a great passion for providing excellent patient care by way of staff education and development.

Key Stakeholders

The key stakeholders for this capstone project included all of the LDR team: RNs, LPNs, CSTs, clinical assistants, CRNAs, MDs, and CMNs. The OB/GYN Department Chair, Pediatrics Department Chair, Vice President of Medical Education, and Chief Executive Officer (CEO) all have great interest in and offer full support of this project as key stakeholders for improvement of patient care and staff/provider development. Last but not least, the patients that entrust their care to this team are key stakeholders, being assured that their caregivers are prepared to handle any emergency that may arise during their labor and birth experience.

Organizational Assessment SWOT Analysis

Strengths

Nursing leadership at this capstone site is solid, with a strong commitment to make a positive difference for the patients they serve and the staff they lead. The CEO is in full support of this project, valuing its need and potential impact, offering financial resources and support staff as needed. The LDR staff are interested and eager to learn and implement best practices in an environment built around exceptional teamwork. The medical staff leaders in the department, both the obstetrician and pediatrician, are engaged to assist and train staff on best-practices. A CNM team leader as subject matter expert is a great strength for this project.

Weaknesses

Prior to introduction of this project, unit staff and providers were unaware of obstetrical emergency rates for their patient population. The quantified inexperienced rate was eye-opening. This organization lacks a standardized orientation to specialty units, such as LDR and ICU, including no formal training for emergency situations. Training is casual and informal in nature, using a paired preceptor model. Lack of provider engagement is also an issue. Although providers demand a more prepared staff in the event of an emergency, little effort has been made to invest in this endeavor.

Opportunities

As a member of a regional healthcare alliance, the organization has a great resource by way of mobile simulation training lab available on a quarterly basis. It is possible that the alliance simulation team will dedicate time every quarter for specific

maternal-child health training, specific to obstetric emergencies after evaluating the outcome of this project.

Threats

High staff turnover remains a threat to all nursing specialty areas. Travel nursing positions around the country and nursing opportunities on a nearby military installation are recruiting and hiring experienced RNs. The top reasons staff are leaving this facility are lack of staff education and standardized orientation, as well as salary and benefits, as identified annually by the employee pride survey (Southeastern Health, 2015).

Available Resources

The alliance's mobile simulation lab is a valuable resource for this project. Dedicated lab time every quarter for simulation and team training is a great benefit. The financial support is available from the organization for staff compensation related to time spent on preparation, didactic training, mobile simulation skills lab, and team drills. The Medical Education department, in collaboration with a partner medical education institution, has offered support by way of extending resources and training that is available to the medical students and residents.

Team Selection

The team selection was based on interest, skill level, and leadership role within the LDR department and organization. The team leader is the Maternal-Child Health service line director, the DNP student. The Maternal-Child nurse educator along with two nursing unit supervisors from each shift volunteered to be on the team. Provider

representation includes one CRNA, one CNM, and the OB/GYN Department Chair. The Administrative Director of Medical Education served as an ad hoc member.

This core team was responsible for providing input for didactic development, scenario selection and leadership for initial and ongoing drills. The team supported the project by ensuring staff participation from all members of the interdisciplinary group.

Cost and Benefit Analysis

Costs

The actual cost for the project is minimal for the student and the organization. In preparation for project development, three Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) education modules will be purchased by the student at a cost of \$24.95 each. The alliance Mobile Simulation Lab is available at no charge to the organization as part of the alliance membership, valued at \$3,200 for the training. Team members will be paid non-productive time for class, skill, and drill preparation. All LDR staff will be paid non-productive time for class and simulation lab mandatory participation. Non-productive time is paid at a regular hourly rate, as non-patient care hours and are not eligible for overtime. The non-productive time code is used to neutrally affect the financial bottom line for organizational departments.

Benefits

The primary benefit of this capstone project was increased patient safety for those seeking care at this organization for their childbirth experience. Benefits to the staff included increased knowledge, confidence, competence, satisfaction, and retention. Increased provider satisfaction and engagement was also a benefit. As a collateral

benefit, the organization's risk exposure during obstetric emergencies should be decreased.

Scope of the Project

This project will implement a standardized training for obstetric emergencies, specifically postpartum hemorrhage and shoulder dystocia, to include didactic education, simulation lab skills check off, initial and ongoing drills, and an annual unit-based skills fair presence. This project will prepare staff for competency validation, both initially and ongoing, when responding to obstetric postpartum hemorrhage and shoulder dystocia emergencies.

The incidence of obstetric emergencies, specifically postpartum hemorrhage and shoulder dystocia, cannot be altered by this project; however, increased staff knowledge and competence should improve patient outcomes.

Goals, Objectives, & Mission Statement

Goals

1. Implementation of evidence-based, standard of care interventions when responding to an obstetric postpartum hemorrhage and shoulder dystocia emergency.
2. Increase and validate staff knowledge and competence when responding to an obstetric postpartum hemorrhage and shoulder dystocia emergency.

