1-2016

Controlled Postpartum-Newborn Simulation With Objective Evaluation Exchanged for Clinical Learning

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Postpartum and Newborn Assessment Study:

Can Controlled Laboratory Simulation be Exchanged for Learning in Clinical?

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Key words: simulation, critical thinking, clinical learning, undergraduate nursing students
Study funded in part by Terry A. Misener Innovative Research Grant

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Background: Simulation is a widely used teaching strategy. A paucity of evidence exist about evaluating acquisition of formal knowledge gained from simulation participation. This study compared practicing simulated assessments in the CSLC to practice in the clinical setting plus simulation, high/low level of student performance, and evaluated performance. Study variables were assessment, intervention, and critical thinking.

Methods: Non-equivalent comparison group, post-test only quasi-experimental. 80 undergraduate nursing students individually demonstrated assessments while trained observer scored performance. Students provided written response to 7 questions before debriefing. *T*-tests, ANOVA, and MANOVA compared scores between the two groups. An outlier analysis operationalized high /low student performance. 92 points on both simulations equated to competent performance; lower scores required remediation.

Results: No significant differences between the two groups on three study variables. A significant correlation found between postpartum and newborn psychomotor skills in high and low performing students. Average simulation performance score was 83 points.

Conclusion: Well-designed simulation can be exchanged for learning in clinical, identify underperforming students, and evaluate performance quality.

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Educators are challenged to find ways to assist undergraduate nursing students to assimilate large quantities of specialized knowledge and develop technical skills and critical thinking for safe, high quality care (Institute of Medicine [IOM], 2011). In nursing, learning occurs in a variety of settings including the classroom, clinical workplace, and Clinical Simulation Learning Centers (CSLC). Nursing education values the 'hands on' approach to provide students opportunity to apply theoretical learning and hone psychomotor skills in traditional clinical settings (Angel et al., 2000; National Council of State Boards of Nursing [NCSBN], 2005; American Organization of Nurse Executives, 2004). Simulation, which often takes place in CSLSs, has been widely adopted for use in nursing education (Kardong-Edgren et al., 2012). Jeffiries (2005, p. 97) defined simulations as "activities that mimic the reality" which can be computer based, encompass role playing, or use interactive videos and mannequins.

The literature is replete with evidence that simulation enhances learning and improves client health outcomes (Cant, & Cooper, 2010; Cook et al., 2013; Lapkin et al., 2010; Meyer et al., 2011). The advent of high fidelity manikins possessing digital recording capabilities provides opportunity to implement realistic and real time simulation experiences in a safe environment (Nehring, 2008). A multitude of nurse programs use simulation to replace a portion of time students spend in traditional clinical settings (Hayden, 2010). This shift toward conducting more learning experiences in CSLCs allows for controlled experiential learning to occur as well as ability to evaluate the quality of and numerically score students' performance and learning. Use of controlled experiential learning is a crucial element of a maternal-newborn nursing course given the unpredictable nature of learning opportunities available to students

during a traditional obstetrical clinical rotation (Gantt, 2010). Several reliable instruments to evaluate simulation performance including technical skills, communication, clinical judgement, and professional behaviors are available (Adamson & Kardong-Edgren, 2012; Clark, 2006; Lasater, 2007; Mikasa, et al., 2013). Several of these instruments are designed so that a numeric score, which correlates to the quality of student performance (above or below expectations), can be calculated.

Simulation, as a teaching, learning, and evaluation strategy, requires careful study to determine if learning in CSLCs results in similar outcomes as traditional clinical. This study's purpose was threefold: to discover whether there are differences between undergraduate nursing students who only participate in postpartum and newborn simulation(s) and students who experience a traditional maternal-newborn clinical plus this same simulation; discover if differences exist between high and low performing students and; to evaluate the quality of students' performance and critical thinking.

Theoretical Framework

We used the simulation based on language learning, (SIMBaLL Model; Arwood & Kaakinen, 2009) a theoretical framework for designing, assessing, and facilitating learning through simulation. SIMBaLL considers language, cognitive, and social levels of the simulation in relationship to the neurobiological acquisition process of learning to think. Within this model, simulation expectations are aligned with thinking levels. Using what students say and the language they use provides nurse educators a window into the student's thinking. Otherwise, nurse educators who only use observation are making potentially false assumptions about student's knowledge. Box 1 shows the SIMBall Applications.

