A Quantitative Approach to Evaluating Caring in Nursing Simulation

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STUDIES OF THE USE OF SIMULATION IN NURSING EDUCATION HAVE FOCUSED LARGELY ON CLINICAL JUDGMENT (LASATER, 2007), THE VALUE OF DEBRIEFING AND REFLECTION (RHODES & CURRAN, 2005), AND STUDENT CONFIDENCE AND COMPETENCE (BEARNSON & WIKER, 2005; BREMNER, ADUDDELL, BENNETT, & VANGEEST, 2006; SCHOENING, SITTNER, & TODD, 2006). If simulation is to be used as a substitute for actual clinical experiences, then it must simulate the essential aspects of nursing practice, and its use in preparing nurses needs further evaluation.

Roach (2002) referred to confidence and competence as vital ingredients of professional caring relationships, along with compassion, conscience, commitment, and comportment. Roach defined competence as the "the state of having the knowledge, judgment, skills, energy, experience and motivation required to respond adequately to the demands of one's professional responsibilities" (p. 54) and noted that nurses who are confident are also comfortable with their level of competence. In order to evaluate all aspects of caring within simulation, a broad perspective is needed.

Components of the Jeffries and Rogers (2007) framework for nursing education simulation center on students, teachers, educational practices, simulation design, and outcomes, but the importance of the nurse-patient relationship is not emphasized. While this model is extremely useful, the discussion pertaining to providing context for family-centered care could be expanded in order to establish the foundation for caring relationships throughout the experience.

Eggenberger and Keller (2008) suggested an innovative approach for grounding nursing simulations in caring theory. These researchers studied how undergraduate nursing students ground nursing actions in caring in simulated emergency situations (Eggenberger, Keller, & Locsin, 2010). Focus groups indicated that caring was expressed with the patient and family, among the students as colleagues, and from faculty to student. Students were caring for self, caring for others, and caring for the patient as the scenario developed from a rapid response to a code blue situation. Findings from this work identified a need for a quantitative tool to measure students' "growing in caring" as they developed increased confidence and competence in simulated patient experiences.

Boykin and Schoenhofer (2001) offer a useful framework to provide the contextual link between reality and caring. This theoretical perspective makes the assumption that "all persons are caring" (p. 11) and describes the nurse entering the world of the patient or family member "with the intention of knowing the other person as caring person" (p. 13). The caring relationship between the nurse and the patient takes place within the nursing situation, either in practice or in the simulated environment.

Because simulated patient encounters have become one solution to the increasing challenge of finding clinical site opportunities, educators are now challenged to assess the effectiveness of the environment for demonstrating how students can progress in caring. This article reports on a research study designed to evaluate the use of a quantitative instrument to measure caring in the nursing simulation environment.

Measurement of Caring in Simulation Quantitative tools, such as the Objective Structured Clinical Examination (Harden & Gleeson, 1979) and the Self-Perceived Judgment Performance Scale (Facione & Facione, 1998), already exist to measure student competency in practice. While these tools can be easily integrated into simulation experiences to measure competency, reflecting one attribute of caring outcomes, tools are needed that can measure all attributes of caring in a simulated nurse-patient relationship.

Three instruments designed to measure caring were not selected for this simulation study. These tools (Brubaker, 2005; Nkongho, 2009; Watson & Lea/Hoogbuin, 2008) measure the effectiveness of integrating caring curricula as a whole, or the development of caring ability over time. In contrast, the student version of the Coates (2009) Caring Efficacy Scale Self-Report was designed to evaluate students' confidence in their ability to demonstrate a caring orientation and establish caring relationships within nursing situations. A preceptor/supervisor version of the Caring Efficacy

RESEARCH

ABSTRACT

Aim. This study was designed to test a quantitative method of measuring caring in the simulated environment.

Background. Since competency in caring is central to nursing practice, ways of including caring concepts in designing scenarios and in evaluation of performance need to be developed. Coates' Caring Efficacy scales were adapted for simulation and named the Caring Efficacy Scale-Simulation Student Version (CES-SSV) and Caring Efficacy Scale-Simulation Faculty Version (CES-SFV).

Method. A correlational study was designed to compare student self-ratings with faculty ratings on caring efficacy during an adult acute simulation experience with traditional and accelerated baccalaureate students in a nursing program grounded in caring theory.

Results. Student self-ratings were significantly correlated with objective ratings ($r = 0.345, 0.356$).

Conclusions. Both the CES-SSV and the CES-SFV were found to have excellent internal consistency and significantly correlated interrater reliability. They were useful in measuring caring in the simulated learning environment.

Scale is also available to rate the student (1996).