Objectives

1. All LDR staff (100%) will be able to recognize a postpartum hemorrhage and shoulder dystocia emergency appropriately and immediately.
2. All LDR staff (100%) will work with their team to relieve the situation.
3. All LDR staff (100%) will attend a didactic, evidence-based session on postpartum hemorrhage and shoulder dystocia emergencies.
4. All LDR staff (100%) will participate in a hands-on simulation skills lab demonstration and practice session on postpartum hemorrhage and shoulder dystocia emergencies.
5. All LDR staff (100%) will participate in postpartum hemorrhage and shoulder dystocia drills, both initially and ongoing, occurring quarterly.
6. The learner's competency will be validated initially upon completion of the simulation training and then ongoing at the ongoing unannounced drills and annual unit-based skills fair.

Mission Statement

To provide quality, evidence-based care in the event of an obstetric emergency, through education, simulation, and validation of competence for LDR staff responding to postpartum hemorrhage and shoulder dystocia emergencies.

Theoretical Underpinnings

Professions use theories to explain basic assumptions and values, to define nature and outcomes, and give purpose to practice (Allgood & Tomey, 1986/2010). Scholars agree that theory is the basis of practice, creating an identity for a profession. Nursing has a rich history of theorists that have shaped the foundation of nursing practice. *The Essentials of Doctoral Education for Advanced Nursing Practice* supports the need for a theoretical footing to create the framework for a change project (American Association of College of Nursing, 2006). The theoretical underpinning of a project supports the purpose, shaping the ideas and interventions into meaningful changes in practice.

Patricia Benner's theory of skill acquisition is the theoretical framework for this capstone project. Throughout various industries, not exclusive to nursing, Benner's model has been used for staff development (Avillion, 2009). In 1984, Benner published *From Novice to Expert: Excellence and Power in Nursing Practice*. This book was based on Dreyfus and Dreyfus' model of skill acquisition and skills development, with application to nursing practice. There are five levels of skill acquisition: (1) Novice, (2) Advanced Beginner, (3) Competent, (4) Proficient, and (5) Expert. Benner believes through adequate education and training, along with experience and skill mastery, a nurse can progress from a novice nurse to an expert nurse (Benner, 1984).

A *novice* nurse has little or no experience related to a specific situation or task; rules and instructions are needed as guidance to make sure appropriate outcomes are met. *Advanced beginners* have been involved in or exposed to real life situations enough that they can manage on their own or with little help. A *competent* nurse can recognize

current problems at hand, while also recognizing what issues may arise in the future. A *proficient nurse* can understand the whole situation and recognize when a situation or action will not produce a favorable outcome. The *expert* nurse acts with intuitive thought, based on knowledge and experience, easily recognizing the unexpected (Benner, 1984).

For the purpose of this project, based on Benner's belief, clinical knowledge is gained through application of practical knowledge and clinical experience. The LDR staff will progress to experts as they respond to obstetric emergencies. Through knowledge gained and skills practiced, the staff will learn to react as a well-orchestrated team, responding to emergencies as second nature. The *advanced beginners* are defined as the LDR staff participating in the didactic sessions, simulation labs, and ongoing emergency drills. *Competency* was measured by the multiple choice quiz for knowledge gained validation after the didactic sessions and a skills competency check off form for the simulation lab and unannounced drills. These concepts are diagrammed in the Conceptual, Theoretical, and Empirical (CTE) structure below. (Figure 1)

