Original Article

Psychometric validation of satisfaction with simulated clinical learning experience evaluation – corrections (SSCLEE-C)

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ABSTRACT

Purpose: This study sought to modify a 19-item instrument designed to measure nursing students’ satisfaction with a simulated learning experience for use in a correctional system to measure nurse satisfaction with simulated learning experiences; and to establish validity for the modified instrument. No measures were available for use in a correctional setting, and few instruments were available to measure nurse satisfaction with simulation experiences.

Design/methodology: One hundred and ninety-eight correctional nurses responded to the original 19-item five-point Likert scale instrument. These data were used for an exploratory and confirmatory factor analysis.

Findings: A 3-factor solution accounting for 62% of the variance. The 3 factors: Fidelity, Objectives, and Problem solving were supported by simulation theory. The 9-item CFA exhibited desirable psychometric properties: Root mean square error of approximation (RMSEA) = .046; Akaike Information Criterion (AIC) = 76.95; Comparative Fit Index (CFI) = .984. The model $\chi^2 = 30.95$ (ns). Alpha reliability estimates of the three factors were 0.70, 0.70 and 0.81.

Originality/value: The Satisfaction with Simulated Clinical Learning Experience Evaluation – Corrections (SSCLEE-C) is the only instrument available for ongoing assessment of correctional nurse satisfaction with simulated clinical learning experiences.

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1. Introduction

Simulation has been used as an effective means of educating healthcare teams for nearly half a century [15]. A unified approach to advancing the science of simulation design with improved research methods, rigor, and funding has been endorsed by the National League for Nursing, the Institute of Medicine, the American Medical Association, the International Association of Simulation and international groups...
such as Clinical Learnings and Society of Simulation in Healthcare [2,6,7].

The aims of this paper are [1] to report on the modification of a 19-item End of Semester Student Simulated Clinical Learning Experience Satisfaction Survey (ESS) [11] which had been used to assess nursing student satisfaction with simulated learning experiences; and [2] to report the psychometric validation of the newly developed 9-item Satisfaction with Simulated Clinical Learning Experience Evaluation- Corrections (SSCLEE-C) instrument. Few instruments were identified for use to measure nurse satisfaction with simulated learning and no instruments were found that had been used in correctional settings.

Simulation was one of several educational modalities introduced into a newly designed and implemented Correctional Nurse Competency Program© (HRSA # D11HP22212-01-01; IRB# X13-060; [13]). The Correctional Nurse Competency Program© (CNCP) is an evidence-based competency program designed specifically for nurses who work within prisons and jails. Following educational experiences, nurses demonstrate their learning through clinical scenarios commonly found in these settings in a state of the art mobile simulation education laboratory [14]. Through an academic-practice partnership supported by the HRSA grant (# D11HP22212-01-01), faculty experts in education and simulation pedagogy, guided correctional health nurses in the development of clinical scenarios for simulations. Measuring the satisfaction with this experience was a component of the evaluation plan for this new program and newly created simulation activities.

1.1. Adapting ESS for correctional settings

The 19-item ESS [11] designed to measure nursing student satisfaction with a simulated learning experience had a Cronbach’s α = 0.96, but no additional information on the instrument’s psychometric properties was published, or, available with telephone follow-up. Given the limited satisfaction measures available, the CNCP© team decided to utilize this instrument as a starting place, acknowledging the need for modification and validation in the correctional system.

The NLN/Jeffries Simulation Framework (2016) provided theoretical support for this instrument development project. This framework has five components: facilitator, participant, educational practices, outcomes, and simulation design organized under three interactive domains: educational practice, outcomes and simulation design characteristics. As will be shown, the 9-items remaining following our analysis and the labeled domains of the instrument were theoretically aligned with one domain of the framework: simulation design characteristics.

