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Self-Confidence in Clinical Decision-Making via Simulation among Pre-Clinical Nurse Midwifery Students: Addressing a Challenge

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Self-Confidence in Clinical Decision-Making via Simulation among Pre-Clinical Nurse Midwifery Students: Addressing a Challenge

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PRÉCIS

The inclusion of TeamSTEPPS® concepts in significantly increased self-confidence with clinical decision-making on the NASC-CDM© scale among pre-clinical nurse midwifery students.

ABSTRACT

Introduction

The purpose of this project is to examine whether a series of three midwifery simulation experiences integrating components of the TeamSTEPPS® toolkit improves students' self-identified confidence with clinical decision-making over a ten-week period.

Methods

This nonexperimental program evaluation project incorporated one formative, quantitative, assessment and a mixed-methods summative framework and took place at a university in the Puget Sound region with a non-random convenience sample of DNP-CNM students in their pre-clinical laboratory skills class. Study participants completed the NASC-CDM© three times during the study and submitted two anonymous reflections about their simulation experiences.

Results

100% of potential participants completed the informed consent and pretest. The first posttest returned seven complete surveys (58.3% response rate) and the final posttest 11 complete surveys (91.7% response rate). Of the possible 24 reflections, 21 were submitted (87.5% response rate). From the first posttest, only one question on the anxiety subscale achieved statistical significance and none from the self-confidence subscale. However, on the final posttest, two items on the anxiety subscale and 14 on the self-confidence subscale achieved statistical significance at $P<0.05$. Following qualitative analysis, two overarching themes emerged, "experiencing simulation" and "belonging," each with four sub-themes, and a total of 332 items were coded.

Discussion

Student immersion in simulation activities, paired with the concrete communication tools included in TeamSTEPPS®, increased student measures of self-confidence. The lack of a relationship between the two subscales using Pearson's coefficient at the final posttest implies that while students' self-confidence increased over the simulation series, their anxiety did not commensurately decrease. This may be due to the exclusive inclusion of emergency scenarios in the simulation series, which confronted students with some of the most stressful situations encountered by midwives. References to TeamSTEPPS® concepts were not included in all reflections, but when present were unanimously positive.

KEYWORDS: midwifery education, qualitative research, quantitative research, practice management

QUICK POINTS:

- Simulation is an evidence-based pedagogical approach demonstrated to improve skills, teamwork, and confidence.
- American nurse midwifery programs do not currently systematically integrate simulation.
- A simulation series using embedded TeamSTEPPS® concepts resulted in increased student self-confidence measures on the NASC-CDM© scale prior to clinical experiences.

INTRODUCTION

Despite recommendations from the World Health Organization (WHO) and other international bodies to incorporate high-fidelity simulation into the curriculums of midwifery programs to benefit from its well-documented strengths as a pedagogical approach, even in well-resourced settings implementation remains inconsistent.[1] Even when embedded, simulation is often exclusively technical skills-focused and falls short of seeking to cultivate collaboration and clinical decision-making skills.[1] Nevertheless, supporting such skills during midwifery education is vital as it impacts the development of their professional identity and patient outcomes once in practice.[8]

Valuable simulation outcomes include increased knowledge, confidence, skills growth, enhanced teamwork, the ability to attain proficiency prior to patient contact, and an opportunity to practice high-acuity, low-incidence clinical cases.[1,7–8] Midwifery students and their future patients deserve the highest standard of professional training, which currently requires the considered integration of a comprehensive simulation program throughout midwifery curricula.[1]

METHODS

Project Design

This nonexperimental program evaluation project included one formative, quantitative, assessment and a mixed-methods summative framework. The purpose of this project is to examine whether a series of three midwifery simulation experiences integrating components of the open-source, successful TeamSTEPPS® toolkit improves students' self-identified confidence with clinical decision-making over a ten-week period. These simulations included postpartum hemorrhage, shoulder dystocia, and neonatal resuscitation, and an interprofessional scenario with the midwifery students as the provider and pre-licensure nursing students. Goals of this project include (a) increased self-confidence and decreased anxiety scores upon evaluation of Nursing Anxiety and Self-Confidence with Clinical Decision Making scale (NASC-CDM©) scores before and after the series, (b) identification of specific TeamSTEPPS® concepts which enhance

leadership and clinical decision-making skills among midwifery students, and (c) analysis of student reflections on their simulation experiences.