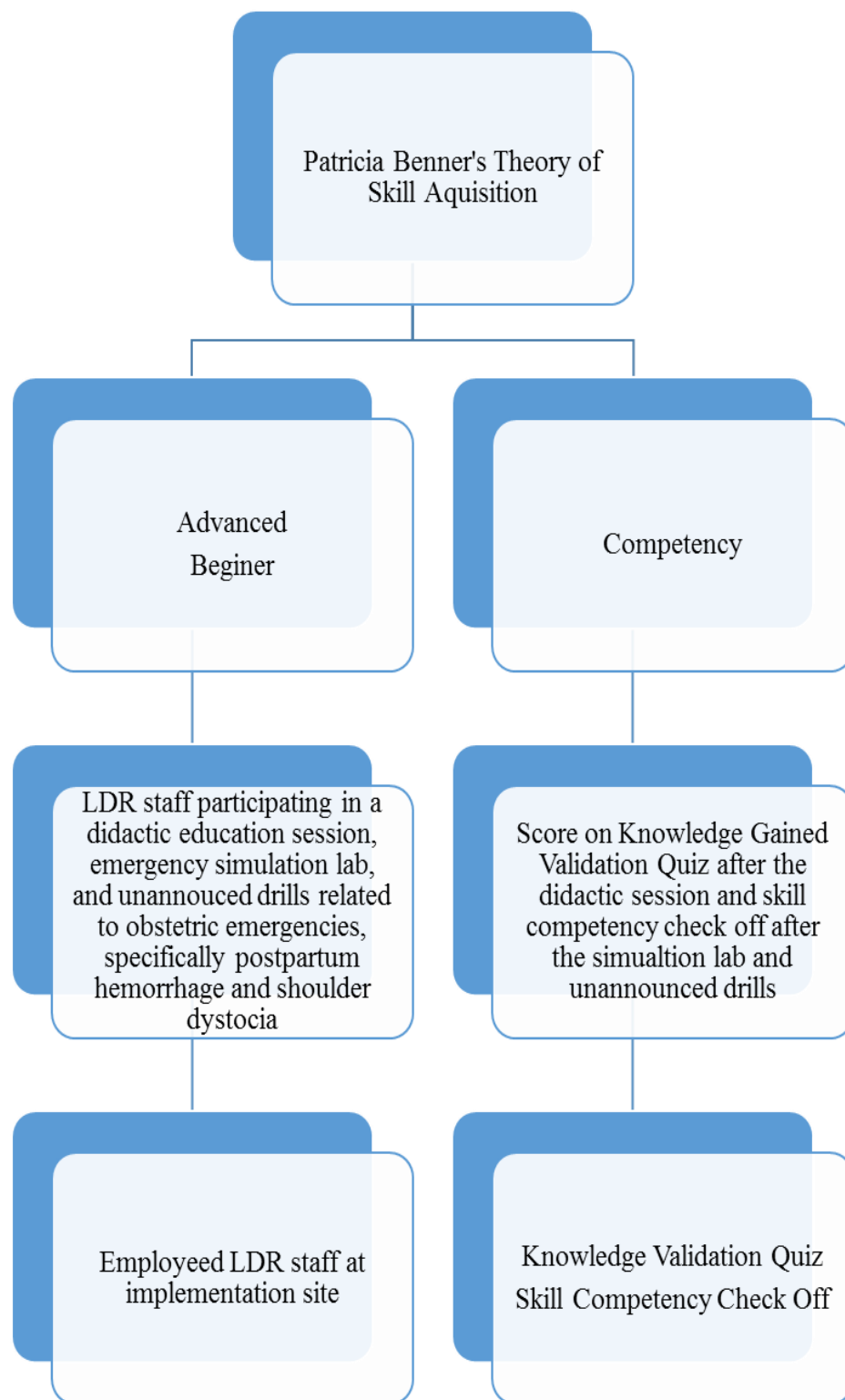


Figure 1. Conceptual-Theoretical-Empirical

Theoretical Literature Review

A literature review was conducted using a variety of online and digital resources. The databases CINAHL, AHEC digital library, and PubMed were utilized to search for studies utilizing Benner's theory related to training and/or competency. Specifically utilizing the basic concepts of the five levels of skill acquisition, three studies were identified.

Meretoja and Leino-Kilpi (2003) studied to see if a nurse manager's evaluation of competency matched self-evaluation of staff nurses working on their units. There were 81 staff nurses and their managers surveyed, using a 73-item questionnaire assessing the competency of the nurse. When comparing the staffs' self-assessment to the assessment by the nurse manager, the managers rated the staff nurses more competent than the staff nurses rated themselves.

Based on Benner's seven domains of nursing practice, the questionnaire used by Meretoja and Leino-Kilpi (2003) was divided into seven competence categories. The categories included: the helping role, the teaching-coaching role, the diagnostic and patient-monitoring function, the effective management of rapidly changing situations, the administering and monitoring of therapeutic interventions and regimens, the monitoring and ensuring the quality of healthcare practices, and organizational work-role competencies. In the categories of the helping role, effective management of rapidly changing situations, and the diagnostic and patient-monitoring function, the staff nurses and nurse managers reported similar scores. The nurse managers rated the staff nurses very high in the teaching-coaching role category. Ensuring quality of healthcare

practices was the lowest scoring category. Benner's theory as justification for the study was not directly stated, but was assumed. Using Benner's research, a strong foundation has been built that supports the achievement of competency for nurses through experience with real-life patient situations. A nurse's progress from novice to expert is parallel to Benner's theory.

Fero, Witsberger, Wesmiller, Zullo, and Hoffman (2009) administered the Performance Based Development System (PBDS) assessment to 2,144 newly-hired nurses. A *post hoc* retrospective analysis was conducted to determine what levels of competency were identified by the PBDS, comparing the PBDS scores to years of nursing experience and education level of the nurses. Expectations were not met by 24.1% of the nurses according to the results. Nurses with the least amount of experience, the most recently hired, had the highest rate of not meeting expectations. Varying education levels of experienced nurses demonstrated a statistically significant difference. Although the post-licensure experience was the same, nurses with the most experience who were trained at the diploma level scored worse than those with an associate or baccalaureate degree.

