

Teaching QSEN Competencies through High-Risk Newborn Simulation: A Case Study

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Abstract: The Quality and Safety Education for Nurses (QSEN) project calls for all nurses to be competent in collaboration and teamwork, patient-centered care, and patient safety. The following collective case study examines the implementation and outcomes of a high-risk newborn simulation on knowledge, skills, and attitudes of junior BSN students enrolled in a maternal-child nursing course. The analysis revealed major themes of fragmentation, overconfidence with medication administration, and appreciation for the role of the registered nurse.

Keywords: high-risk infant nursing; low-fidelity simulation; maternal-child nursing; nursing education, QSEN, patient-centered care; patient safety; patient simulation; teamwork

Introduction

The literature suggests learning to care for newborns requires skills that may be difficult to achieve during a traditional maternal-child nursing course. Simulation has been proposed as one teaching strategy to help prepare nursing students to work in a complex health environment (Jeffries & Rizzolo, 2006; NLN, 2005). While the literature surrounding use of simulation to care for adult patients is common, there is limited literature to describe the use of simulation to teach newborn care. The purpose of this paper is to describe the implementation and outcomes of a low-fidelity simulation designed to teach the care of a complicated newborn to five clinical groups of undergraduate baccalaureate nursing students.

Background

In the landmark report, *To Err Is Human*, the Institute of Medicine (IOM) recommended major changes were needed to create a safer health care environment, including changing the professional education paradigms (Kohn, Corrigan, & Donaldson, 2000), but real reform in nursing education has been slow in coming (Cronenwett et al., 2007; NLN, 2005). To facilitate a nursing education paradigm shift, the Robert Wood Johnson Foundation created QSEN (2007). The goal of the project was to reshape nursing education and professional identity formation based on six competencies: patient-centered care, teamwork and collaboration, evidence-based

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practice, quality improvement, safety, and informatics. The QSEN framework focused on helping students gain knowledge, skill, and attitudes surrounding the six competencies.

Teaching QSEN competencies as they relate to newborns in the clinical setting can be particularly challenging. The safety concerns of the obstetrical setting often relegate students to the observer role (Mahlmeister, 2008). Students come under additional scrutiny as recommended infant abductions prevention practices may limit student access to newborns (Joint Commission, 1999). In maternal-child health, person-centered care translates to person- and family-centered care (Conway et al., 2006). Family-centered maternity care principles maintain that mothers are the preferred caregiver for infants (Westmoreland & Zwelling, 2000). As rooming in is encouraged, the nurse's primary role is to facilitate attachment in healthy newborns, rather than provide care (Karl, Beal, O'Hare, & Rissmiller, 2006). Thus, students may have less opportunity to learn newborn assessment and care.

With minimal clinical exposure to normal newborns, recognition of abnormal newborn findings is challenging for the student and the novice maternal-child nurse. Early signs of neonatal complications are often non-specific as newborn immune systems respond differently than those of adults or older children (Haque, 2005). Walker, Neilson, Young, and Raine (2006) found that even experienced health care providers did not always recognize characteristics of bile staining, indicating intestinal obstruction, in an infant's emesis.

Still, the maternal-child nurse needs to be very skilled at newborn assessment and ready to initiate collaborative care because illness may occur and rapidly progress even in full-term infants without traditional risk factors. For example, necrotizing enterocolitis (NEC) has occurred in term infants with no known risk factors (Maayan-Metzger, Itzhak, Mazkereth, & Kuint, 2004). Severe hyperbilirubinemia occurs in term infants without clear etiologies (Sgro, Cambell, & Shah, 2006).

Late pre-term infants, or babies born at 35-37 weeks gestation, also referred to as near-term infants, are of particular concern to the maternal-child nurse. These infants frequently room in or are cared for in regular nurseries but are at higher risk for hypoglycemia, temperature instability, respiratory distress, and jaundice than full-term infants (Cambell, 2006; Medoff-Cooper, Bakewell-Sachs, Buus-Frank, & Santa-Donato, 2005; Wang, Dorer, Fleming, & Catlin, 2004). De Carvalho Guerra Abecasis and Gomes (2006) found five percent of all pre-term infants who initially roomed in subsequently developed complications requiring transfer to the neonatal intensive care.