Literature Review

The NCSBN (2010) conducted a national simulation use survey in U.S. undergraduate nursing programs. Findings from 1060 undergraduate programs revealed 46% of obstetrical nursing courses incorporated high fidelity simulations, 38% used medium fidelity simulations, and 30% utilized simulations focused on task specific situations (Hayden, 2010). Nurse educators have primarily used simulation as a teaching strategy that places greater emphasis on skill acquisition and student self-efficacy than on student acquisition of higher-order thinking or problem-solving (Kaakinen & Arwood, 2009). Others described a boot camp approach to simulation to teach skills students need prior to placement in authentic clinical settings (Fountain & Spunt, 2006; Gardner & Raemer, 2008; Raines, 2010; Wilford & Doyle, 2006). Few nursing programs used simulation to design learning experiences that required students to synthesize skills into a comprehensive, whole practice situation (Jefferies et al., 2009).

Patient outcomes and self-confidence in maternity clinical settings improve when nurses, physicians, and students participate in postpartum-newborn simulation. Several researchers reported fewer medication errors, improved neonatal outcomes, and success placing intravenous catheters after nurses participated in simulated learning experiences (Grobman et al., 2011; Ford et al., 2010; Wilfong et al., 2011). Neonatal outcomes like increased 5 minute APGAR scores, and incidence of hypoxic ischemic encephalopathy improved as did management of shoulder dystocia and cord prolapse when experienced physicians and nurses participated in simulation-based training in obstetrical emergencies (Smith et al., 2013). There was a significant difference between a group of novice nurses and residents who had either didactic teaching or a simulation experience with the simulation group performing better in cases of shoulder dystocia and eclampsia management (Daniels et al., 2010). Nursing students consistently describe increasing

self-efficacy and confidence as an outcome of participation in postpartum-newborn simulation experiences (Bantz et al, 2007; Cass et al., 2011; Chung et al., 2011; Fountain & Spunt, 2006; Kim & Shin, 2013; Lee & Kim, 2011; Robertson, 2006; Schoening et al., 2006; Simonelli & Gennaro, 2012).

A plethora of research about use of simulation in nursing education exists, however few have evaluated the impact of simulation on students' clinical performance and knowledge acquisition. Hayden et al. (2014) demonstrated learning that occurs in simulation transfers to clinical practice. Similarly, Radhakrishnan et al. (2007) reported a positive relationship between the skill of assessing and monitoring basic vital signs with performance of these skills in clinical. Students' communication skills, knowledge acquisition, clinical competence and performance improved in clinical through participation in simulation (Simonelli, & Paskausky, 2012; Young, et al, 2012). Some researchers evaluated students' performance of basic assessment and technical skills, interventions, communication, clinical judgment, and conceptual understanding during simulated scenarios (Frontiero & Glynn, 2012; Lasater, 2007; Radhakrishnan et al., 2007). Gantt (2010) trialed a way to quantify data recorded on the Clark Simulation Evaluation rubric along with student documentation of patient care based on obstetrical and medical-surgical simulation performance. However, in the U.S. grading of simulation performance is uncommon. When simulation performance is graded, faculty tend to favor a pass/no pass rating versus assigning a score (Hayden, 2010). Gantt (2010) reported using a similar strategy to avoid student anxiety about grades.

A trend exists in nursing education toward use simulation to replace a portion of traditional clinical experiences (Hayden, 2010; Hayden et al., 2014). Therefore, there is need to determine whether learning, critical thinking, interventions, and outcomes relative to client care

in both of these settings are the same. Additionally, it is important that faculty be able to identify students' simulation performance or thinking that falls below passing as well as objectively evaluate and score these same behaviors. We investigated whether student performance and learning in a simulated setting can replicate student learning and experience in a traditional clinical setting. Our research questions are: 1) is there a difference between the two groups in psychomotor skills, ability to determine appropriate intervention, and think critically in the maternal-newborn setting?; 2) do differences exist between high and low performing students psychomotor skills, ability to determine appropriate intervention, and think critically in the maternal-newborn setting?; 3) can the quality of students' psychomotor skills, ability to determine appropriate intervention, and think critically the maternal-newborn setting be effectively evaluated?