Benner's five levels of confidence (novice, advanced beginner, competent, proficient, and expert) were used by Fero et al. (2009). The concept of *novice* was specifically defined in this study to be a new nurse graduate with limited experience and the inability to function independently. Although defined by Benner, the concepts of advanced beginner, competent, proficient, and expert were not utilized in this study. The researchers felt that Benner's concepts were supported by the study. The appropriate

interventions were identified on the PBDS by the nurses with the most experience. These findings support Benner's theory that a nurse progresses from novice to expert with experience and mastery of skills (Benner, 1984).

Uys (2004) examined the competency level of nurse graduates from eight universities, four utilizing problem-based learning (PBL) and four that did not utilize the PBL model, using a qualitative designed study. In order to understand the graduates' level of competence, both the graduates and their nurse managers were interviewed. There were 49 total graduates included in the study. A series of open-ended questions were asked of both the graduate and nurse manager, while the principle investigator recorded the interviews. The primary question asked was, "Can you describe an incident which illustrates your/his/her problem-solving ability?" Each incident was categorized as novice, advanced beginner, competent, or proficient based on the answers provided by both the graduate and the nurse manager. Graduates from the non-PBL universities had more incidents of novice ratings than the graduates from the PBL universities.

A comprehensive review of Benner's framework was incorporated into this study. The investigator carefully defined the terms *novice*, *advanced beginner*, and *proficient* to ensure that all incidents described by the graduates and the nurse managers were categorized equally. The concept of *competence* was defined by the investigators as the advanced beginner. The results of this study validated that a nurse progresses from novice to expert through education and situation exposure.

Work Planning

ACOG and AWHONN, professional organizations for obstetricians and nurses respectively, regularly publish updated guidelines, position statements, and recommendations for improving the care of women and infants. The series *Optimizing Protocols in Obstetrics*, published by ACOG, discusses evidence-based research and practice recommendations related specifically to the management of obstetric hemorrhage and shoulder dystocia emergencies. This series presents a comprehensive review for these obstetric emergencies, including a purpose statement, references, definitions, risk factors, preparation, diagnosis, treatment, protocols, debriefing, and documentation. Including interdisciplinary personnel roles, this publication is supported by research and best-practices outlined by these professional organizations. These how-to guides serve as maps for implementing quality improvement projects in labor and delivery units. For the purpose of this capstone project, these publications will serve as resources for planned interventions.

The target audience for this capstone project is all LDR RNs, LPN, CSTs, unit clinical assistants, MDs, CNMs, and CRNAs. One hundred percent participation is expected, unless there are extenuating situations, as this project is a quality improvement initiative for the population of patients that this target population serves and the organization as a whole.

Planned Interventions

Didactic education sessions. Classroom setting sessions, one hour in length, will provide a didactic foundation and instruction related to postpartum hemorrhage and

shoulder dystocia emergencies. The objectives for these sessions are as follows: (1) the learner will describe common OB emergencies and incidence, (2) the learner will discuss the statistics and data about the current rate of postpartum hemorrhages and shoulder dystocia emergencies, as well as staff experience level percentages, at the implementation organization, (3) the learner will identify symptoms of a postpartum hemorrhage, (4) the learner will identify interventions for a postpartum hemorrhage, (5) the learner will identify symptoms of a shoulder dystocia, (6) the learner will identify interventions for a shoulder dystocia, and (7) the learner will discuss documentation and risk management related to postpartum hemorrhage and shoulder dystocia. Instruction was presented in a PowerPoint presentation and conducted in an interactive lecture format. Contact hours (1.25) are offered for full attendance, with completion of the course and presenter evaluation. Credits are provided by the organization's Education Services Department, accredited by the American Nurses Credentialing Center's Commission of Accreditation, after rigorous evaluation of course materials, references, and the presenter's (the student) qualifications.

Mobile Simulation (Sims) lab. Mobile simulation lab sessions, one hour in length, will be offered for groups of six to seven participants per session. The staff from the alliance will be the orchestrators and facilitators of the simulation activity, based on the resources noted above. Real-life roles of participants will be incorporated to demonstrate interdisciplinary participation and teamwork. Scenarios encompassing a shoulder dystocia, followed by a postpartum hemorrhage will be enacted. Conversation throughout and during debriefing after the lab training will allow for highlighting of

positive actions, as well as discussion for needed improvements. Contact hours (1.0) are offered for full attendance, with completion of the course and presenter evaluation.

Credits are provided by the alliance, accredited by the American Nurses Credentialing Center's Commission of Accreditation, after rigorous evaluation of course materials, references, and the facilitators' qualifications.