The Caring Efficacy Scale is based on Watson's (1985) carative factors, which include being authentically present in the "caring moment" (Watson, 1985, 1988), forming a human caring relationship, and responding to human needs. Both caring actions and caring choices take place within the nurse-simulated-patient transaction, and caring attributes can be observed in all of the ways of being and knowing within the nurse-patient relationship.

Method DESIGN A correlational study was designed to compare student self-ratings with faculty ratings on caring efficacy during a simulation experience using the Caring Efficacy Scale. The study instruments were adapted by the researchers from the Student and Preceptor/Supervisor Rating Forms of the original Caring Efficacy Scale (Coates, 1996, 1997). The study reports the psychometric properties of the modified instruments.

SETTING The study was conducted with students enrolled in an acute care adult health nursing practice course in a college of nursing (CON) whose curriculum is grounded in caring theory. The simulation scenario used to evaluate the CES was designed to support learning as opposed to formally evaluating student practice. Students knew evaluation scores were being generated and that these scores had no impact on their course grade.

The CON had developed simulation scenarios that incorporate the learning of physiological data, psychomotor skills, and real-life context to provide opportunities to create caring interventions. This clinical practice course included a high-fidelity simulated cardiac arrest experience with actors representing the patient's wife. It was developed using the American Heart Association's Advanced Cardiac Life Support (2005) practice standards and the American Association of Critical Care Nursing Association's (2010) evidence-based guidelines on family presence during emergent events.

SAMPLE A purposive sample of 57 participants was obtained from six clinical groups. Three groups consisted of traditional junior undergraduate nursing students (completing their degree in two years), and three groups consisted of accelerated students (completing the nursing program within one calendar year). The traditional students were in their second of four clinical practice courses; the accelerated students were in the final semester of their three-semester clinical program. Both groups were similarly enrolled in their second adult acute care course.

The students were almost equally from the traditional (n = 28) and accelerated (n = 29) programs. Ten students were male (six traditional, four accelerated), and 47 were female (11 traditional, 25 accelerated).

INSTRUMENT Permission to modify the existing Caring Efficacy Scale Self-Report (30 items, Form B) and the corresponding Caring Efficacy Scale-Preceptor/Supervisor Rating Form was obtained from Dr. Carolie Coates. The scales were renamed the Caring Efficacy Scale-Simulation Student Version (CES-SSV) and the Caring Efficacy Scale-Simulation Faculty Version (CES-SFV).

Cronbach's alpha coefficient for the original Caring Efficacy Scale Self-Report (Form B) was .88 (Coates, 2009). There are no reported alpha coefficients for the preceptor/supervisor rating form. Twelve-item versions of both scales are available but were not used.

The scales were modified to reflect the one-time simulation experience and the family member's presence in the encounter. Wording that previously focused on ongoing or overall abilities and on clients or patients alone now reflected an isolated simulation experience. For example, item 11 on the original CES Self Report student scale, which states "I can usually create some way to relate to most any client/patient," was changed to "I created ways to relate to this patient/family."

PROCEDURE University institutional review board approval was obtained to conduct this study. Student participants completed the CES-SSV. They were rated by two independent raters (a doctoral student and faculty member who was not the clinical instructor) who used the CES-SFV. Each simulation group consisted of three to four undergraduate students, one faculty member, and two graduate nurse educator students. The faculty member played the role of the wife, who remained at the bedside during the code. Graduate students provided support in various roles, from operating the simulator to acting in the role of charge nurse.

Simulations were videotaped, as is the routine at the CON. Both raters used the live and videotaped sessions to complete the CES-SFV. The videos were also used to establish inter-rater reliability. In the case of wide discrepancies in scoring between the raters, the videotape was reviewed and rescored by both raters. Students completed the CES-SSV upon completion of the simulation.

DATA ANALYSIS Scores for items that were rated in the negative sense ("I did not feel confident in my ability to express a sense of caring to my patient/family") were reversed so that totals across items would have meaning. Responses were coded so that "strongly agree" was entered as "6" and the strongly disagree response was entered as "1." Possible total scores ranged from 30 to 180, with higher scores indicating stronger caring efficacy. Data were entered into SPSS Version 18 and total scores for student self-ratings and for each rater were calculated separately.

Findings Total scores by students and faculty raters are presented in Table 1. The mean score for all items is indicated to reflect the strength of the perceived efficacy. Overall scale reliability (Cronbach's alpha) is provided for each rater.

The data demonstrate a wide range of scores across raters, indicating that the scale has the possibility of differentiating among students. The mean rating across items indicates that students rate themselves as slightly to moderately in agreement with items reflecting their caring efficacy (4.24). Faculty raters similarly demonstrated slight and moderate agreement with the items (4.01 and 4.20). No ceiling effect was found in the scores; there was room for higher ratings. The overall scale shows excellent reliability for all raters (.917 to .965).

