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Evaluation of an unfolding obstetric experience simulation in an undergraduate nursing program☆

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ABSTRACT

Background: Clinical practice for pre-licensure nurses in obstetrics widely varies and many sites do not consistently present opportunities to meet course objectives or manage complex obstetric nursing care. To address this problem at our institution, we designed a large-scale obstetric simulation using recommendations for best practice in simulation design criteria. We designed an unfolding, obstetric simulation that allowed students repeated opportunities for deliberate practice after micro-debriefing.

Method: A convenience sample of junior level nursing students (n = 53) participated in a pre/post design evaluation to measure achievement of communication skills based on student perception of obstetric nursing self-efficacy and their ability to transfer those skills to a similar scenario.

Results: Scores for obstetric self-efficacy were significantly improved. Pre-simulation (M = 40.78), Time 1 (M = 61.0) and Time 2 (M = 69.27), F (2, 159), =112.12, p = .00. A significant difference was found (t (52) = −7.839, p = .000) when comparing the mean pre and posttest clinical accuracy and completion scores for SBAR forms (n = 53).

Conclusion: Our unfolding, obstetric simulation was effective in helping our students demonstrate the achievement of course objectives through improved obstetric self-efficacy scores and scores for shift to shift communication.

1. Introduction

Nursing education programs have expanded to prepare increased numbers of nurses; yet clinical sites are physically limited in their capacity to accommodate large numbers of students. Given the competition for clinical sites and the wide variety of patient conditions likely to be encountered, it is impossible to predict the quality of obstetric clinical experiences. Use of effective simulation provides a mechanism to replace and/or augment traditional clinical practice for students so that the experience reinforces the objectives of the curriculum (Alexander et al., 2015).

In our program, the obstetric course is taught as a 5-credit course (3 credits of theory and 2 credits of clinical). The course is offered in the spring semester of the junior year. Approximately 30 students are enrolled in each of two course sections. On average, six to eight students are assigned in groups to one of five clinical hospital sites that range in type from small community hospitals to large teaching hospitals. Although clinical instructors are provided with weekly objectives and plan clinical activities to meet those goals, it is impossible to guarantee that patient census will support the stated objectives for every group. In addition, students' evaluations of their clinical experience indicated that opportunities vary widely; in some hospitals, students were limited to observation only, with no occasions for administering hands-on care. To address the problem, the lead faculty member, assisted by simulation and clinical faculty, designed a complex unfolding obstetric simulation to assure that all students participated in a high-risk patient scenario that met the course objectives. The simulation was used to fulfill 16 h (two clinical days) out of the 84 total clinical hours for the course. The purpose of this paper is to describe the development, implementation, and evaluation of the simulated obstetric clinical experience.