Clinical simulation is a way to increase confidence, knowledge, critical thinking, and psychomotor skills in student nurses (Jeffries & Rizzolo, 2006). Curran, Aziz, O'Young and Bessel (2004) found simulation could be used to teach newborn resuscitation to medical students. Robertson (2006) found the use of a high-risk obstetrical simulation resulted in an increase in knowledge and high satisfaction in undergraduate nursing students. Bantz, Dancer, Hodson-Carlton, and Van Hove, (2007) used high-fidelity simulation to teach newborn assessment as part of an alternative obstetrical learning experience and found the experience increased student confidence. What remains unknown is how the use of high-risk newborn simulation affects knowledge, skills, and attitudes in student nurses.

Method

University institutional review board approval was received to conduct this study. We designed a high-risk newborn simulation using Jeffries's (2007) template. For the patient, we chose a late

pre-term infant receiving group B streptococcus prophylaxis per CDC guidelines who developed hypoglycemia and NEC symptoms (Schrag, Fultz-Butts, & Schuchat, 2002; Yeo, 2006). The simulation included a 5-minute orientation, 15 minutes of running time, and 20 minutes of debriefing. The debriefing was used to reinforce learning and help discharge emotion (Stafford, 2005). The learning objectives were to:

1. Interpret newborn assessment findings
2. Perform effectively as a team member
3. Provide patient- and family-centered care
4. Administer safe care

Over the course of one academic year, five clinical groups of 10 traditional baccalaureate nursing students participated in this high-risk newborn simulation. The simulation took place in the Nursing Learning Resources Center. For each of the five clinical groups, one student was assigned as an RN, one as the LPN, and one as the parent. The other seven students were observers. The simulation began with the parent in a different area, but the parent was cued to come to the bedside if a nurse did not update her. As the instructors, one of us played the role of the RN giving shift exchange report and subsequently the physician (see Figure 1). The other instructor observed. We both assisted with the debriefing.

Figure 1. Shift Report

Baby Girl Jones, or Jill, is a late preterm infant born at 36.2 weeks at 5 PM yesterday afternoon. Mom is a married gravida 3, para 27 year old named Jane. Jill weighed 3200 grams at birth. This morning's weight is 3120 grams. Mom was group B beta strep positive, but delivered precipitously before antibiotics. Jill needed positive pressure ventilation briefly. Apgars were 4 & 9. Blood cultures and a CBC were drawn to rule out sepsis per protocol. The cultures will be 48 hours at 6PM tomorrow. A saline well was placed and antibiotics started, but all other nursery orders apply. The ampicillin is due now. Mom called for a nurse at 6:30 because she couldn't get Jill to wake up at all to breastfeed. At that time she was lethargic and had a temperature of 96.6 R. She was brought to the nursery and put under the warmer. The rest of her vitals were respirations of 44, heart rate of 110, a blood pressure of 65/34, and a SAO2 of 96%. Her blood glucose was only 39mg/dl, and she refused to eat. Dr. Smith just ordered 15ml D5W per OG now. Jill's mother doesn't know this yet. I need you to give the meds and gavage this baby because I have another patient that is not doing well.

We placed a saline well in the scalp of a low-fidelity infant CPR manikin with an oral-gastric pouch. To simulate NEC, the oral pouch was filled with 10 milliliters of bile green water, and chocolate syrup was mixed with red jelly to resemble a bloody stool. The baby was placed in a warmer. Bedside supplies included diapers, a 5 French feeding tube, mixed size syringes, oral glucose, the patient medications, a *NeoFax* drug reference book (Young & Magnum, 2004), and a patient chart.

We used a collective case design for the study. The issues flowed from the learning objectives. Data came from direct observation and the group discussion debriefing. Stake's (1995) method was used for data analysis, by which data were categorically aggregated to address the issues, and subsequently patterns were established to identify the predominant theme.