Methods

Following Institutional Review Board approval, this study was carried out at a private university located in the Pacific Northwest. Participants were recruited as a convenience sample from all senior undergraduate nursing students enrolled in a maternal-child course. Students, who were in the third or fourth semester of a five semester nursing program, self-selected a pediatric or maternal-newborn traditional clinical experience. All students completed the postpartum and newborn simulations. Students received a verbal explanation about this study by a faculty and study team member not involved with didactic or clinical teaching, the simulation, or assigning course grades and signed a written consent form. A roster of participant names and corresponding unique identifying code numbers was generated and kept in locked in a filing cabinet with data collected.

Simulation Intervention

The postpartum and newborn simulation intervention was developed by a faculty team possessing exptertise in maternal newborn nursing, nursing education, NLLT, and use of the SIMBall Model. This simulation incorporated best practices from three bodies of knowledge: The Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) Standards for Professional Nursing Practice (2009); The Essentials of Baccaluareate Nursing Education for Nursing Practice (2008) and; policies and standards of nursing practice for maternal-newborn care used by local health systems partners. The simulation design captured students' competency in psychomotor skills and appropriate interventions through performance of postpartum and newborn assessments; critical thinking was demonstrated by written responses to reflection questions.

Students self-selecting the traditional pediatric clinical participated only in the postpartum and newborn simulations and received no further maternal or newborn instruction or experience. Students self-selecting the maternal-newborn clinical completed 90 clinical hours in a traditional clinical setting as well as participated in the same simulation. Toward the end of the pediatric or maternal-newborn clinical rotation all students completed the same timed postpartum and newborn simulation scenarios, which were audio and video recorded. Study participants received no compensation and course grades were not affected because faculy assigning grades was unaware of which students participated. See Box 2 for simulation interventions and Table 1 for postpartum and newborn simulation procedures.

Study Design

A non-equivalent comparison group, post-test only quasi-experimental design was used to compare two groups of students: those receiving only the postpartum and newborn simulations

vs. those receiving both 90 hours of traditional maternal-newborn clinical instruction plus the simulations. This study's variables of interest were nursing assessment, intervention, and critical thinking in conducting postpartum and newborn assessments.

Data Collection and Statistical Analysis

Four data collection tools were developed by the faculty team: the postpartum assessment and newborn assessment check-off form(s); the Situation Background, Assessment, Recommendation (SBAR) report form; and seven written reflection questions. Content validity of each data collection tool was established through review by a panel of expert maternal-newborn nurses. All tools were piloted, tested, and revised prior to use in this study. Data collection tools were tested for inter-rater reliability via intra-class correlation (ICC) between individual raters and further assessed with one researcher reviewing 15 (18%) of randomly-selected video and audio recordings of student assessments against postpartum-newborn check-off forms. Inter-rater reliability was evaluated using a two-way mixed, consistency, average-measures ICC (Hallgren, 2012). The degree to which coders provided consistency in their ratings of randomly-selected video recordings was in the excellent range (ICC = .91) indicating coders had a high degree of agreement between ratings. Points were assigned to all items listed on the two check-off forms. Table 2 details simulation scoring procedures. Tables 3 provides examples of post-simulation clinical thinking reflection questions.

Statistical tests used to analyze data include: descriptive and frequency statistics; *t*-tests to evaluate differences between the groups in assessment skills, determination of interventions, and critical thinking; *t*-test and correlations to determine differences between high-performing and low performing students in assessment skills, determination of interventions, and critical

thinking; two-way analysis of variance (ANOVA) to evaluate interaction between the clinical groups, level of student semester (3^{rd} vs. 4^{th} semester students) and; a multivariate analysis of variance (MANOVA) to assess differences between psychomotor and critical thinking to determine the effectiveness of simulation to evaluate students' levels of performance.

Results

Eighty-five students were enrolled in the maternal-child course, and 82 (96%) voluntarily participated in this study. Of the 82 original participants, two withdrew for personal reasons leaving a final sample size of 80. Participants were primarily female (86.3%) with a mean age of 24.01($\pm$ 6.06) years and in the fourth semester of a five semester nursing program. Forty-one (51.2%) participants completed a traditional pediatric clinical and 39 (48.4%) a traditional maternal-newborn clinical. A-priori power analysis based on three variables with a medium effect size, alpha level of .05, and power of .8 indicated 76 students were required in each of the two groups for a total of 152 student participants. The final calculated total effect size between the two groups (N = 80) for the overall score (postpartum final score plus newborn final score) was .024, indicating very small differences between the two groups on their overall scores. Table 4 details descriptive statistics.

