International Journal of Advanced Multidisciplinary Research and Studies

Improving Culture of Safety using Structured Clinical Debriefing among Nursing Students

¹ Shania Mathews, ² Sunddip Panesar Aguilar, ³ Mark Kelso, ⁴ Lori Kupczynksi, ⁵ Anu Ullas, ⁶ Cynthia A Dubs
¹ College of Nursing, University of South Florida, United States
²,³,⁴ College of Health Sciences, University of St. Augustine, United States
⁵ College of Nursing, University of South Florida, United States
⁶ College of Nursing, University of South Florida, United States

Corresponding Author: **Sunddip Panesar-Aguilar**

Abstract
Debriefing is considered a critical element in healthcare education. Although an abundance of research has been conducted to evaluate the effectiveness of debriefing during simulation, no studies have compared the effectiveness of structured debriefing in promoting clinical safety during clinical rotation. This quantitative quasi-experimental ex-post facto design study aimed to examine the causal relationship between structured debriefing and the promotion of safety during clinical practices in healthcare settings. Participants consisted of 149 senior undergraduate nursing students from the associate-degree nursing program. A quasi-experimental ex-post-facto research design was utilized. The study compared the archival data of students' exit HESI exam scores for senior undergraduate nursing students who attended traditional debriefing sessions with students who attended structured debriefing sessions during clinical rotation. Hypothesis testing for the research question was performed using one-way ANOVA, and there was sufficient evidence to reject the null hypothesis. There were no significant differences between the environment, concept safety, and QSEN groups. The one-way ANOVA results illustrated a statistically significant positive difference in exit HESI exam sub-scores safety components among nursing students who participated in structured debriefing sessions compared to nursing students who participated in traditional debriefing sessions during clinical rotation. The study results could help nurse educators re-design the nursing curriculum and use structured debriefing as a teaching strategy in the undergraduate nursing curriculum to educate students regarding the promotion of clinical safety in healthcare settings.

1. Introduction

Clinical education is considered the heart of professional education in nursing (Farzi *et al*., 2018) [14]. Clinical rotation allows students to observe and practice their skills safely in a healthcare setting (Billings & Halstead, 2020) [9]. Nursing students must also participate in a debriefing session at the end of their daily clinical rotation. Debriefing is a teaching strategy that nurse educators utilize to develop critical thinking skills in nursing students (Keating, 2017) [19]. Debriefing also enables students to reflect on their observations and enhance future clinical performances (Keating, 2017) [19]. The QSEN project has laid out teaching strategies such as clinical journaling, reflection, and challenges for nursing students to reflect on their nursing experiences and observations during clinical rotation to practice safe nursing skills (Doughty, 2020) [13]. The use of effective debriefing during clinical rotation enables nursing students to practice safe nursing skills. The nursing programs utilize standardized exit Health Education Systems, Inc (HESI) exams to evaluate student performance in clinical and academic settings.

Much research has been conducted on the effectiveness of debriefing during simulation practice in nursing education (Allahbakhshian *et al*., 2018; Ha, 2020) [4, 17]. However, more needs to be explored regarding how efficiently the debriefing strategies are implemented during clinical nursing education (Agency for Healthcare and Research Quality [AHRQ], 2019). Additionally, the effectiveness of structured debriefing in improving student academic performance is yet to be explored (AHRQ, 2019).

Nursing is considered one of the most significant healthcare professions, as nurses are the primary providers of direct patient

care and are involved in numerous roles to meet increasingly complex healthcare needs (American Association of Colleges of Nursing [AACN], 2019) [5]. Data shows that approximately 3.8 million nurses nationwide are employed in healthcare (AACN, 2019) [5]. Nurses constitute a large healthcare workforce that provides direct care to patients (AACN, 2019) [5]. Nurses spend a considerable amount of time with patients at the bedside. Nurses collaborate with multi-disciplinary healthcare team members and discuss the care of the patients. Nurses' liaison between the patient and other healthcare team members, including physicians, in delivering safe and effective care (AHRQ, 2021). Hence, building a culture of safety in all phases of nursing education and nursing practice is essential. Medical errors are one of the causative factors for patient injury, disability, and even death (Rodziewicz et al., 2021) [22].

Clinical safety is considered an essential component of healthcare as it helps reduce errors, risks, and harm to patients in hospital settings (American Nurses Association (ANA), 2019) [6]. The ANA defines the culture of safety as "core values and behaviors resulting from a collective and sustained commitment by organizational leadership, managers, and health care workers to emphasize safety over competing goals" (ANA, 2019, p. 1) [6]. In a healthcare organization, the safety of patients and healthcare providers is a priority. The key components of the culture of safety include values, leadership, ownership, communication, collaboration, a blame-free environment, and ongoing evaluation (ANA, 2019) [6].