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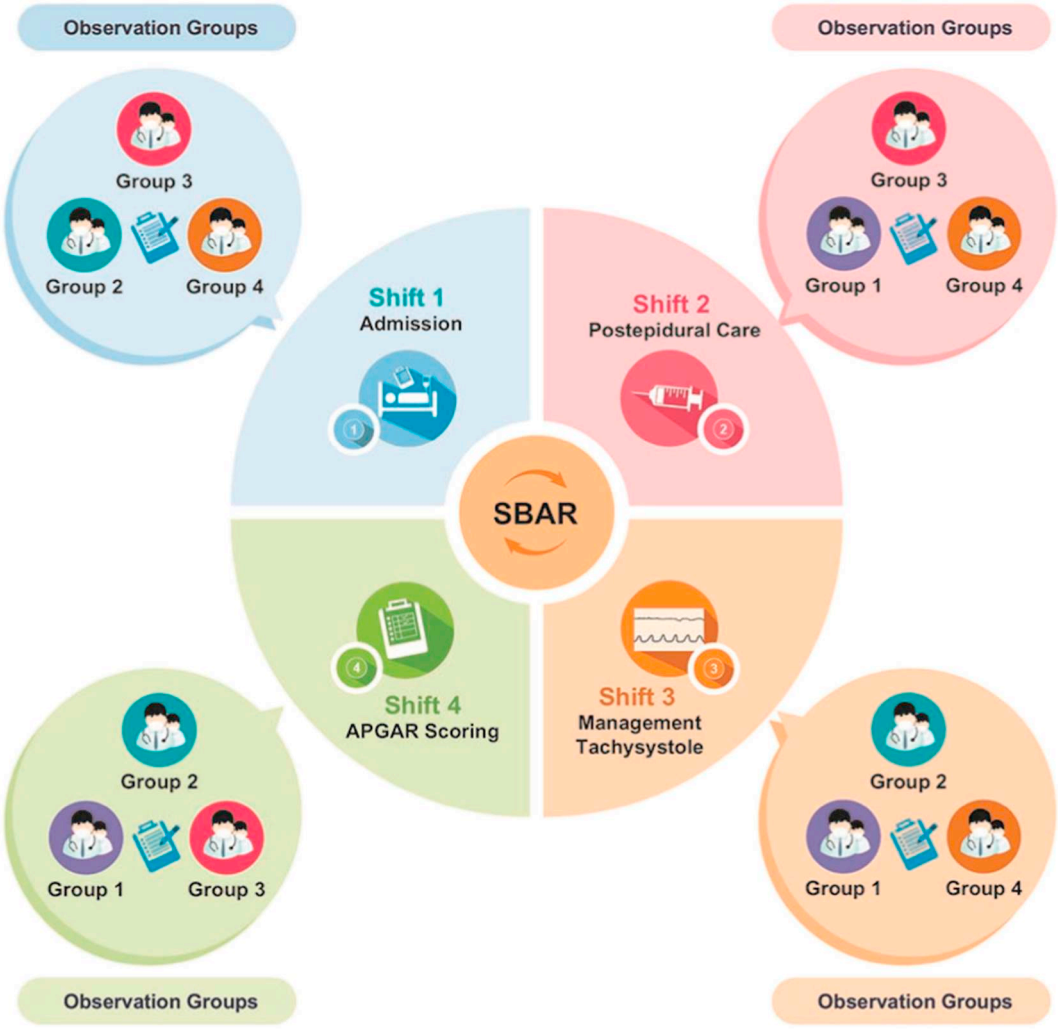

Fig. 1. Communication flow between shifts and contextual problem for the shift.

2. Simulation development

2.1. Learning objective: communication

Demonstration of effective communication is both a course-based objective and the overarching objective linking all shifts for the simulation (See Fig. 1) Students rarely have the opportunity to practice communication skills in clinical and must be allowed to practice patient handoffs in a situated complex environment (Lee et al., 2016). The ability to practice shift to shift handoffs is important because errors in communication can occur when information is being transferred from one provider to the next during handoffs. When information is being passed, key information is often omitted, creating a safety issue because of the possibility of a negative patient outcome (Lyndon and Zlatnik, 2015). A simulated unfolding scenario consisting of four "hospital" shifts was created to ensure that all students have an opportunity to practice shift to shift handoff, nurse to provider communication, and nurse to patient communication.

To facilitate structured communication, students were provided with a situation, background, assessment, and recommendations (SBAR) tool. The tool was developed to improve patient safety by providing a structure for high-quality, specific patient handoff reports. This direct and concise structure is an efficient mechanism for communication, resulting in fewer opportunities for misunderstanding (Haig et al., 2006). For this simulation, students used an obstetric SBAR instrument that was updated to reflect the most recent communication guidelines for fetal heart rate information (Edwards and Woodard, 2008; Lyndon and Zlatnik, 2015). Each scenario shift was designed to demonstrate the relationship between communication and important assessments, interventions, and evaluations.