Correlations for total scores among raters are listed in Table 2. The correlation between overall scores for the raters is significant at the 0.01 level at 0.658. A lower but still statistically significant correlation exists between the student score and the two raters' scores (.345 and .356). Conceptually, this indicates that independent raters agree on what they see relative to students' caring efficacy. Students who rate themselves highly are also rated highly by the faculty raters, and this relationship is statistically significant.

Since the two types of students participating in the simulation experience brought different backgrounds and experience, and were nearly equal in number, a second analysis was run that allowed comparison of the groups of students. Table 3 reflects this comparison.

Independent t-tests indicate no significant difference in rating by group for either the student or faculty rating. This reflects the similarity in performance by the two student groups. One rater showed a wider dis-

Table 1. Total Scores by Rater

Rater	Total Score Mean/ Mean of all items	Standard Deviation	Range	Cronbach's alpha
Student	127.14/4.24	16.34	89-159	.917
Rater 1	120.47/4.01	18.87	68-155	.965
Rater 2	126.11/4.20	21.87	83-182	.964

Table 2. Correlation of Total Scores by Rater

Rater	Student Self-Report	Rater 1	Rater 2
Student	1	.345**	.356**
Rater 1	.345**	1	.658**
Rater 2	.356**	.658**	1

** correlation significant at 0.01 level

Table 3. Comparisons of Scores by Student Type

Rating	Traditional (n = 28)	Accelerated (n = 29)
Mean Self-Rating	127.86	126.45
Mean Rater1	121.82	119.17
Mean Rater 2	121.32	130.72

Table 4. Lowest Item-Total Correlation by Rater

Student Rating Item /correlation	Rater 1 Item /correlation	Rater 2 Item /correlation
Item 12 / .260	Item 21 / .289	Item 2 / .356
Item 24 / .274	**Item 8 / .440**	**Item 13 / .417**
Item 13 / .315	Item 27 / .467	Item 28 / .446
Item 20 / .349	Item 5 / .513	**Item 22 / .447**
Item 8 / .361	**Item 22 / .544**	**Item 8 / .487**

Note. Repeated items in bold.

crepancy between groups but the difference was not statistically significant.

ITEM ANALYSIS Although the sample size for the current study is too small to support a factor analysis for the adapted instruments, an examination of the performance of individual items can contribute to an understanding of any potential clusters of items. For each rating, inter-item and item-total correlation matrices were developed and analyzed. The items that differed most from the total are listed in Table 4.

One item, Item 8, appeared in all three ratings as being less correlated with the total score: "I had difficulty in suspending my personal beliefs and biases in order to hear and accept the patient/family as people." Two other items appeared on two of the three scales: Item 13, "I felt if I talked to this patient/family on an individual, personal basis, things might have gotten out of control," and Item 22, "If I thought a patient/family was uneasy or needed some help, I approached them." Possibly the nature of the simulation scenario did not call forth these responses by students and lower correlations were accurate to the situation.

Discussion One of the potential drawbacks of the increasing use of simulation in nursing education is that no simulator can be a real replacement for a complex, unique human being when it comes to forming relationships. Nursing is a profession based in relationship-centered caring. The Coates Caring Efficacy Scale was adapted for use in the simulation environment and has shown both statistically significant measurement strength and conceptual linkages to caring concepts.

The particular scenario used for this study, with its use of a live family member and a supporting curriculum grounded in caring, may have produced a unique experience for demonstrating caring, but the instrument shows promise to form a base for evaluating caring efficacy. Tracking student responses to the CES-SSV across the curriculum could support individualized instruction to increase competency in demonstrating the professional attributes of caring behaviors. Including caring concepts in each simulated scenario could moderate the focus on technical skill that may occur with scenarios focused only on psychomotor skills. Given the excellent reliability of the CES-Simulation versions, the instrument could be used for competency evaluation in the educational setting. Correlation of the scores from two raters indicates that one rater would be sufficient in the educational setting.

The CES-SSV and the CES-SFV were used as a self report and independently rated scale for students engaged in simulation experiences. The types of students, traditional and accelerated, who participated in the project showed no significant differences in scores. The scales have excellent internal consistency and sig-

nificantly correlated interrater reliability. Responses to the items make sense in that the more observable behaviors are rated higher by the faculty than by students.

Further research needs to be conducted with different types of scenarios and to measure the growth of caring over time. Further development of the instruments may also be desirable. Communication is an important component of caring. The Caring Efficacy Scale could be further modified with items designed to measure team communication and caring. An additional consideration is that, whereas efficacy reflects competence, self-efficacy is the perception of confidence. The student version, in a sense, measures self-efficacy while the faculty version measures observed efficacy. Further exploration of the relationship between these concepts is warranted.