Permission was obtained from the author to use the NASC-CDM© for this study. In April 2021, the applicable Institutional Review Board identified this study as "Not Human Participant Research" and approval to implement the project was received from the site. No identifying data was collected from the participants following signed completion of informed consent forms via Qualtrics survey.

Setting

The setting for this project is a university in the Puget Sound region in a Doctor of Nursing Practice (DNP) in Certified Nurse Midwifery (CNM) program, with annual cohorts of 10-14 students. This accredited program has access to a well-resourced simulation center with trained facilitators, a high-fidelity birthing manikin, a mid-fidelity birthing manikin, and multiple task trainers. This program also has administrative and program faculty support for simulation, which is key for this project.

Participants

A non-random convenience sampling of DNP-CNM students in their pre-clinical laboratory skills class was used for this study. Participants were recruited via a presentation in the course with the researcher available for questions, comments, or concerns. Informed consent was signed using a Qualtrics form. Any CNM-track DNP student enrolled in this laboratory skills class who completed this consent met inclusion criteria, which resulted in a maximum sample size of 12. An individual was excluded from the project if they declined to consent, were not a CNM-track DNP student, or were not enrolled in this laboratory skills class in the term the study was conducted.

Intervention Plan

Study participants completed the NASC-CDM© prior to participating in the simulation series, after the first simulation, and after completing the series. They also submitted two reflections, which were anonymized by the course faculty. To fulfill the project purpose and

aims, this project integrated a selection of TeamSTEPPS® tools that pertain to leadership and decision-making into pre-existing midwifery simulations. Selected TeamSTEPPS® concepts were reviewed during a lecture, as a part of student preparation for simulation, and use was included on the evaluation rubric. Selected concepts included: SBAR, Brief, Huddle, Checkback, Call Out, Situation Monitoring Process, and Debrief.

A mixed-methods approach allowed application of both deductive and inductive methodologies to analyze the effectiveness of the pedagogical approach on self-confidence with clinical decision-making as well as the experience of participating in the approach.[6] Use of a tool incorporating an anxiety and a self-confidence subscale gives a better overview of the true impact of simulation, as one scale may change substantially while the other may see a more subtle change.

The theoretical framework for this project is Albert Bandura's Theory of Self-Efficacy, a subset of his broader Social Cognitive Theory, which posits that self-efficacy is affected by proficiency experiences, social modeling, social persuasion, and reading one's own physical and emotional states.[3,4] This framework encompasses the simulation experience: direct practice of complex skills, observation of peers meeting objectives, encouragement from teammates, and practice reflecting upon one's own state and its impact on performance.

Tools and Measurement

The NASC-CDM© is a 27-question scale using "a 6-point, Likert-type tool with two subscales,"[9] one for anxiety and one for self-confidence, that takes around 20 minutes to complete.[9] Results of a pilot and main study assessing for construct and convergent validity indicate that the NASC-CDM© is an effective scale at measuring self-confidence and anxiety among prelicensure nursing students.[9] The NASC-CDM© was intended to be generalizable; according to White, the scale "was written deliberately in a generic manner to allow for use among different program types, different levels of students, and varied clinical situations."[9] While use of this study for a different population than intended is a limitation, no comparable midwifery-specific tool is available. The NASC-CDM© was administered via Qualtrics survey.

Student reflections were collected via a learning management system by the course faculty of record. After use for the course, these were anonymized by the faculty and sent via email to the investigator. These are one-page reflections with no specific formatting or prompt.

Data Analysis

Data from the NASC-CDM© surveys was collected using Qualtrics and analyzed using Microsoft Excel. Statistical analysis was performed as follows: independent bivariate analyses were completed with a t-test performed on each item for both subscales and *P*-values were set to $P < 0.05$.[6] Additionally, the totals for each subscale were added up and compared using Pearson's coefficient, *r*, to determine if there is a relationship between anxiety and self-confidence.[6] This was completed between the pretest and the first posttest after the first simulation is completed, and between the pretest and the final posttest after all simulations have been completed.

On the qualitative side, student reflections were coded on paper copies by hand, then transferred to Microsoft Excel where a codebook was maintained and organized according to recommendations from Bree and Gallagher.[2,6] Theming as used for analysis in iterative cycles, following a process outlined by Maguire and Delahunt.[5] Data cleaning necessitated eliminating corrupted NASC-CDM© surveys, omitting any type that is not narrative reflection, and reviewing coding for entry errors.