2.2. Scenario design and progression

The simulation scenario was written by the lead faculty member of the course and reviewed by three clinical content experts for obstetric fidelity, accuracy, and relevance to clinical practice. The Association of Women's Health Obstetrics and Neonatal Nurses (AWHONN) position statements (2018) for communication, oxytocin management, standardization of fetal heart rate monitor interpretation, and postpartum hemorrhage management, guided the development of problem-based learning for the scenario. Students were presented with a real-world problem, worked in teams to intervene appropriately, evaluated the patient response, and communicated their results to their peers (Savery, 2015). Each scenario shift was further developed so students could practice skills identified in the 2014 RN Practice Analysis: Linking the NCLEX-RN® Examination to Practice (NCSBN, 2014). See *Active Observation* excerpt in Box 1 which includes the skills and objectives for the first shift. The simulation scenario shifts were designed to align with recommendations for best practice in simulation design, as defined by the International Nursing Association for Clinical Simulation and Learning (INACSL) (2016). In addition, two Certified Healthcare Simulation Education (CHSE) experts reviewed the scenarios. Finally, the

simulation was delivered using an unfolding scenario approach. The unfolding structure is ideally suited for topics intended to help students gain an appreciation for problems that develop and become increasingly complex over time (Oudshoorn and Sinclair, 2015).

The scenario unfolded in four "hospital" shifts, beginning with admission to the obstetric unit and culminating in APGAR scoring of the newborn. Each shift was presented to students as a real-world problem that required them to make decisions about patient care based on the information available to them and allowed them to apply knowledge gained from the theory course. For example, in the first shift, students were presented with a female patient admitted for augmentation of labor at 36 weeks of gestation after spontaneous rupture of membranes. The patient's history included a complex home situation—the patient was a young, single mother of two who worked full-time and had little to no prenatal care. The case was further complicated by a history of postpartum hemorrhage, a history of cigarette smoking (½ pack per day), and a religious basis for refusal of blood products. Students were expected interview the patient, review the chart, discuss the triage report, and make decisions about pain control (e.g., medication, dosage) and whether to start the oxytocin as ordered, based on interpretation of the fetal heart rate monitor pattern. Rotation through the shifts continued throughout the patient care day with patient status changes revealed through electronic fetal monitor readings, maternal vital signs, and interaction with the health care provider.

A distinguishing feature of this simulation was the opportunity for students to engage in deliberate practice based on clear and direct feedback. Constructive feedback about communication and performance improvement was provided through short micro-debriefing between the shifts. Micro-debriefing (no more than 5 min) occurs within the event and allows participants to reflect on their actions and correct their performance after feedback (Eppich et al., 2015). In addition, students repeated the entire simulation 2 weeks after their initial exposure because repetition of simulation experiences improves knowledge and clinical performance scores (Scherer et al., 2016). During Time 1, students engaged with a high-fidelity mannequin as the patient. Time 2 included an added layer of complexity and realism: a standardized patient.

2.3. Prebrief

Prebrief is an important component of simulation-based learning because it helps to prepare the learner for the simulation day. "Prebriefing is an essential three-phase process of planning, briefing, and facilitating that occurs prior to the SBL [simulation-based learning] experience based upon the purpose/learning objectives of the scenario" (McDermott, 2016, p. 226). A formal prebrief can set success as a goal for the day and better prepare students for a reflective debrief. To prepare for the simulated experience, students were assigned readings, a video, and a presimulation quiz that was completed prior to the start of the experience. In addition, students were provided with instructions about the logistics of the simulation day which included the schedule, orientation to the room, mannequin, monitors, and patient care equipment.

3. Implementation of the simulation day

Students were randomly assigned to four-person groups that rotated through active participation in the scenario shifts. Twelve students awaiting their active shift observed the simulation via video conferencing software. The contextual problem for each shift and the flow of communication between shifts around the SBAR communication tool is represented in Fig. 1. To mitigate observers' disengagement, we developed the active observation tool (Box 1), which asks students to address one or two objectives that they observed during the scenario shift. Student observers recorded the evidence for or against the particular objective on the tool and used the documentation to support discussion in the formal debriefing session at the end of the day. In addition, one clinical faculty was assigned to the observation room to answer questions and to assist in maintaining focus on the scenario observation.

Each group rotated through a simulated hospital shift for 15 to 20 min. Groups were advised as the shift approached the time limit as a means of encouraging the recorder to prepare a shift report in the form of an SBAR. At the end of the shift, the group provided the completed SBAR report to the oncoming group. A short, directed micro-debrief, which supports reflection in action, was conducted by a trained CHSE simulation facilitator who observed the simulation. The micro-debrief also ensured that all data were communicated and served as an opportunity to model proper SBAR technique, if necessary (Eppich et al., 2015).