Research Question One

We found no significant differences between the simulation plus maternal-newborn clinical group and the simulation-only group in the study variables, indicating both groups demonstrated equal levels of skill and ability to appropriately intervene. *T*-test results revealed no significant difference between these groups on assessment skills as measured for postpartum assessment ($t_{(79)} = -.516$, $p = .609$) and newborn assessment ($t_{(79)} = -.483$, $p = .632$) checklists.

Ability to determine appropriate interventions and think critically, evaluated by postpartum and newborn written scores, were equivalent in both groups ($t_{(79)}$ = -.838, p = .405 and $t_{(79)}$ = -.481, p = .632 respectively). No significant differences were noted in overall total scores (assessment plus written scores) for postpartum total score ($t_{(79)}$ = -.361, p = .719) or newborn total score ($t_{(79)}$ = .087, p = .931).

A 2-way ANOVA was performed to determine if a combined effect existed between students in the simulation plus maternal-newborn clinical group or the simulation-only group and their semester in the nursing program. No interaction was noted between third and fourth semester students and the type of clinical experience on their psychomotor performance or critical thinking ($F_{(3,76)}$ = .334; p = .801). MANOVA was used to simultaneously compare the two clinical group's psychomotor performance and critical thinking. Findings from this analysis were not significant (F = .580; p = .628), indicating no relationship between the two clinical groups and their final postpartum and newborn simulation scores.

Research Question Two

Study findings support the research teams assumption that differences exist between high and low performing student's ability to assesses, appropriately intervene and think critically was supported. An outlier analysis was designed which operationalized high performing students as one standard deviation above the total mean simulation score (83 points) and low performing students one standard deviation below this same mean score. Total postpartum and newborn scores were calculated by adding points achieved on both of these assessments and written reflection questions. A significant correlation was found between postpartum psychomotor skills and critical thinking (r = .66; p = .001) and newborn psychomotor skills and critical thinking (r =

.63; $p = .001$) in both high performing and low performing students. Further analysis to compare differences between psychomotor skills and critical thinking for high and low performing students found no significant differences ($t_{(78)} = -.492$, $p = .624$; $t_{(78)} = -.554$, $p = .581$ respectively). In other words, high performing students performed well on all three variables and low performing students performed poorly on these same variables.

Research Question Three:

Study findings indicate simulation can effectively evaluate quality of student performance. High-quality student performance was determined by the research team a priori. The research team assumed high quality work is required for the student to deliver 'safe nursing care'. Therefore, level of competence on the postpartum and newborn simulations was established as 92 points or higher, which designated the lowest score equating to 'A' work on a traditional A through F grading scale at the university where this study was conducted.

Audio and video recordings were used along with faculty observation on an as need basis to determine if the student completed items on the postpartum and newborn check off forms. This practice was aimed at ensuring the student received all the points earned for their simulation performance. Despite this, evaluation of the total overall score (sum of the postpartum final score and newborn final score) revealed students average simulation performance score to be 83 points. Roughly one-quarter of students demonstrated competence with postpartum assessment, intervention, and critical thinking and one-third of students demonstrated newborn competence on these same variables.

Discussion

An important study finding is that no difference exists between students who only practiced postpartum and newborn assessments in the CLSC and students who had a traditional clinical plus simulation in terms of ability to assess, intervene, or think critically. Therefore, the concept that practice in the field is a better learning environment because it is 'hands on' was not supported in this study. Similarly, Hayden et al. (2014) reported no significant differences among pre-licensure students completing all clinical hours in a traditional clinical setting and those substituting up to 50% of clinical time with simulation in terms of comprehensive nursing knowledge, clinical performance, and NCLEX-RN pass rates. Radhakrishnan et al. (2007) found no significant differences between students participating in clinical practice without additional practice simulations and those participating in clinical practice plus practice simulations in terms of delegation, communication, and focused assessment.