Unannounced drills. After the foundation of education and hands-on practice has been established through didactic education sessions and mobile Sims lab sessions, the project team members will orchestrate unannounced postpartum hemorrhage and shoulder dystocia drills, using low-fidelity simulation in the LDR unit. Scheduled drills will be conducted to include both day and night shifts, weekday and weekend shifts, to ensure the most participants in the drills. Unannounced drills will occur ongoing, on a quarterly basis. Scenarios will be produced by the team that will allow for learned evidence-based approaches to be practiced for gained experience.

Annual skills fair. The Maternal Child Health service line conducts a department specific skills fair annually. To maintain competency, through education and information recall, the didactic session PowerPoint presentation will be uploaded in NetLearning, a healthcare learning management software package, and assigned to the target audience for review and completion. The presentation will be stored in the NetLearning software for future reference. As new evidence evolves and best practices change, the presentation will be updated to reflect the most up-to-date information.

Project Management Tools

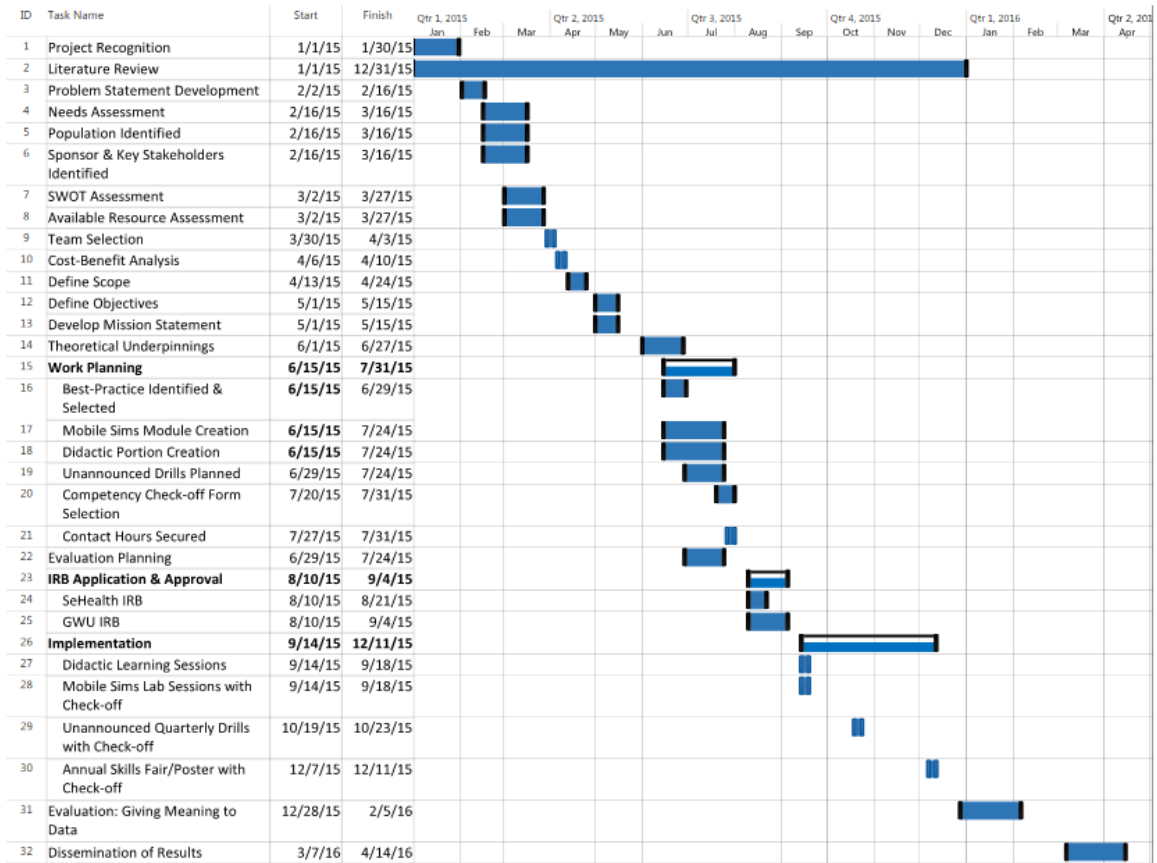


Figure 2. GANTT Chart

Proposed Timeline.