3.1. Debrief

At the completion of the final shift, all students reconvened in a classroom around a large table. Each shift was debriefed, guided by the shift-specific objectives and skills incorporated. The instructors and facilitators used Promoting Excellence and Reflective Learning in Simulation (PEARLS) as a debriefing strategy (Eppich & Cheng, 2015). The framework supports both the novice and experienced educator in selection of the optimal approach to debrief: set the stage for the debrief, discuss performance gaps, recognize achievements, formulate clear questions, and summarize lessons learned (Eppich et al., 2015). Prior to the debriefing, the facilitator considered the amount of time available, the type of performance gap, and the level of experience/insight of the learner. For example, Time 1 was conducted early in the course, when students have had little clinical experience and have a superficial level of knowledge of the content. Typically, directive feedback was provided during the Time 1 debrief session. For Time 2, the debrief session was a focused, guided discussion that included input from the standardized patients. Because all students completed the active observation form, detailed student perspectives emerged from discussion among students, culminating in a student summary of the rationale of the group. In addition, students participating in Time 2 directly heard the perspective of the standardized patient. This feedback helped the student to understand how their words and actions were perceived, particularly if the students used jargon or did not directly address the patient.

4. Evaluation

The purpose of this study was to evaluate the obstetric simulation in terms of students' ability to communicate important information from shift to shift during a simulated clinical experience after practicing communication skills during complex obstetric simulation and whether they can transfer those skills to similar scenarios.

- Is there a difference in the ONSE self-efficacy scores from pre-simulation, post simulation time 1 to post simulation time 2?
- Is there a change in the clinical accuracy and completion of situation background-assessment-recommendation (SBAR) form scores when presented with a different clinical scenario prior to the simulation experience and at the end of the course?

5. Methods

The study was conducted at a small private baccalaureate granting university in a simulation center accredited by the Society for Simulation in Healthcare (SSH). Institutional Review Board approval was obtained. Data was analyzed using SPSS software. Two sections (A and B) of the course were offered in the spring semester of the junior year. All students enrolled in the course (N = 57) were invited to participate in this pre/post-test design. Although participation in the

Table 1
Obstetric nursing self-efficacy instrument questions©.

How sure are you that you can:
1. Obtain an obstetric history
2. Recognize critical elements of an obstetric history
3. Perform a comprehensive obstetric assessment
4. Identify signs of fetal well-being (or status) on a fetal heart monitor tracing
5. Recognize changes in maternal vital signs that require intervention (hypo/hypertension, fever, tachycardia)
6. Recognize changes in maternal physical assessment that require intervention (edema, reflexes, epigastric distress, decreased urinary output, etc)
7. Implement measures to maximize fetal oxygenation status (positioning, maternal oxygenation, etc)
8. Implement measures to reduce uterine activity (Fluids, Pitocin d/c, etc)
9. Implement measures to stimulate uterine activity
10. Collaborate with other members of the team to stabilize maternal vital signs
11. Collaborate with other members of the team to stabilize fetal well-being
12. Make timely contact (before the occurrence of an adverse event) with the physician or nurse midwife to report critical changes in maternal or fetal status
13. DOCUMENT an obstetric history
14. Thoroughly COMMUNICATE the patient situation (condition or status) during consultation or handoffs
15. Report relevant elements of the patient background during consultation or handoffs
16. Anticipate and/or recommend course of action to physician or nurse midwife when seeking consultation when feeling STRESSED or RUSHED
17. Accurately communicate planned course of action during a consultation or hand-off
18. Accurately communicate plan of care or change in plan of care to patient and family

simulation was required, participation in the study was optional. The final convenience sample was 53 students.

Simulations were delivered at two points during the course, Time 1 was a mannequin-based simulation occurring approximately 2–3 weeks into the course. At Time 2, the simulation was repeated using a standardized patient (live actor). Obstetric nursing self-efficacy scores were measured at three points in time and SBAR scores were measured pre and post simulation.