Content analysis focused on identifying whether the simulation series impacted students' self-confidence with clinical decision-making, teamwork or communication skills, or sense of self-efficacy. Recurring themes that did not center on these topics will be discussed as unexpected findings, as this may indicate an outcome or experience students found particularly notable. Following coding, qualitative data was compared to quantitative data to draw final conclusions.

RESULTS

Quantitative Analysis

12 out of 12 potential participants completed the informed consent and the pretest. Following the first simulation in the series, students were asked to complete the survey a second time, listed as the first posttest on the accompanying tables. Nine students completed the first posttest, seven of whom had no missing responses (58.3% response rate).

With a two-tailed t-test and *P*-value of $P < 0.05$, only one question on the anxiety subscale achieved statistical significance, with another approaching significance at $P=0.06$. No questions on the self-confidence subscale achieved significance, though one approached it at $P = 0.06$. Pearson's *r* was also calculated between the self-confidence and anxiety subscales, with an average of –0.65 for the pretest and –0.58 for the first posttest responses. On both the pretest and the first posttest, 11 items reached significance at $r > \pm 0.70$, although the items were different between the two data sets.

Every attempt was made to capture complete data sets from all 12 students who completed the pretest following the simulation series; however, only 11 complete final posttests were returned (91.7% response rate), and only 21 out of a possible 24 reflections were completed (87.5% response rate).

For the final posttest, with the same two-tailed t-test and *P*-value of $P < 0.05$, 14 items on the self-confidence subscale and two on the anxiety subscale achieved statistical significance (Table 1). Pearson's *r* was again calculated between the self-confidence and anxiety subscales, with an average of –0.15 for the final posttest responses, of which none were significant at $r > \pm 0.70$ (Table 2).

Qualitative Analysis

A total of 21 student reflections were analyzed using cycles of theming, following data cleaning to remove identifiers. Three cycles of theming were performed, with verification by the second author following each cycle. From this process, two overarching themes emerged, each with four sub-themes. For the overarching theme of “experiencing simulation,” sub-themes of “valuing repetition” (36 codes), “evoking emotion” (120 codes), “preparing for a successful sim” (50 codes), and “embracing learning and curiosity” (44 codes) were identified. Related to the second theme of “becoming,” “enhancing confidence” (13 codes), “developing the midwifery

role" (12 codes), "collaborating with a team" (25 codes), and "growing and changing" (25 codes) arose. Exemplars for each sub-theme can be found in Table 3. Following this analysis, a process model was developed to help appreciate and describe the interactions between the identified themes (Figure 1).

DISCUSSION

Overall, the simulation series had a notable impact on self-confidence with clinical decision-making. Following the simulation series, self-confidence with clinical decision-making increased significantly on just over half the items, which contributes to two project aims. Even taken alone, this is an important positive outcome of simulation for pre-clinical nurse midwifery students as they begin their clinical experiences.

At the same time, the utility of the first posttest results is limited, due to the 58.3% response rate; nevertheless, they seem to indicate that one simulation is not enough to see changes in students' self-assessed clinical decision-making when compared with the final posttest results, with a 91.7% response rate. On the first posttest, only one question showed significant change from the pretest, whereas 16 items showed such a change following the simulation series. Interestingly, these were not evenly dispersed across the two subscales; 87.5% were from the self-confidence scale. Contrary to the expected findings, the lack of a relationship between the two subscales using Pearson's coefficient at the final posttest implies that while students' self-confidence increased over the simulation series, their anxiety did not commensurately decrease.

The reflections shed some light on the duality of increased confidence with maintained anxiety. Students expressed a variety of emotions about simulation, from confidence, safety, and excitement to nerves, paralysis, and humility. One student wrote "I am still terrified of encountering these emergencies in real life situations, but it feels less daunting." This statement underlines the experience of becoming more confident, while also remaining emotionally reactive to the idea of managing obstetric emergencies. Simulation may also have provoked feelings of anxiety, as detailed by another learner who reported that "being in an emergency situation with people who called me into the room and then looked at me expectantly for

leadership was jarring, and a useful wake-up call before heading into clinicals." Though a plurality of experiences were reported, one interpretation is that, for some, simulations centered on critical scenarios made real the responsibility carried by nurse midwives when births present with complications. Consequently, despite validation of their skills, learners continued to experience a level of anxiety when contemplating future care delivery.