Results

Our major observational findings are reported in Table 1. The findings were classified according to the learning objectives. Cronenwett et al.'s (2007) recommended QSEN related knowledge, skills, and attitudes also guided the categorical classifications.

Table 1. Knowledge, Skills, and Attitude Data

Objectives/ Issues	Knowledge	Skills	Attitudes
Interpret newborn assessment	Understood seriousness of bilious aspirate, but not the seriousness of bloody stool	Didn't include the diaper with assessment	
Perform as a team member	LPN asked to practice outside of scope of practice assessing and calling physician	Not using SBARR & failure to call for Xray	Hesitation in assuming role
Provide patient and family-center care	Parents had to initiate contact	Minimal discussion of infant's condition/failure to elicit parent's needs	Devaluing parent by sending mother to room
Administer safe care	Saline well not checked for patency or flushed after medication Didn't verify mother/baby ID	Didn't use appropriate strategies to reduce use of memory with medication reference memory	Multiple errors demonstrated lack of value of role in preventing errors

Interpret Assessment.

Some students chose to gavage the infant first. Others assessed the infant first. All students who attempted the gavage feeding recognized that the green aspirate was an abnormal finding requiring physician notification. All students correctly held the gavage feeding. Many students failed to look in the infant's diaper as part of the assessment. Of those who did look, some did not interpret the bloody stool as a finding requiring physician notification. Some students called the physician regarding the bilious aspirant before completing the rest of the GI assessment.

Perform as a Team Member.

The second objective was to perform effectively as a team member. Overall, the students demonstrated a lack of understanding of the RN role. More often than not, the RNs asked the LPNs to function outside their scope of practice or against the clinical facility policies. For instance, in several cases the RN asked LPN to assess the infant or call the physician. The debriefing revealed that the students were surprised to learn that the Nurse Practice Act (Indiana

Board of Nursing, 2005) did not include assessment within the LPN's scope of practice. Students also reported that they felt they had seen LPNs functioning as RNs during their clinical rotations.

The students clearly demonstrated discomfort with calling the physician and a total lack of understanding of the situation-background-assessment-recommendation-readback (SBARR) method of communication recommended by QSEN (2007). While students gave the situation and background, no student included a complete assessment with an interpretation, gave a recommendation, or read back the order. When students transcribed the order, it was on a sheet of paper and never placed in the chart. Several students found themselves having to call the physician back because they did not fully understand or had forgotten the order. Only one group started the steps to obtain the ordered X-ray.

Provide Person- and Family-Centered Care

The third objective was to provide patient- and family-centered care. Here students demonstrated a wide variety of comfort in caring for a family with an appropriately concerned parent. All of the students waited for the parents to come to the nursery instead of calling for them. Some students insisted that the parent return to her room. Others allowed the parent to stay, but ignored her needs. These students failed to explain procedures as they were performed, such as anchoring the feeding tube, and avoided discussing the baby's condition. Other students were more supportive, encouraging the parent to come to the warmer and giving the best explanations they could. The debriefing revealed that this was the first time many of student realized that as nurses they would sometimes have to be the bearer of bad news.

Administer Safe Care

The final objective was to provide safe care, but many medication administration issues were noted. The students did not always check the saline well for patency before delivering the medication. Some students failed to follow their medication with a flush. The ampicillin was labeled in a pharmacy bag to give over 1-2 minutes. None of these students would have ever given ampicillin per the push method to an infant. A drug reference was sitting beside the medication, yet not one student took the time to look up the medication. Another safety issue noted was many students failed to match the identification bands of the infant and the parent as the adult entered the nursery.

Major Themes

We reviewed the categorical data for new patterns and meanings. The analysis revealed three major themes: fragmentation, overconfidence with medication administration, and role appreciation.