Given the lack of significant difference in thinking and doing between 'work in the field' and simulation, as noted in this study, it seems logical for nurse educators to use simulation for more than just supporting student' self-efficacy and psychomotor education. This notable study finding is relevant given current challenges in providing high-quality clinical learning experiences in a milieu fraught with a shortage of nursing faculty, increasing competition for limited clinical sites, restricted numbers of students allowed on a nursing unit, and limiting student clinical activities to observation versus practice (Hayden et al., 2014). In addition, placement in clinical does not guarantee productive learning takes place especially if students spend a majority of clinical hours performing routine care tasks and clinical faculty spend much time supervising students' performances of hands-on skills versus fostering clinical reasoning (IOM, 2011).

This study's second finding that low performing students demonstrated below average ability to assess, intervene, and critically think demonstrates usefulness of simulation to identify 'underperforming' students prior to placement in the clinical and allows nurse educators to design and implement remediation strategies tailored for individual students based on their specific learning needs. In this study a striking area of student underperformance was related to following four steps of newborn and mother identification (22% failed to identify mother; 16% failed to verify newborn's birthdate; 15% did not verify placement of two baby bands and; 7% did not verify unique identification number on baby's band matched number on mother's band). Frontiero & Glynn (2012) similarly reported inconsistent patient identification when students cared for more than one patient in a simulated scenario. In response to this noted area of underperformance and subsequent implications related to patient safety, faculty teaching the didactic maternal child course incorporated an authentic case scenario about a newborn being discharged home with the wrong parents. This strategy assisted students recognize how a series of events, in which nurses and other health care providers did not follow policies and procedures for newborn identification during the hospital stay or upon discharge, resulted in this outcome. A faculty guided discussion ensued to help students identify: points of care where unit policy related to newborn identification were not followed; reasons why the policy may not be adhered to; personal, emotional, and financial costs associated with improper identification; and, actions nurses should take to mitigate a repeat of this scenario. Additionally, during a required preconference maternal-newborn simulation students rotated through a faculty guided skills station which required hands-on demonstration of the four elements of postpartum-newborn identification. As a result, students' performance on this aspect of the newborn simulation was notably improved.

Evaluation of the quality of individual student performance and subsequent correlation to letter grades on a traditional grading scale was an important component of this study considering faculty tend to be cautious about grading simulation (Hayden, 2010). Additionally, many researchers continue to use student self-report and end of simulation evaluation to determine quality and effectiveness of learning in simulated scenarios (Darcy et al., 2013; Hayden, 2010; Kardong-Edgren et al., 2012). A surprising study finding, based on objective evaluation by experienced maternal-newborn faculty, was the low number of students demonstrating competence at an 'A' level on both simulations. This, along with the finding that a relationship exists between the 'average' student's psychomotor and written scores, puts to rest the assumption that those possessing excellent psychomotor skills also understand the rationale or critical thinking behind skill performance.

In this study, findings indicate students may be able to perform a psychomotor skill without understanding the rationale behind that choice. In turn, this point to the need for instituting a hierarchal scaffolding of simulation experiences in a manner that allows student participation from simple to more complex patient scenarios arranged across topics throughout the curriculum. Use of this curricular change would ensure all student nurses had controlled simulated learning opportunities for improved higher order thinking about complex patient needs such as prioritization of patient care. Another benefit of scaffolding curriculum would be to assess students' abilities to deliver quality patient care. Simulation could be interspersed with classroom knowledge to scaffold theory and clinical practice. The bottom-line is that thinking does not necessarily involve doing. But doing, as in simulation, can be arranged to provide opportunities for higher order thinking and problem solving leading to safer nursing practice (Arwood & Kaakinen, 2009).

Limitations

Study limitations include convenience sampling, insufficient sample size and number of students in each comparison group. A-priori power analysis indicated 152 participants was required (76 per group). Data analysis revealed a small effect size ranging from .02 to .05 for postpartum, newborn, and total scores. Power analysis post-data-collection revealed a power of .08, indicating such a small effect size would be able to detect a difference between the comparison groups if one actually existed. To attain power of .80, an untenable sample size of nearly 1,000 students would be required. Results do support statistical significance with this study's smaller sample size. Design and implementation of random, inconsistent remediation strategies is another limitation.