TeamSTEPPS ® concepts were specifically named in 32% of the codes related to "collaborating with a team." All mentions were positive and indicated that use of the TeamSTEPPS® toolkit improved their simulation experience. Due to the open-ended nature of the question, more detailed feedback was not elicited that could have contributed to an analysis of how this toolkit supported their role development and learning engagement, which presents an opportunity for further study.

Unexpected Findings

Two recurring themes were identified from student reflections that were tangential to the project purpose, but which are worth mentioning here due to their importance to the students: the utility of the PartoPants™ as a learning modality and the value of acting in the role of the birthing patient. Students indicated that PartoPants™ were an engaging tool that enabled them to immerse themselves in a mid-fidelity postpartum hemorrhage scenario. Equally important to the learners was the opportunity to act as the patient in the simulation, as opposed to using a standardized patient or embedded participants. They highlighted the significance of experiencing communication, teamwork, and interventions from this perspective and frequently stated a belief that it will enable them to be more compassionate providers.

Limitations

This project was limited due to the small sample size and incomplete data capture when students did not complete the posttests or reflections. Additionally, this project took place amidst a return to in-person simulation, which meant that for many students this was their first experience with simulation. This may have caused more focus on the set-up and process of simulation than on the integration of the experience. Finally, consequent to the convenience sampling procedure and size, there are many potential exclusions in the building of this survey

population. As the sample is already grouped into an extant cohort, they are likely to have similarities and may be demographically distinct from even CNM cohorts in this region and state. Demographic information was not collected as part of this study, as collection of demographic identifiers could compromise the anonymity of participants.

Opportunities for Future Study

This study was designed with the goal of being accessible for partial replication by other simulation centers and midwifery programs in the United States to identify whether TeamSTEPPS® is an effective clinical confidence builder when embedded into a midwifery simulation curriculum, as more evidence is needed to support this intervention for this purpose and population. Furthermore, there is a lack of midwifery-specific tools or tools validated for use with this population. As a result, this project used a tool that was created for nursing students. A study specifically validating this or a similar tool, or creating one unique to midwifery, would be a valuable contribution to the literature surrounding midwifery simulation and aid further research in this area.

Bibliography

1. Amado Martins JC, Negrão Baptista RC, Dias Coutinho VR, Domingues Fernandes MI, Fernandez AM. Simulation in nursing and midwifery education. *T*he Regional Office for Europe of the World Health Organization. Published October 1, 2018. Accessed April 17, 2023. https://www.who.int/europe/publications/i/item/WHO-EURO-2018-3296-43055-60253
2. Bree R, Gallagher G. Using Microsoft Excel to code and thematically analyse qualitative data: A simple, cost-effective approach. *All Ireland Journal of Teaching and Learning in Higher Education*. 2016;8(2):2811-28114. https://ojs.aishe.org/index.php/aishe-j/article/view/281
3. Davidson J. *Bandura's Social Cognitive Theory: An Introduction*. Davidson Films; 2003. https://video.alexanderstreet.com/watch/bandura-s-social-cognitive-theory-an-introduction
4. Lopez-Garrido G. Self-efficacy theory in psychology: Definition & examples. Simply Psychology. Published November 3, 2022. Accessed April 17, 2023. https://www.simplypsychology.org/self-efficacy.html
5. Maguire M, Delahunt B. Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Ireland Journal of Teaching and Learning in Higher Education.* 2017;8(3):3351-33514. https://ojs.aishe.org/index.php/aishe-j/article/view/335
6. McKenzie JF, Neiger BL, Thackeray R. *Planning, implementing, and evaluating health promotion programs: A primer.* 7th ed. Pearson; 2017.
7. Vermeulen J, Beeckman K, Turcksin R,et al. The experiences of last-year student midwives with high-fidelity perinatal simulation training: A qualitative descriptive study. *Women Birth.* 2017;30(3):253-261. doi:10.1016/j.wombi.2017.02.014
8. Vermeulen J, Buyl R, D'haenens F, et al. Midwifery students' satisfaction with perinatal simulation-based training. *Women Birth.* 2021;34(6):554-562. doi:10.1016/j.wombi.2020.12.006

9. White KA. Development and validation of a tool to measure self-confidence and anxiety in nursing students during clinical decision making. *J Nurs Educ.* 2014;53(1):14-22. doi:10.3928/01484834-20131118-05