As specified by the Jeffries Simulation Framework (2016), simulation design characteristics include: objectives, fidelity, cues, reflective thinking, and problem solving. CNCP© learning objectives and scenario content identify the expected processes and outcomes for participants. Fidelity of a scenario is equivalent to the reality of the simulation. The closer a simulation is to reality, the higher the fidelity of the simulation (Jeffries, 2012). Information provided in the scenario to guide a participant’s actions are planned and labelled as cues. Reflective practice is enhanced by the debriefing component of the simulation. Debriefing allows participants to explore their actions with a trained facilitator [3]. Reflecting on one’s actions fosters an environment to change the behavior [5]. Problem solving, the last component of simulation design characteristics, is a participant behavior response to situations built into the scenario. The challenges built into the scenario should be reflected in the learning objectives of the simulation to prompt appropriate actions and provide the basis for measurement.

1.2. Procedures

Authorization to perform the study was obtained from the University’s Office of Research Compliance (IRB# X13-060; HRSA, grant # D11HP22212).

1.3. Sample

A convenience sample of nurses (n = 198) employed by the state correctional system were eligible to participate. Participation in responding to the program evaluation measures was voluntary, however, participation in the CNCP© was mandatory. De-identified and aggregated data is reported to protect the identity of participants. Being that the convenience sample was driven by the availability of participants, an a priori power analysis was not conducted. However, for a model with 3 latent factors and 8 or more indicators, a sample size of approximately 110–120 provides the desired statistical power of p = .80 [17].

1.4. Data analysis

Data were analyzed using the SPSS 18.0 statistical package [16]. Univariate statistics were used to describe the sample. All data were examined for accuracy of data entry. Missing data was individually analyzed for significance. Imputations were not needed for the analysis due to a minimal number of missing data fields.

Adaptation of EES for Corrections

The 19-item EES instrument utilized a 5-point Likert scale with responses ranging from strongly disagree [1] to strongly agree [5], with higher scores indicating higher degree of satisfaction with simulated learning. Analyses conducted resulting in the 3-factor 9-item instrument which was labelled the Satisfaction with Simulated Clinical Learning Experience Evaluation – Corrections (SSCLEE-C) is described in detail under the results section. SSSCLEE-C is scored using a 5-point Likert scale from strongly disagree [1] to strongly agree [5] with higher scores indicating higher degree of satisfaction.

2. Results

2.1. Demographics

Of the 198 participants, 148 (82%) participants were female, white (n = 131, 70%) and between 40 and 49 years of age
2.2. Principal components analysis

The evaluation of the ESS found that items loaded strongly on three factors. This prompted the use of exploratory and confirmatory factor analyses, where the aim was to derive a measure with simple structure, and there is an understanding that some correlation will exist among items. Given this aim, an oblique rotation method is recommended (Finch, 2006). The process is described below.

**Exploratory Factor Analysis.** Principal component analysis (PCA) was used to identify distinct factors based on Eigenvalues of 1 or greater, with a threshold value of \( p = .32 \), and with an aim of finding a parsimonious number of high-loading variables (Table 1). Following an initial 4-factor solution in which the last factor did not meet criteria, the PCA was constrained to 3 factors which accounted for 62% of the variance. Subsequently, Promax rotation was used with Kaiser Normalization. Removing 3 items that loaded on two or more factors; and observing a small number of items on each scale with high loadings, a 9-item scale was identified.

**Confirmatory Factor Analysis.** Confirmatory factor analysis (CFA) was applied to the 3 factor solution. CFA proceeds from the assumption that scale items are indicators of latent (unobserved) factors and uses maximum likelihood estimates to evaluate the level of fit between the data and the measurement model and to identify redundant items. The resulting three factor 9-item CFA exhibited desirable psychometric properties: Root mean square error of approximation (RMSEA) = .046; Akaike Information Criterion (AIC) = 76.95; Comparative Fit Index (CFI) = .984. The model \( \chi^2 = 30.95 \) was non-significant. The CFA results are shown in Fig. 1. Additional information on the SSCLEE – C, including item means, inter-item correlations and covariance, is provided in Table 2.