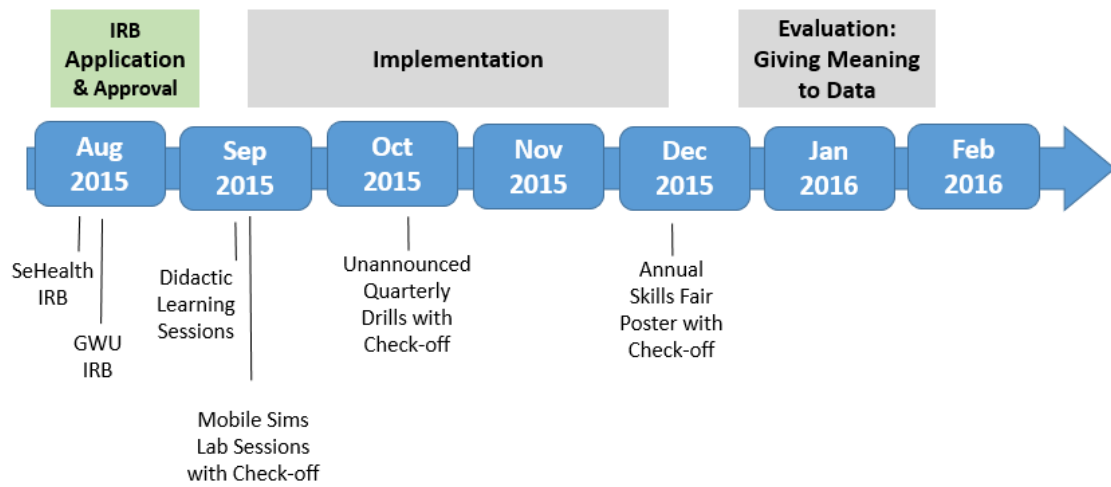


Figure 3. Proposed Timeline

Proposed Budget

Expense Item	Value	Payer Source
AWHONN Shoulder Dystocia: Improving Outcomes	\$24.95	Student
AWHONN Obstetric Hemorrhage: Current Challenges and Solutions	\$24.95	Student
OB Hemorrhage: Simulation Based Training Strategies	\$24.95	Student
ACOG Optimizing Protocols in Obstetrics	Free Resource	N/A
Mobile Simulation Lab	\$3,200	In kind provided by implementation site
Staff participation in approximately 88 hours for this project	\$1,792	In kind provided by implementation site
Total Cost	\$5,066.85	
Less in kind value	\$4,492.00	
Actual Cost	\$74.85	Student

Figure 4. Proposed Budget

Evaluation Planning

Evaluation Plan

Knowledge gained after the didactic presentation will be validated by the use of a questionnaire containing 25 multiple choice or true/false questions, which was developed by the DNP student. A score of 92% or greater is required to validate knowledge gained. A score less than 92% will require one-on-one remediation with the project leader.

Mobile simulation lab practice session participants will be evaluated for competency using a competency check sheet that was developed by the alliance simulation coordinator. A score of 35 out of a possible 44 points is necessary to validate competence. A score less than 35 will require one-on-one remediation with the project leader.

During quarterly, unannounced postpartum hemorrhage and shoulder dystocia drills, each participants' competency will be validated using the same tool used during the mobile simulation lab. A score of 35 out of a possible 44 points is necessary to validate competence. A score less than 35 will require one-on-one remediation with the project leader.

The Maternal Child Health department skills fair is held annually. A NetLearning module, containing the original didactic session PowerPoint presentation, with updates as new evidence evolves, will be required with knowledge gained or retained validated by the 25 item questionnaire, containing both multiple choice and true/false questions. A score of 92% or greater is required to validate knowledge gained. A score less than 92% will require one-on-one remediation with the project leader.

The alliance mobile simulation lab will be rotating to the organization quarterly. Fifty slots will be reserved during the summer session for hands-on simulation training for obstetric emergencies. The same skill competency checklist used in the original sims lab sessions will be utilized. A score of 35 out of a possible 44 points is necessary to validate competence. A score less than 35 will require one-on-one remediation with the project leader.