Table 1: Pretest to Final Posttest T-test ***p*-values**

Question	*p*-value Self-Confidence	*p*-value Anxiety
1	0.04	0.51
2	0.02	1
3	0.02	0.60
4	0.06	0.70
5	0.02	0.20
6	0.02	0.25
7	0.07	0.85
8	0.17	0.48
9	0.91	0.83
10	0.09	0.25
11	0.13	0.37
12	0.05	0.87
13	0.001	0.02
14	0.08	0.34
15	0.04	0.12
16	0.06	0.78
17	0.01	0.04
18	0.59	0.89
19	0.01	0.66
20	0.03	0.11
21	0.003	0.08
22	0.18	0.90
23	0.07	0.96
24	0.01	0.36
25	0.30	0.50
26	0.02	0.92
27	0.001	0.44

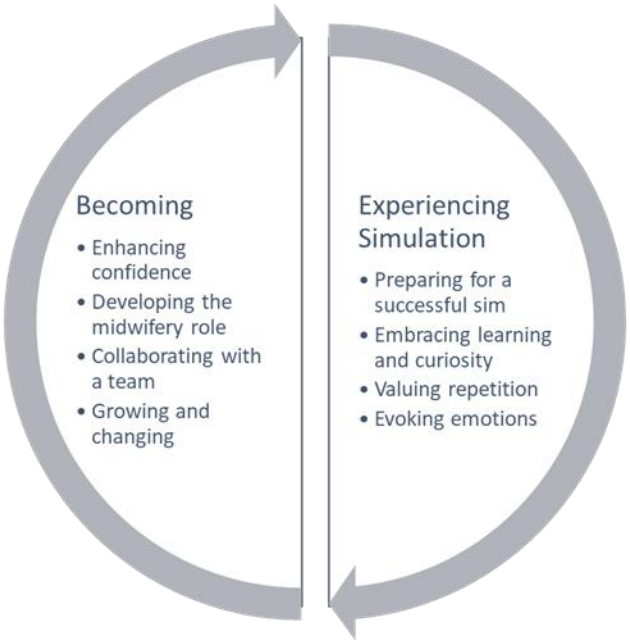
Table 2: Final Posttest Self-Confidence to Anxiety Subscale Pearson's *r* values

Question	Pre-Test Pearson's *r*	Post-Test Pearson's *r*
1	-0.69	0.03
2	-0.45	0.06
3	-0.62	-0.15
4	-0.43	0.39
5	-0.77	0.15
6	-0.58	-0.16
7	-0.80	-0.35
8	-0.70	-0.59
9	-0.91	-0.50
10	-0.59	-0.12
11	-0.55	0.05
12	-0.31	-0.24
13	-0.73	0.04
14	-0.67	-0.10
15	-0.68	0.01
16	-0.63	-0.33
17	-0.60	-0.19
18	-0.66	-0.12
19	-0.70	-0.36
20	-0.73	-0.15
21	-0.65	0.16
22	-0.78	-0.23
23	-0.79	-0.37
24	-0.73	-0.44
25	-0.65	-0.27
26	-0.72	-0.31
27	-0.43	0.16
Average	-0.65	-0.15

Table 3: Sub-Theme Exemplar Statements

Sub-Theme	Exemplar Statement
Valuing repetition	"The simulations helped make didactic content more accessible through repitation [sic] and the examples demonstrated by my peers."
Evoking emotions	"I could not collect my thoughts and I felt extremely overwhelmed."
Preparing for a successful sim	"I struggled identifying the back and chest of the infant while practicing, although not during the simulation."
Embracing learning and curiosity	"I had a few key takeaways..."
Enhancing confidence	"I feel more confident in my life-saving skills and my ability to quickly learn the flow of an emergency."
Developing the midwifery role	"as a result of this process, I better understand the importance of controlling the room and facilitating an environment where the team and the family feels well supported."
Collaborating with a team	"While we implemented TeamSTEPPS, such as check-back, I learned the importance of ensuring the person you are speaking to is aware and listening to you."
Growing and changing	"That is an area I need to work on in overcoming when responding to a problem or emergency."

Figure 1. Process Model of Themes from Qualitative Data



This figure represents a visual model of the interactions between the two overarching themes and their subthemes from student reflections about simulation experiences.