5.1. Self-efficacy

The Obstetric Nursing Self-Efficacy (ONSE) is an 18-item instrument that measures student belief in their ability to perform specific behaviors: assessment, intervention, and communication, see Table 1. The instrument was found to be reliable for use with nursing students, with split half-reliability scores were calculated as 0.85, 0.96, and 0.92 (Guimond and Simonelli, 2012). The rating scale has a range of five responses of certainty delivered via an a secure online survey generator that offers a password-protected environment in which survey data was collected, students selected options ranging from completely sure to not sure at all (5 = Completely sure to 1 = Not at all sure). The maximum score is 90. The ONSE was administered at three points during the study: as a pre-test before simulation Time 1 and as a post-test after Time 1 and Time 2. For this study, alphas were 0.95, 0.95 and 0.94.

5.2. SBAR proxy measure for transfer of learning

A video vignette of a postpartum hemorrhage protocol drill (Kentucky Hospital Association, 2015) was used to evaluate the students' ability to transfer communication skills learned in the simulation. On the day of the simulation (Time 1) students were presented with the video vignette case study and completed an SBAR form based on the case study. After the completion of the second simulation, students were presented with the same video vignette case study and completed an SBAR form again. The completed forms were scored by expert clinical faculty for accuracy and completeness of the SBAR forms at the end of the course, so faculty were blinded to when the SBARs were written by the student.

Table 2
Comparison of pretest and posttest clinical accuracy and completion SBAR scores.

SBAR form scores before and after simulation						
		Pre-test			Post-test	
Semester	N	M	SD	T	M	SD
Semester 1	28	7.68	1.963	−6.821**	10.392	1.663
Semester 2	25	5.72	1.429	−4.339**	7.60	2.345
Combined	53	6.75	1.979	−7.839**	9.07	2.44

** Significant, p = .000.

6. Results

6.1. Obstetric nursing self-efficacy scores

A one-way ANOVA was performed to compare the means for Obstetric Nursing Self Efficacy scores before the simulation and after each simulation experiences (n = 46). Combined scores for Section A and Section B were significantly different for Pre-simulation (M = 40.78), Time 1 (M = 61.0) and Time 2 (M = 69.27), F (2, 159), =112.12, p = .00. For Section A only, the means for the three times were significantly different (M = 34.97, 58.83, 68.71 respectively). F (2, 84) = 89, p = .00. For Section B only, the means for the three times were significantly different (M = 47.52, 63.52, 70.81 respectively). F (2, 72) = 41.38, p = .00.

6.2. SBAR pretest and posttest scores

Paired samples *t*-tests were calculated comparing the mean pre and posttest clinical accuracy and completion SBAR scores (proxy measure for transfer of communication skills) (n = 53). As shown in Table 2, a significant difference was found (t (52) = −7.839, p = .000). The mean proxy measure pretest score for the combined sections (M = 6.75, SD = 1.979) was significantly different from the mean scores for the posttest (M = 9.07, SD = 2.44).

7. Discussion

There is evidence that improved confidence gained through repetition in simulation develops critical thinking skills, these skills are especially helpful for clinical areas like obstetrics where hands on clinical practice may be limited (Cummings and Connelly, 2016). The ONSE tool is specific to obstetric nursing skills and measures student perception of their belief that they can fully assess the patient, intervene as necessary, and subsequently communicate changes to colleagues, providers, and patients. In our study, students were given the opportunity to practice both specific obstetric and clinical communication skills through patient handoffs in a situated complex environment. Students learned from directive feedback and returned to practice the same skills with a standardized patient. This type of practice may prevent errors that occur during the handoff of patient information between shifts or in communication with other health care providers (Lee et al., 2016; Lyndon and Zlatnik, 2015). Few studies have demonstrated transfer of skills learned in simulation to the clinical environment; the improvement in SBAR scores was a promising indication that students were able to transfer the skills learned in simulation as evidenced by improved ability to organize and communicate information during a handoff or provider report.