Medical errors are a causative factor for over 100,000 deaths annually (Centers for Disease Control and Prevention [CDC], 2021) [11]. Even though the death rates secondary to medical errors dropped significantly in 2021 they are still costly from an economic, human, and social viewpoint. An evidence-based estimate of medical errors suggests that over 400,000 patients experience some preventable medical errors during their hospital stay (Rodziewicz et al., 2021) [22]. Additionally, increases in medical errors significantly increase deaths, disabilities, lost productivity, and increased medical costs (Rodziewicz et al., 2021) [22]. Furthermore, the medical cost of treating these errors is estimated to be approximately $20 billion annually (World Health Organization [WHO], 2021). Hence, it is critical to implement preventable strategies that reduce medical errors and enhance patient safety.

Clinical learning is an essential element of the nursing curriculum. According to the Florida Board of Nursing, an associate degree professional nursing education curriculum must consist of 50% clinical training (Florida Board of Nursing, 2023) [15]. Based on the Florida Board of Nursing requirement, nursing students complete the required hours of clinical rotation during their nursing program. Clinical rotations are an essential part of nursing education that enable students to apply theoretical learning to clinical practice settings (Keating, 2017) [19]. The effectiveness of clinical learning is based on students' success in their academic and professional careers. Clinical instructors promote clinical learning by using various teaching strategies such as clinical rounds, pre- and post-debriefing, drug calculation examinations, and direct supervision (Bastable, 2017) [8]. During clinical rotation, students must attend the pre- and post-debrief sessions as part of their clinical attendance. Debriefing enhances students' critical thinking and clinical reasoning abilities, enabling them to perform skills like a nurse (Bradley et al., 2020) [10].

2. Problem and Research Question
The problem is whether the implementation of structured debriefing over traditional debriefing during clinical rotation impacted senior undergraduate nursing student's promotion of safety during clinical practices in the healthcare setting, as evidenced by the student's exit HESI scores. Nurses provide direct care to patients in a healthcare setting. Hence, nurses play a vital role in ensuring patient safety by monitoring patient's conditions, identifying near misses and errors, and providing quality care (American Society of Advanced Nurses [ASRN], 2015). According to the National Council of State Boards of Nursing (NCSBN, 2021) [21] report, 46% of skills performed by novice nurses require clinical judgment, and nearly 50% of novice nurses are involved in nursing care errors.

This quantitative quasi-experimental ex-post-facto study answered the following research questions:

RQ1. To what extent does a difference exist between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on safe, effective environment among senior undergraduate nursing students?

RQ2. To what extent does a difference exist between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on nursing concept safety among senior undergraduate nursing students?

RQ3. To what extent does a difference exist between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on QSEN culture of safety and safety monitoring among senior undergraduate nursing students?

Hypotheses
The quantitative quasi-experimental ex-post-facto study tested the following hypotheses:

H$_1$. There is a significant difference between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on safe, effective environment among senior undergraduate nursing students.

H$_2$. There is a significant difference between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on nursing concept safety among senior undergraduate nursing students.

H$_3$. There is a significant difference between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on QSEN culture of safety and safety monitoring among senior undergraduate nursing students.

3. Materials and Methods
A quasi-experimental ex-post-facto research design was utilized to evaluate the senior undergraduate nursing student's promotion of safety during clinical practices in a healthcare setting as evidenced by the student's exit HESI exam sub-scores on the safe and effective environment, nursing concept safety, and QSEN culture of safety and safety monitoring. The study utilized senior undergraduate nursing students from two cohorts: Cohort A, which attended structured debriefing sessions, and Cohort B, which

participated in traditional debriefing sessions during clinical rotation.

3.1 Participant Sampling

The general population for this study consisted of English-speaking undergraduate associate degree nursing students educated in the healthcare educational institution of South Florida. A convenience sample of 149 senior undergraduate nursing students from the associate-degree nursing program at a public healthcare educational institution in South Florida was used in the study. The exit HESI exam results of students enrolled in three consecutive semesters (fall 2020, spring 2021, and Fal1 2021) of two academic cohorts were taken for the study. All student participants were enrolled in an adult-health II nursing class and completed 112 hours of clinical rotation. The control group consisted of students in Cohort A who received traditional debriefing following clinical rotation. The experimental group comprised Cohort B students who received structured debriefing following clinical rotation.

3.2 Data Collection

Data was collected from a healthcare educational institution in South Florida. Archival data were collected from HESI exam databases for two cohorts of undergraduate senior nursing students who participated in the clinical debriefing during the final semester and completed their exit HESI exam at the end of the program. The study examined quantitative data in the form of archival student records. Quantitative data was collected and compared via analysis of exit HESI exam sub-scores on the safe, effective environment, nursing concept safety, and QSEN culture of safety and safety monitoring of two senior nursing cohorts. The HESI exit exam is a 150-item comprehensive exam administered to senior nursing students near the nursing curriculum's completion. The exam measures graduating students' preparedness for the NCLEX-RN exam. The data used for the study was previously recorded and stored by the healthcare educational institution in South Florida.

