EXECUTIVE SUMMARY

Effect of Nurse-Led Simulation on OB/Perinatal Nurses' Knowledge & Confidence in Managing Complications & Emergencies

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Background & Aims

OB/perinatal emergencies and complications are low-volume, high risk occurrences, and research suggests that simulation helps both novice and experienced clinicians to obtain and maintain clinical competence (Argani, Eichelberger, Deering, & Satin, 2012; Committee on Patient Safety & Quality Improvement, 2011; Cooper et al., 2012; Ennen & Satin, 2010; Fuchs, Miller & Berkowitz, 2009; Gardner, Walzer, Simon, & Raemer, 2008; Jeffries, Bambini, Hensel, Moorman, & Washburn, 2009; Shekelle et al., 2013). However, much nursing simulation research occurs in academic settings that may not be transferable to practice ones; and reliable/valid, quantitative, outcome measures are needed to determine best practices (Birch et al., 2007; Brewer, 2011; Cooper et al., 2012; Gough, Hellaby, Jones, & MacKinnon, 2012; Jeffries et al., 2009).

Thus, our primary aim was to answer the hypothesis of whether nurse-led simulation-plus-lectures will increase OB/perinatal staff nurses' self-reported knowledge and confidence in managing emergencies and complications. A secondary aim was to confirm the reliability and validity of a new tool for quantitative measurement of simulation outcomes.

Framework

A treatment delay framework provides context for the significance of this study. Women who present with OB/perinatal complications or emergencies may have already experienced a first delay in seeking care and a second delay in traveling to care. Then when they present at the hospital, they need not also experience another dangerous delay in receiving care—the third delay in the "three delays" framework (Pacagnella, Cecatti, Osis, & Souza, 2012). Registered nurses (RNs) must be prepared to intervene efficiently and effectively in order to avoid serious maternal or infant morbidity and mortality. Additionally, in the setting for this study, a role-based professional model that guides decision-making based on patient stability, aids RNs in avoiding any third delay.

Methods/Procedures/Sampling

We used a quasi-experimental, cross-sectional, pretest/posttest survey design. The instrument was a new, investigator-designed *NursOB* tool with two anchored subscales: 1) a knowledge subscale that asks respondents to self-rate their knowledge from 0 to 10 on each of five OB/perinatal complications/emergencies and 2) a confidence subscale that asks them to self-rate confidence in the same situations. Ordinal scores for each item and for each of the two subscales are calculated. Content validity for the NursOB was established prior to use in this study through literature and OB expert nurse panel review and consensus.

After institutional review board approval, an inclusive, convenience sample of RNs from postpartum and labor and delivery units in our 411-bed, urban, community, not-for-profit hospital anonymously a) completed the *NursOB tool* as a pretest, b) attended a four-hour nurse-

taught lecture on the five OB/perinatal emergencies/complications, c) participated in a nurse-led, four-hour, low fidelity simulation exercise on those same five situations including videotaping of one station for debriefing, and c) then completed the *NursOB* as a posttest two weeks after all OB/perinatal RNs had a attended one of the three training days. Data analysis included independent t-tests as well as descriptive and reliability statistics.

Findings

The pre-education (n=58) and post-education (n=33) groups were similar in age (p=0.70), years of practice (p=0.33), and years of OB practice (p=0.53). Response rate for the pretest was 88%, and for the posttest, 49%. The hypothesis was rejected with unpaired t-tests showing no statistically significant changes in knowledge and confidence from pretest to posttest for any of the individual items on the *NursOB* or on either of the subscales measuring overall knowledge and confidence ($p<.05$). Reliability measured as internal consistency was strong for both knowledge (Cronbach's $\alpha = 0.925$) and confidence (Cronbach's $\alpha = 0.938$) subscales on the *NursOB.*

Limitations & Discussion

Study findings are not generalizable because of small, nonprobability sampling. Additionally findings may have been weakened by technical difficulties that created inconsistent use of videotaped debriefing. Nonetheless several things can be learned from this project.

First, findings fill a gap in quantitative, simulation outcome measurement (Brewer, 2011) by establishing content validity and strong reliability for the *NursOB* tool that provides a direct, ordinal level measure of confidence and knowledge and supports future inferential research.

Second, the rejection of the hypothesis may be more statistical than real. A potential type II error may have been created by sampling with inadequate power, self-reported overestimation of knowledge and confidence at baseline, unpaired pretest/posttest scores, and a mingled sample of labor/delivery and postpartum RNs, whose baseline knowledge and confidence may have differed more than anticipated. A pretest to posttest numerical decrease in knowledge subscores for oxytocin management and obstetrical hemorrhage suggests baseline overestimation; and anecdotal reports from leaders of case simulations suggested quicker and more thorough participation of labor and delivery nurses with a "hanging back" of postpartum nurses. Because we did not collect data on practice areas, we could not test for those differences.

Finally, as Ennen and Satin (2010) have concluded, even small research projects can make important practical contributions by correcting problems in the simulation drill itself, identifying areas for future education, overcoming barriers to learner engagement, resolving cost and space issues, and evaluating transfer of learning into practice. In our case both study results and complementary anecdotal feedback a) established a quantitative tool for future inferential research and other outcome measures, b) improved performance of in-house simulation leaders, c) reinvigorated RN interest in annual reviews, and d) identified space, human, and equipment resources needed to conduct off-unit, low-fidelity simulation in our setting.

Recommendations

Researchers should replicate the study with a larger sample, paired pretest/posttest participants, continued testing of the *NursOB* tool, and separate analysis for labor/delivery and postpartum RNs' *NursOB* scores. Ideal future studies would measure patient outcomes and RN performance during direct care, but given the low volume of these emergencies/complications

that approach could require substantial funding, lengthy data collection, and use of multiple sites with large OB/perinatal practices. Videotaped performance during in situ simulation may be a more practical option. With adequate funding Riley et al.'s (2011) quasi-experimental trial of prospectively collected safety and perinatal morbidity/morality patient data before and after simulation with and without team training is a project worth replicating.

Second, given the total body of literature on OB/perinatal simulation and the possibility of a type II error in this study, educators' use of nurse-led low fidelity simulation with ongoing monitoring of outcomes is warranted using the *NursOB.* If low-fidelity simulation is effective, then the higher costs of other simulation may not be necessary.

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