Self-efficacy testing is insufficient on its own as a simulation outcome; students often overestimate their abilities when rating their own self-efficacy because they have only one experience with feedback and rarely practice a given skill again (Kardong-Edgren, 2013). However, structured observed simulations are beneficial in that they can correct

over confident behavior and improve or validate higher self-efficacy beliefs (Bandura, 1980). In our study, we provided an opportunity to practice SBAR communication multiple times during the simulation scenario day and to repeat the entire simulation with a standardized patient. We then tested both self-efficacy and communication skills using a different contextual problem (postpartum hemorrhage). Our students improved in both self-efficacy and in communication skills scores after repeating the simulation with standardized patients. Our results were consistent with findings from a meta-analysis by Oh et al. (2015) which found that the use of standardized patients improved student confidence and communication skills. Yu and Kang (2017) conducted a role-play simulation using SBAR and also found that students were more confident and had demonstrated increased clarity scores when communicating with SBAR after practicing this skill. Other researchers have had similar results, practicing SBAR communication provided students and graduate nurses with an organized sequence for giving a handoff report and prepared them for transition to clinical practice (Kim et al., 2018; Thomas et al., 2009). Kostoff et al. (2016) concluded that implementation of an SBAR communication tool improved student self-perception of interprofessional communication and handoff practice. Based on our evaluation and the findings of others, we believe that the results from this unfolding obstetric simulation provide evidence that our students have demonstrated effective communication and may be able to transfer that learning to a different clinical situation.

7.1. Limitations

Although this single site study was conducted with a convenience sample of nursing students to address a gap in clinical opportunity for communication, these practices may be helpful to other clinical faculty. Additional limitations included problems with the room's audio-visual equipment, which made the dialogue difficult to hear throughout the room, may have contributed to lower posttest SBAR scores for section B. The mean scores for the ONSE were higher for section B so higher scores for the post-test SBAR were expected. In addition, the survey was delivered as a link via email and although students were given time to complete the survey in class, some students (n = 4) did not complete the final survey.

8. Conclusion

Simulation provides a method for focused objective based learning where students can practice in a safe environment. Our students practiced the entire simulation with a mannequin and then again with a standardized patient. Students demonstrated improved ratings of obstetric nursing self-efficacy and improved their scores for SBAR completion and accuracy after participating in micro-debriefing between each shift and a traditional debriefing period at the end of the final simulation. Although these results cannot be generalized, repeated simulation experiences with deliberate practice were helpful for our students. This article outlines the development, implementation, and evaluation of our unfolding obstetric simulation which may be useful information for other educators interested objective driven scenarios for specialty courses such as obstetrics.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.nedt.2019.05.003.

References

Alexander, M., Durham, C.F., Hooper, J.I., Jeffries, P.R., Goldman, N., Kardong-Edgren, S., Tillman, C., 2015. NCSBN simulation guidelines for prelicensure nursing programs. J. Nurs. Regul. 6 (3), 39–42. https://doi.org/10.1016/S2155-8256(15)30783-3.

Association of Women's Health Obstetric and Neonatal Nurses. (2018). AWHONN: Position statements. Retrieved from: https://www.awhonn.org/page/PositionStatements.

Bandura, A., 1980. Gauging the relationship between self-efficacy judgment and action. Cogn. Ther. Res. 4 (2), 263–268. https://doi.org/10.1007/BF01173659.

Cummings, C.L., Connelly, L.K., 2016. Can nursing students' confidence levels increase with repeated simulation activities? Nurse Educ. Today 36, 419–421. https://doi.org/10.1016/j.nedt.2015.11.004.

Edwards, C., Woodard, E.K., 2008. SBAR for maternal transports: going the extra mile. Nurs. Womens Health 12, 515–520. https://doi.org/10.1111/j.1751-486X.2008.00385.x.

Eppich, W., Cheng, A., 2015. Promoting excellence and reflective learning in simulation (PEARLS): development and rationale for a blended approach to health care simulation debriefing. Simul. Healthc. 10, 106–115. https://doi.org/10.1097/SIH.0000000000000072.

Eppich, W.J., Hunt, E.A., Duval-Arnould, J.M., Siddall, V.J., Cheng, A., 2015. Structuring feedback and debriefing to achieve mastery learning goals. Acad. Med. 90, 1501–1508. https://doi.org/10.1097/ACM.0000000000000934.