Conclusions

In undergraduate nursing education, well designed simulation can be exchanged for learning that occurs in traditional clinical settings as well as result in positive learning outcomes. Design and use of simulations grounded in learning theory and an assessment model, like Arwood & Kaakinen's (2009) SIMBaLL Model can result in similar and at times better learning outcomes than students might achieve in traditional clinical. Use of evaluation rubrics to score specific actions is another advantage of simulation because they allow objective evaluation and ability to determine the student's level of competency. The practice of audio and video recording simulation supports reflective practice and student learning because it allows for immediate feedback and ability to debrief. Simulation is also beneficial in identifying underperforming students; developing individualized remediation plans; increasing confidence students can provide safe, appropriate nursing care in clinical and; identifying gaps in student learning or understanding that directs course or curriculum refinement. Use of simulation also assists

educators overcome barriers associated with tradition clinical like unpredictable or tenuous learning experiences. More research is needed related to faculty attitudes and practice related to grading simulation beyond a pass/no pass rating scale.

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Box 1. *SIMBaLL Applications*

Simulation Task	Cognitive Level of Simulation	Student Language Used	Comments
Freezes; unable to engage in task; unable to respond or imitate a task.	Sensorimotor	No language, Emotionally unable to explain or talk	• Requires no conceptual learning by the student.
Imitates modeling of psychomotor skills; follows the procedures as given; sequential.	Preoperational	'Me', 'My patient', 'I don't know' I or Me, First, I do X, then I do, Y, then….;	• Concepts are about self or about personal needs as a nurse educator to take care of patient
Uses given rules to do a procedure; considers one cluster of issues per patient; or one set of rules per patient; or one patient with several needs.	Concrete	'I am to put up the head of the bed when patients have difficulty breathing.' I give X medicine when….. I do what the protocol says	• Students can explain why he/she is caring for patient needs using rule-like language.
Understands multiple concepts related to a single patient (patient can be treated as a whole, not just as a diabetic patient, postpartum or newborn patient, etc.); Understands multiple medical concepts as a whole, rather than as parts.	Formal	Patient shows X, so that means there are two options; Y is the better option because….. Patient B needs medicine X because it is time for him to have it; I will give him his medicine while Patient C visits with family, then I will see if Patient C is ready for….	• Students can take patient's perspective & appropriately deal with simultaneous, complex task through analysis & synthesis of what others need. • Student can multitask, perform nursing assessments, ask patient focused assessment questions, & direct another nurse to do something related to the patient.

Box 2. *Simulation Interventions*

Faculty Guide	**Student Self-selected**
• 24 hours of face to face maternal-newborn didactic instruction. • 1 hour reviewing mechanics of Electonic Health Rcord (EHR). • 1 hour veiwing instructional DVD depicting expert nurse performing postpartum & newborn asessments followed by guided discussion. • 3 hours to practice postpartum & newborn assessments & administering newborn vaccine in CLSC under expert faculty guidance.	• Unlimited opporutunity to view instructional DVD depicting expert nurse performing postpartum & newborn asessments. • Unlimited opportuinity to independently practice postpartum & newborn assessments in CLSC. • Obtain tutoring from expert faculty during specified postpartum & newborn asessement practice session(s) in CLSC. • Review and utilize the same postpartum & newborn simulation check off form(s) faculty used to evaulate simulation performance to guide practice sessions.

Table 1. *Postpartum Newborn Simulation Procedures*

Student	Expert Faculty Observer
• Pediatric clinical students scheduled date to complete simulation midway through 90-hour clinical rotation. • Maternal-newborn clinical students scheduled date to complete simulation at end of 90 hour clinical rotation.	
• Arrived at CLSC 15 minutes before scheduled simulation time. • Arrived appropriately dressed & prepared. •	• Greeted & identified student.
• Listened to recorded shift report in quiet room as many times as needed. • Made written notes.	• Oreinted student to the simulation procedure. • Demonstrated use of tape recorder. • Explained parameters of listening to report & note taking.
• Knocked on door before entering patient room. • Washed hands. • Introduced self and purpose. • Updated information on 'white board'	• Voice of postpartum woman & newborn following scripted responses. • Noted start time simulation & initiated audio/video recording. • Completed postpartum & newborn check off forms as students completed assessment and interventions listed.