The debate about the meaning of caring in nursing, and the appropriateness of attempting to measure and quantify its relational practices, continues. Nurses are able to identify caring in moments of exquisite practice, and there is a sense of connectedness and purpose when choosing to respond with a caring attitude. The privilege of being in the moment with patients often defies description. For many nurses, engaging in caring relationships with patients motivates them to continue to practice within the current health care environment. Adding this aspect of practice to the simulated environment will be important as the use of simulation in nursing education increases. **NLN**

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References

American Heart Association. (2005). Guidelines for cardiopulmonary resuscitation and emergency cardiovascular care, Part 4: Adult Basic Life Support. (2005). *Circulation, 112*(suppl. IV), IV-19-IV-34.

American Association of Critical Care Nurses. (2010). Family presence during resuscitation and invasive procedures. AACN Practice Alert. Retrieved June 3, 2010, from www.aacn.org.

Bearnson, C. S., & Wiker, K. M. (2005). Human patient simulators: A new face in baccalaureate nursing education at Brigham Young University. *Journal of Nursing Education, 44*(9), 421-425.

Boykin, A., & Schoenhofer, S. (2001). *Nursing as caring: A model for transforming practice*. Sudbury, MA: Jones & Bartlett.

Bremner, M. N., Aduddell, K., Bennett, D. N., & VanGeest, J. B. (2006). The use of human patient simulators: Best practices with novice nursing students. *Nurse Educator, 31*(4), 170-174.

Brubaker, C. L. (2005). *An instrument to measure ethical caring in clinical encounters between student nurses and patients* (Doctoral dissertation). ProQuest Digital Dissertations. (AAT 3196644)

Coates, C. J. (1996). Development of the Caring Efficacy Scale: Self-Report and Supervisor versions. Unpublished manuscript, University of Colorado Health Sciences Center, Denver, CO.

Coates, C. J. (1997). The Caring Efficacy Scale: Nurses' self-reports of caring in practice settings. *Advanced Practice Nursing Quarterly, 3*(1), 53-59.

Coates, C. J. (2009). Caring Efficacy Scale. In J. Watson (Ed.), *Assessing and measuring caring in nursing and health sciences* (pp. 163-169). New York: Springer Publishing.

Eggenberger, T. L. & Keller, K. B. (2008). Grounding nursing simulations in caring: An innovative approach. *International Journal for Human Caring, 12*(2), 42-46.

Eggenberger, T. L., Keller, K. B., & Locsin, R. (2010). Valuing caring behaviors within simulated emergent nursing situations. *International Journal for Human Caring, 14*(2), 22.

Facione, N. C., & Facione, P. A. (1998). *Professional judgment rating form.* Millbrae, CA: California Academic Press.

Harden, R., & Gleeson, F. (1979). Assessment of clinical competence using Objective Structured Clinical Examination (OSCE). *Medical Education 13*, 41-54.

Jeffries, P. R., & Rogers, K. J. (2007). Theoretical framework for simulation design. In P. R. Jeffries (Ed.), *Simulation in nursing education: From conceptualization to evaluation* (pp. 21-31). New York: National League for Nursing.

Lasater, K. (2007). High-fidelity simulation and the development of clinical judgment: Students' experiences. *Journal of Nursing Education, 46*(6), 269-276.

Nkongho, N. (2009). Caring ability inventory. In J. Watson (Ed.), *Assessing and measuring caring in nursing and health sciences* (pp. 117-124). New York: Springer Publishing.

Rhodes, M., & Curran, C. (2005). Use of the human patient simulator to teach clinical judgment skills in a baccalaureate nursing program. *CIN: Computers, Informatics, Nursing 23*(5), 256-264.

Roach, M. S. (2002). *Caring: The human mode of being: A blueprint for the health professions* (2nd rev. ed.). Ottawa, Ontario: Canadian Hospital Association Press.

Schoening, A. M., Sittner, B. J., & Todd, M. J. (2006). Simulated clinical experience: Nursing students' perceptions and the educators' role. *Nurse Educator, 31*(6), 253-258.

Watson, J. (1985). *Nursing: The philosophy and science of caring.* Boston: Little, Brown. Reprinted (1985). Boulder, CO: Colorado Associated University Press. (Original work published 1979).

Watson, J. (1988). *Nursing: Human science and human care.* New York: National League for Nursing. Watson, R. & Lea/Hoogbruin, A. (2008).

Watson, R., & Lea/Hoogbruin, A. (2008). Caring Dimensions Inventory. In J. Watson (Ed.), *Assessing and measuring caring in nursing and health sciences* (pp. 179-182). New York: Springer Publishing.