Logic Model



Figure 5. Logic Model

Quality Improvement Methods

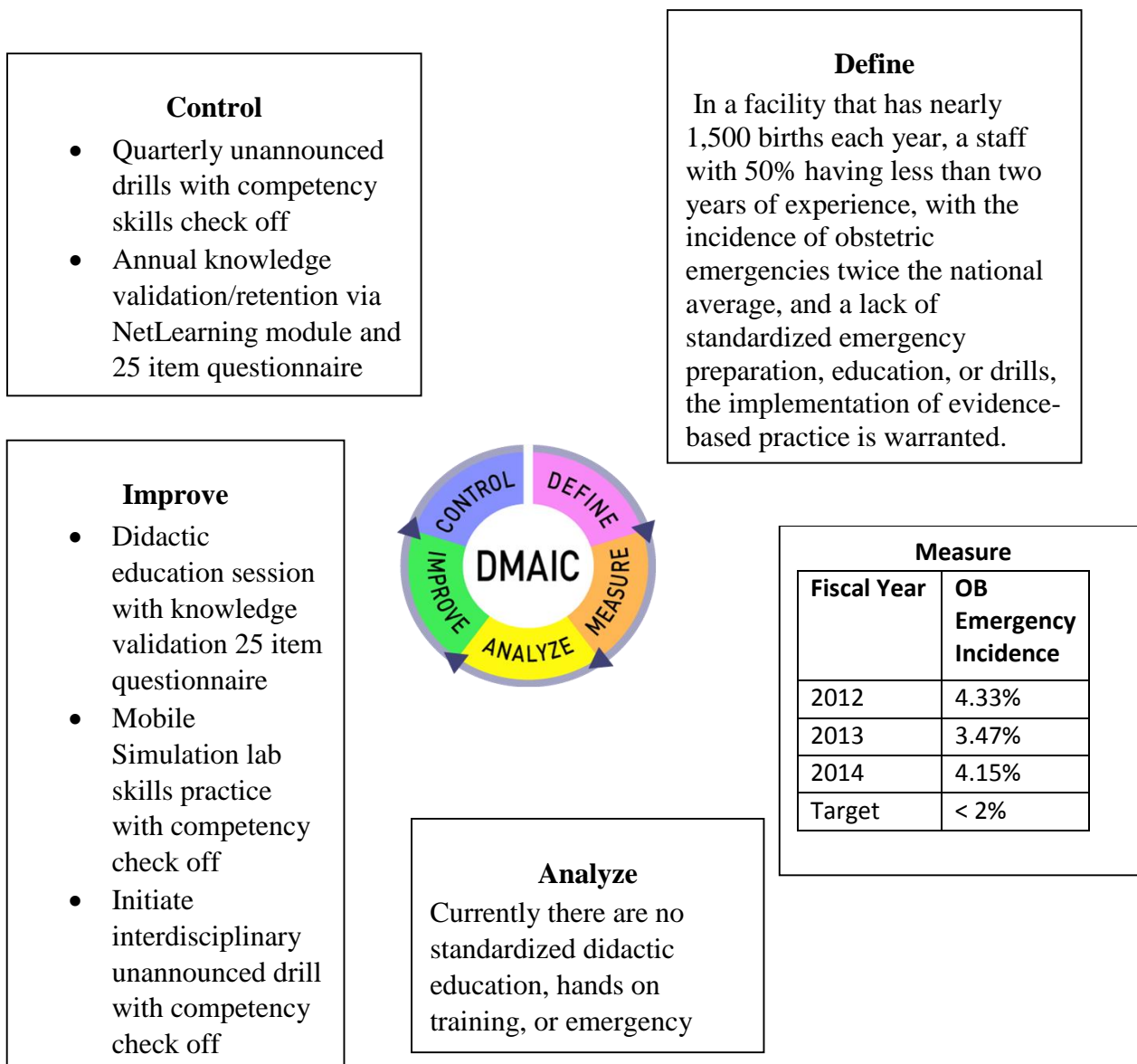


Figure 6. Quality Improvement Methods

Implementation

Protection of Human Subjects

Permission to implement this evidence-based change project was granted by the implementation site Institutional Review Board (IRB), as well as the University's IRB committee. Due to the quality improvement nature of this project, expedited review eligibility criteria was met. The risks for participants, all affiliated with or employed by the implementation site, was minimal.

Project Process

This project included a total of 56 participants, each taking part of some or all of the components, all of whom work or have privileges at the implementation site. Nine of these participants were in addition to the target audience.

Over the course of four days, a total of 24 one-hour didactic sessions were held. Attendees of the sessions each received 1.25 contact hours. The didactic session included a PowerPoint presentation and interactive lecture. A total of 56 people attended the didactic session; 30 of 32 RNs, one of one LPN, six of six CSTs, six of six unit clinical assistants, three of four CRNAs, zero of nine OB/GYNs, and one of six CNMs. Six internal medicine residents and three pediatricians attended after seeing the course advertised at the organization.

Concurrently, Sims lab practice sessions were held. Over the four days a total of 24 sessions were held, lasting one hour each, with six to seven people participating in each session. Each attendee was awarded 1.00 contact hour for successful completion of

the Sims lab practice session. The same 56 people that attended the didactic sessions also participated in the Sims lab practice sessions.

A total of seven unannounced OB emergency drills were held in the LDR unit. The drills spanned week days, weekend days, week nights, as well as weekend nights. A total of 47 staff members participated; 29 RNs, 1 LPN, 6 CSTs, 6 unit clinical assistants, three CRNAs, one CNM, and one pediatrician. The interactive drills were comprised of three different scenarios that presented OB cases complicated by shoulder dystocia and postpartum hemorrhage emergencies.

The annual unit-based skills fair was held one month after the didactic, Sims lab, and unannounced drill sessions. A Net Learning module which included the original didactic PowerPoint presentation with a knowledge validation quiz was assigned to all LDR staff for mandatory completion. A time limit of two weeks was given for staff to complete the module. The Net Learning module was assigned to 45 staff members. It was completed by 43 staff members, equating to a 95.6 percent participation rate.

Outcomes Data

All participants in the didactic sessions and the Net Learning module were asked to complete a 25 item multiple choice, true/false quiz. The expectation of every participant to make greater than 92% on the quiz was met or exceeded. No participants needed one-on-one remediation.

The passing check-off score for the simulation sessions, as well as the unannounced drills, was 35 of 44 possible points. All participants met or exceeded this expectation. No participants needed one-on-one remediation.