• Conduct postpartum & newborn assessments in 45 minutes or less.	• Completed postpartum & newborn check off forms as students completed assessment and interventions listed.
• Recognized & responded to abnormal postpartum assessment finding. • Forumlated & gave SBAR[a] report to physician.	• Role played physician. • Provided scripted responses to the SBAR report. • Scored SBAR report.
• Adminstered Hepatitis B vaccine to newborn.	• Voice of newborn (crying)
• Provided postpartum and newborn education.	• Completed postpartum & newborn check off forms as students completed teaching points listed.
• Maintained client safety. • Maintained nurse safety.	
• Responded, in writing, to 7 reflection questions in quiet location. • Provided with nursing diagnosis handbook. • Working computer available to chart postpartum assesment in EHR[b]. • Charted newborn assessment in paper chart. • Completed written responses & charting within 30 minutes.	• Escorted student to quiet room. • Provided verbal instructions to students. • Set timer & ended writing sessionwhen 30 minutes elapsed. • Reviewed and discussed charting in the EHR & on paper chart with student. • Reviewed & scored written responses based on predetermined parameters agreed upon by faculty team.
• Debrief with faculty observer.	• Added points attained on the postpartum & newborn

• Followed up with remediation as indicated.	assessment check off forms & written questions. • Debriefed with students about went well & areas for improvement. • Developed remediation plan if student did not achieve 92 total points on the postpartum or newborn assessment plus written responses.

544 [a] Situation Background, Assessment, Recommendation and [b] Electronic Health Record

545 Table 2. *Simulation Scoring Procedures*

Postpartum Simulation Score	**Postpartum Written Reflection Score**	**Final Postpartum Simulation Score**	**Newborn Simulation Score**	**Newborn Written Reflection Score**	**Final Newborn Simulation Score**	**Total Simulation Score**
• Sum of all psychomotor skills, interventions, & SBAR report listed on postpartum check off form. • Points assigned during expert faculty observation of student's simulation performance.	• Sum of responses to 3 postpartum related written reflection questions. • Point values for questions ranged from 3 to 6. • Faculty observing postpartum simulation assigned points to written responses in accordance with a standardized 'answer key' developed by faculty team.	• Sum of the Postpartum Simulation & Written Reflection Scores.	• Sum of all psychomotor skills, interventions, & SBAR report listed on newborn check off form. • Points assigned during expert faculty observation of student's simulation performance.	• Sum of responses to 4 newborn related written reflection questions. • Point values for questions ranged from 1 to 6. • Faculty observing newborn simulation assigned points to written responses in accordance with a standardized 'answer key' developed by faculty team.	• Sum of the Newborn Simulation & Written Reflection Scores.	• Sum of the Final Postpartum & Final Newborn Scores.
Total points: 85	**Total points: 15**	**Total points: 100**	**Total points: 85**	**Total points: 15**	**Total points: 100**	**Total Points: 100**

Table 3: *Assessment of Clinical Thinking Post Simulation*

Student Name: _____ Date: _____
Time Started: _____ Time Ended: _____

1. Indicate what you believe to be Ashley's KEYSTONE issue in NANDA format (3 pt).
2. **Explain how the physiological changes of pregnancy contribute to the keystone issue listed in question 1. Your response is to include information from Ashley's 'client story' such as her medical and pregnancy history, known risk factors, your physical assessment findings, textbook and other assigned readings in this course (6 pts).**

1. During your simulation, which client did you assess first (check one) (1 pt). ☐ **Ashley** ☐ **Baby Kimberly**
7. Explain why you choose to assess this client first (2 pts).

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Table 4. *Descriptive Statistics for Total Sample and Variable Characteristics (N = 80)*

Variable	**Mean (± SD) / n (%)**
Age	24.0 (± 6.1)
Female	69 (86.3%)
Postpartum-newborn simulation only students (vs. + clinical)	41 (51.2%)
Total overall simulation score	83.5 (± 14.5)
Postpartum final score (sim + written)	82.5 (± 12.4)
Newborn final score (sim + written)	84.8 (± 9.6)
High-performing students (postpartum portion)	19 (23.8%)
High-performing students (newborn portion)	23 (28.8%)
RN safety score (total possible 5)	4.9 (± 0.3)
Patient safety score (total possible 31)	27.8 (± 2.7)