Relying on a process of deliberation among authors, and in consideration of simulation design characteristics defined by Jeffries and Rogers [9], the three resulting factors were labeled “fidelity”, “problem solving” and “objectives”. Fig. 1 represents the factors and corresponding items. Factor one is labeled as fidelity (Cronbach’s \( \alpha = .821 \)) and included items 9, 11 and 18. Item 9 read: “Participation in the simulation increased my confidence in providing care for clients in this type of situation”; item 11 read: “Participation in the simulation helped clarify the importance of correctional nursing roles and team work in providing care to our clients”; and item 18 read: “I was satisfied with my role assignments”. The team interpreted these items to address the direct link to the reality a simulation creates. The realism of the environment is a critical element when simulating the assessment procedures healthcare providers must go through prior to caring for a patient. The environment must accommodate normal practices and routines [9]. This facilitates transference into clinical practice.

Factor two, labeled as problem-solving (Cronbach’s \( \alpha = .703 \)) is comprised of both problem-solving and critical thinking. Items 5, 7 and 10 are included in this factor. Item 5 states: “The simulation helped me learn new skills”; item 7 states: “The simulation resembled real-life situation”; and item 10 states: “I receive adequate and timely cues during the simulation when needed”. Many instances that occur in correctional settings (prisons or jails) are unconventional environments for healthcare. The ability to problem solve within the structure of custodial regulations requires critical thinking skills. The simulation environment must mimic this clinical reality in order for the healthcare team to practice safely. The fidelity of the simulation environment allows sufficient time for the practice of problem-solving and critical thinking during the debrief activity, as nurse participants review their experience of assessment and interventions in response to the simulation presented to them. Factor 3, labeled objectives of the simulation (Cronbach’s \( \alpha = .704 \)) include items 1, 14 and 17. Item 1 says: “I clearly understood the purpose and objectives for this course’s simulations”; item 14 reads: “Debriefing after the scenario helped me understand the rationale for decisions”; and item 17 states: “The simulation and debriefing helped me recognize my weakness”. The simulation objective reflects both cognitive and reflective perspective. Intended outcomes and behaviors are the result of cognitive framing and reflection of one’s practice as proposed in the simulation objectives. The simulation objectives must be attainable for the learner to achieve successfully [10] and build clinical competence. Additional information on the SSCLEE – C, including item means, inter-item correlations, and covariates, is provided in Table 2.

### Table 1 – Factor loadings, SSCLEE.

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
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<tbody>
<tr>
<td>9</td>
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<tr>
<td>11</td>
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<td>.184</td>
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<tr>
<td>10</td>
<td>.320</td>
<td>.713</td>
<td>.130</td>
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The bolded items are the high-loading variables to identify the 3 item factor.

### 3. Discussion

The findings of this study suggest that the SSCLEE-C can be used to measure satisfaction with the clinical simulation learning experience among correctional nurses. The three factors of the reduced 9-item SSCLEE-C, interpreted as fidelity, objectives, and problem-solving are theoretically supported by the simulation design characteristics (Jeffries, 2012) and imply those components most important for work in the correctional environment. Our experience when designing this program found that replicating scenarios that were found to occur in the clinical environment (such as codes or emergencies) made the simulation experience real for nurse participants. But more important were the materials that
comprised the underlying structure: such as adult learning styles, moving knowledge from familiar to unfamiliar, incorporating the ANA Scope and Standards of Correctional Nursing Practice (2013). Such foundations provided the opportunity to transfer learned or refreshed knowledge in the simulated environment to the clinical environment through use of critical thinking and skill demonstrating enhanced clinical competency.

4. Conclusion

The modified and validated Satisfaction with Simulated Clinical Learning Experience Evaluation – Corrections (SSCLE-C) is the first corrections modified nursing simulation evaluation instrument designed to test correctional clinical nurse competency through self-report of satisfaction with simulation.
learning. The 9-item instrument measured three factors: fidelity, problem-solving and objectives to evaluate participant learning, skill performance, satisfaction, critical thinking, and self-confidence. These factors appear to capture the essence of simulation design, a critical component of the Correctional Nurse Competency Program© [13,14]. The next steps involve testing the reliability of the instrument with a more rigorous study design and larger samples across multi-state sites.

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REFERENCES