Evaluation

Interpretation of Outcomes

Comparison to literature. Reflecting on findings from the literature review and consensus statements from associated professional organizations, standardized team training and repetitive practice provide better knowledge and competence of staff when caring for patients during an obstetric emergency. Through creation and implementation of a standardized emergency preparation education session and skills practice opportunities, the staff involved were able to rehearse appropriate responses to the emergencies presented. Due to the infrequent and unpredictable nature of these emergencies, deliberate practice is needed to keep information and skills in the forefront of the mind.

According to ACOG (2014) department-wide education, competency checkoff, and ongoing drills are best practices for emergency preparation. As a result of participating in evidence-based interactive didactic and simulation sessions, the staff were prepared to respond in the unannounced drills, which replicated potential and real-life events. The competency of staff participating in this project responding to shoulder dystocia and postpartum hemorrhage obstetric emergencies was validated.

Theoretical framework. Benner's theory of skill acquisition gave purpose to this project, demonstrating the validity of theoretical framework for a change. A theory directs ideas and interventions, molding them into meaningful changes in practice. The outcomes of this project echoed Benner's theory that knowledge is increased through experience. The advanced beginners in this project moved to competent nurses on their

journey to becoming expert obstetrical nurses, through repetitive practice and competency validation.

Interpretation of the Process

Achievements. The needs assessment presentation to key stakeholders created immediate support and ignited a catalyst for this project. Awareness of national trends compared to local statistics was eye-opening, especially when paired with staff experience levels. The organization strives to provide evidence-based, excellent patient care to every patient that enters the doors. This became a necessary implementation, meeting no resistance.

The frontline staff also were very interested in making a difference when presented with the data from the needs assessment, as well as evidence that supported best practices. The staff knew that experience levels were mixed, with lesser experience tipping the scale; however, no one had presented the data to support their hypothesis. The same was true for the volume of high risk or emergency encounters. The data presented validated their feelings that they experienced these types of events more than their peer LDR nurses. The passion to provide the best care for the patients they serve, combined with leader and organization support, created an easy process to recruit a team to help develop and make this project implementation a success. By learning the process and steps to initiate data-driven, evidence-based, successful change, this team identified other improvement projects they want to explore.

Based on the anonymous post-course evaluation form, which was required to receive the contact hour credit, the overall response by the participants concurred that the course was excellent. Select comments from the evaluations included:

“I now know what I can do as the nurse to assist during an emergency.”

“I will make myself more aware of what’s going on in the labor room, so I can be ready to help in an emergency.”

“I feel more prepared to respond to an emergency.”

“I can now provide the best care possible to my patients.”

“I plan to use this in my nursing practice every day.”

“I now know the warning signs and feel that I can recognize an emergency early.”

“This was very helpful; I have not been refreshed on this information since I was a student.”

Overall the response to the project implementation and the evidence it was built upon was overwhelmingly positive.

Recommendations for improvement. While interest and support of the project was noted from the beginning, actual provider (obstetrician and CNM) participation was lacking in the actual implementation of the project. Research supports training and practicing as a team to ensure the entire team responds with synchrony in an emergency. Providers ultimately are the leaders of the obstetric team during the emergency, acting as the coach for a successful outcome.

Research demonstrates the need for department-wide education and practice to provide the best outcomes. Going forward it is recommended that obstetrical providers take an active role in unannounced drills, as well as annual simulation training.

Plan for sustainability. Educational services and the core team of frontline staff will be responsible for continuation and sustainment. Unannounced drills will occur ongoing, on a quarterly basis. Scenarios will be produced by the team that will allow for learned, evidence-based approaches to be practiced for gained experience. Annually 50 slots will be dedicated in the alliance simulation mobile lab for obstetrical emergency practice. During the Maternal Child Health annual skills fair, a Net Learning module containing the original didactic session PowerPoint presentation, with updates as new evidence evolves, will be required with knowledge gained or retained validated by the 25 item questionnaire, containing both multiple choice and true/false questions. A score of 92% or greater is required to validate knowledge gained. As new evidence evolves, and best practices change, the core team will update the presentation to reflect the most up-to-date information. As evidence and better practices evolve for responding to obstetrical emergencies, this team will be abreast of the changes and will alter their care approaches accordingly.

Conclusion

Obstetric emergencies occur on many occasions without warning, with little time to hesitate before responding. Staff caring for obstetrical patients must be poised to respond appropriately without hesitation, working as a team. The uncertainty and unexpected nature of an obstetrical emergency are reasons for all obstetrical caregivers to

be prepared at all times to respond to the needs of the patients. Through the implementation of an obstetrical team emergency training program, staff will have an increased level of knowledge and competence when responding to an obstetrical emergency through ongoing training and regular drills. Patients will have the greatest gain through this well-orchestrated, prepared team approach to their care.

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