Fragmentation

Students failed to view the infant as a whole being. The baby had many NEC signs and symptoms (Yeo, 2006), yet the incomplete gastrointestinal assessments showed the students had trouble putting the pieces together. Another example of fragmentation was the failure to recognize the family unit. QSEN (2007) described patient-centered care as recognizing the

patient, or the designee, as full partner. Patient-centered and family-centered care is a more expansive to recognize the importance of the family unit (Conway et al., 2006). While some students attempted to answer questions, no student took the initiative to update the parent, offered to let her talk to the physician, or encouraged the parent to express her feelings.

Overconfidence with medication administration.

Suresh et al. (2004) found inexperience caused 10% of all medical errors in a neonatal intensive care. Inexperience may result in a lack of awareness of consequences. The fact that no student consulted an available reference for a medication they would have never given IV push or in the newborn dose was extremely concerning, and indicated a larger problem with overconfidence with medication administration. It was especially troubling when students were aware of the media coverage surrounding three infant deaths from a medication error at an area hospital (Neonatal Heparin, 2006).

QSEN (2007) recommended the use of technology at the bedside to support decisions and reduce errors. Our school did not require PDA use, but we feel the findings from this simulation supported the need to adopt such technology. Had the students been using PDAs routinely at the bedside, it would have been second nature to look up the unfamiliar medication.

Role appreciation

The failure to involve families, to effectively collaborate and direct care, and to take measures to reduce errors all indicated that the students had an incomplete understanding of the RN role. The debriefing revealed this was the first time many students had been able to make important care decisions. They verbalized that the simulation helped them not only learn newborn complication, but how to put the pieces together and function as a nurse.

Jeffries and Rizzolo (2006) suggested simulation could increase self-confidence, but failed to include other attitudes as an outcome of simulation. While knowledge and skills may be taught in a variety of ways, teaching values and attitudes present more of a challenge. We felt an appreciation for the expansiveness of the professional nurse role was the most important outcome of this simulation. Students valued the experience and verbalized wanting more simulations in the curriculum.

Lessons Learned

Overall, the simulation helped the students understand the RN role, but we felt several modifications could improve the learning experience. A low-fidelity infant manikin was all that was available. During the prep time students were given instructions on the manikin's limitations. Jeffries and Rizzolo (2006) found similar outcomes between the use of a high-fidelity and low-fidelity manikin, but it is our opinion that pretending to hear breath and bowel sounds may have contributed to the reason students were not as thorough with other aspects of the assessment. Our facility will not be purchasing the high fidelity infant in the near future, but we are obtaining a medium- fidelity model for future use.

While this simulation did help the students better understand the RN's role, using an LPN student and a medical student would have created a better interdisciplinary experience. Unfortunately, medical students only stay through their second year on our campus. As such,

they have not covered maternal-child health, and would have been unlikely to be able to participate effectively. However, there are LPN students within the community and we feel we should explore including them in future simulations.

The lecture readings from Lowdermilk and Perry (2007) covered newborn assessment and procedures, but given the complexity of this case we feel the students should have been given a preparatory assignment. We knew most students understood how to place a nasal-gastric tube, but also knew that they would not be as familiar with an oral-gastric tube. Thus, we included these instructions during the manikin orientation. In hindsight, the students would have benefited from a reading assignment that reviewed SBARR, infant gavage feedings, and infant medication administration using saline wells.

Finally, we feel we should have asked the students to engage in reflective journaling after the debriefing. Forneris and Peden-McAlpine (2007) found critical thinking was greatly accelerated in novice nurses who participated in journaling, interviews, preceptor coaching, and leader-facilitated group discussions over a six-month period. We feel that the addition of journaling with instructor feedback would have furthered value formation.

Limitations

This simulation was perceived as a successful learning experience by the students and instructors. The observational data indicated the simulation helped students learn newborn assessment, teamwork, patient- and family-centered care, and patient safety, and contributes to the body of knowledge surrounding both the QSEN (2007) and Jeffries (2007) frameworks. However, the ability to generalize the findings to other populations is limited by the qualitative nature of the study. Future studies should include experimental designs and larger samples. In addition, research is needed to develop reliable and valid tools to measure QSEN related knowledge, attitudes, and skills.

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