Guimond, M. E., & Simonelli, M. C. (2012). Development of the obstetric nursing self-efficacy scale instrument. Clin. Simul. Nurs., 8(6), e227-e232. https://doi.org/10.1016/j.ecns.2011.01.007.

Haig, K.M., Sutton, S., Whittington, J., 2006. SBAR: a shared mental model for improving communication between clinicians. Jt. Comm. J. Qual. Patient Saf. 32, 167–175. https://doi.org/10.1016/S1553-7250(06)32022-3.

International Nursing Association for Clinical Simulation and Learning (INACSL), 2016. INACSL standards of best practice: simulation design. Clin. Simul. Nurs. 12 (Suppl), S5–S12. https://doi.org/10.1016/j.ecns.2016.09.005.

Kardong-Edgren, S., 2013. Bandura's self-efficacy theory…something is missing. Clin. Simul. Nurs. 9 (9), e327–e328. https://doi.org/10.1016/j.ecns.2013.07.001.

Kentucky Hospital Association, 2015, July 29. OB hemorrhage drill at Norton Hospital. [Video file]. Retrieved from. https://www.youtube.com/watch?v=lomMGVL6uo.

Kim, J.H., Hur, M.H., Kim, H.Y., 2018. The efficacy of simulation-based and peer-learning handover training for new graduate nurses. Nurse Educ. Today 69, 14–19. https://doi.org/10.1016/j.nedt.2018.06.023.

Kostoff, M., Burkhardt, C., Winter, A., Shrader, S., 2016. An interprofessional simulation using the SBAR communication tool. Am. J. Pharm. Educ. 80 (9), 157.

Lee, J., Mast, M., Humbert, J., Bagnardi, M., Richards, S., 2016. Teaching handoff communication to nursing students: a teaching intervention and lessons learned. Nurse Educ. 41 (4), 189–193. https://doi.org/10.1097/NNE.0000000000000249.

Lyndon, A., Zlatnik, M.G., 2015. Communication of fetal heart monitoring information. In: Lyndon, A., Ali, L.U. (Eds.), Fetal Heart Monitoring: Principles and Practices, 5th ed. Association of Women's Health, Obstetric and Neonatal Nurses, Washington DC.

McDermott, D.S., 2016. The prebriefing concept: a Delphi study of CHSE experts. Clin. Simul. Nurs. 12, 219–227. https://doi.org/10.1016/j.ecns.2016.02.001.

National Council of State Boards of Nursing, 2014. RN Practice Analysis: Linking the NCLEX-RN® Examination to Practice: US and Canada. Retrieved from. https://www.ncsbn.org/7109.htm.

Oh, P.J., Jeon, K.D., Koh, M.S., 2015. The effects of simulation-based learning using standardized patients in nursing students: a meta-analysis. Nurse Educ. Today 35 (5), e6–e15. https://doi.org/10.1016/j.nedt.2015.01.019.

Oudshoorn, A., Sinclair, B., 2015. Using unfolding simulations to teach mental health concepts in undergraduate nursing education. Clin. Simul. Nurs. 11, 396–401. https://doi.org/10.1016/j.ecns.2015.05.011.

Savery, J. R. (2015). Overview of problem-based learning: Definitions and distinctions. In A. E. Walker, H. Leary, C. E. Hmelo-Silver, & P. A. Ertmer (Eds.), Essential readings in problem-based learning (pp. 5–16). West Lafayette, IN: Purdue University Press.

Scherer, Y.K., Foltz-Ramos, K., Fabry, D., Chao, Y.-Y., 2016. Evaluating simulation methodologies to determine best strategies to maximize student learning. J. Prof. Nurs. 32, 349–357. https://doi.org/10.1016/j.profnurs.2016.01.003.

Thomas, C.M., Bertram, E., Johnson, D., 2009. The SBAR communication technique: teaching nursing students professional communication skills. Nurse Educ. 34 (4), 176–180. https://doi.org/10.1097/NNE.0b013e3181aaba54.

Yu, M., Kang, K.J., 2017. Effectiveness of a role-play simulation program involving the sbar technique: a quasi-experimental study. Nurse Educ. Today 53, 41–47. https://doi.org/10.1016/j.nedt.2017.04.002.