3.3 Data Analysis and Results

Data was statistically analyzed using the Statistical Package of the Social Sciences (SPSS) version 27. Simple descriptive statistics provided a baseline analysis, and a generalized linear model evaluated the intervention's effectiveness (Gray et al., 2017) [16]. The demographic information of participants was analyzed using descriptive statistics. The demographic data helped in determining whether the participants used in the study were a representative sample of the target population (Gray et al., 2017) [16]. Data analysis for this study was conducted using one-way ANOVA. The one-way ANOVA test was used to determine if there were statistically significant differences between the means of two cohort groups of senior nursing undergraduate students (Laerd Statistics, 2018) [20].

Research Question and Null Hypothesis 1

RQ1: To what extent does a difference exist between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on safe, effective environment among senior undergraduate nursing students?
H$_{01}$: There is no significant difference between the students who used structured clinical debriefing and students who

used traditional debriefing on exit HESI exam sub-scores on safe, effective environment among senior undergraduate nursing students.

Hypothesis Testing for Research Question 1

Hypothesis testing for Research Question 1 was performed using a one-way ANOVA. The one-way ANOVA calculations, shown in Table 1, provided evidence to reject the null hypothesis of no differences between groups F (1, 145) = 12.7, p = .000 (Tan, 2017).

Table 1: One-Way Analyses of Variance in Environment Sub-Scores

Sub-Scores		Sum of Squares	df	Mean Square	F	Sig.
Env	Between Groups	273781.033	1	273781.033	12.702	.000
	Within Groups	3125420.655	145	21554.625		
	Total	3399201.687	146			

Thus, it appears that for environment, the alternative hypothesis of statistically significant differences between debriefing group types is accepted.

Table 2: Effect Sizes for One-Way ANOVA in Environment Sub-Scores

Sub-Scores	η^2	Lower	Upper
Env	.081	.016	.174

Note: η^2 = Eta-squared

As shown in Table 2, the difference is moderate, as indicated by the effect size η^2 = .08.

Research Question 2/Null Hypothesis 2

RQ2: To what extent does a difference exist between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on nursing concept safety among senior undergraduate nursing students?
H$_{02}$: There is no significant difference between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on nursing concept safety among senior undergraduate nursing students.

Hypothesis Testing for Research Question 2

Hypothesis testing for Research Question 2 was performed using one-way ANOVA. The one-way ANOVA calculations indicated no differences between groups F (1, 146) = 27.6, p = .000 and provided evidence to reject the null hypothesis as shown in Table 3.

Table 3: One-Way Analyses of Variance in Concept Sub-Scores

Sub-Scores		Sum of Squares	df	Mean Square	F	Sig.
Concept	Between Groups	656099.769	1	656099.769	27.603	.000
	Within Groups	3470269.657	146	23768.970		
	Total	4126369.426	147			

Thus, it appears that for concept the alternative hypothesis of statistically significant differences between debriefing group types is accepted.

Table 4: Effect Sizes for One-Way ANOVA in Concept Sub-Scores

Sub-Scores	η^2	Lower	Upper
Concept	.159	.065	.265

Note: η^2 = Eta-squared

As shown in Table 4, the difference is moderate, as indicated by the effect size $\eta^2 = .16$.

Research Question 3/Null Hypothesis 3

RQ3: To what extent does a difference exist between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on QSEN culture of safety and safety monitoring among senior undergraduate nursing students?

H03: There is no significant difference between the students who used structured clinical debriefing and students who used traditional debriefing on exit HESI exam sub-scores on QSEN culture of safety and safety monitoring among senior undergraduate nursing students.

Hypothesis Testing for Research Question 3

Hypothesis testing for Research Question 3 was performed using one-way ANOVA. The one-way ANOVA shown in Table 5 provided evidence to reject the null hypothesis of no differences between groups $F(1, 147) = 4.96$, $p = .027$.

Table 5: One-Way Analyses of Variance in QSEN Sub-Scores

Sub-Scores		Sum of Squares	df	Mean Square	F	Sig.
QSEN	Between Groups	102237.240	1	102237.240	4.960	.027
	Within Groups	3029841.270	147	20611.165		
	Total	3132078.510	148			

Thus, it appears that for QSEN, the alternative hypothesis of statistically significant differences between debriefing group types was accepted.

Table 6: Effect Sizes for One-Way ANOVA in QSEN Sub-Scores

Sub-Scores	η^2	Lower	Upper
QSEN	.033	.000	.106

Note: η^2 = Eta-squared

As shown in Table 6, the difference is moderate, as indicated by the effect size $\eta^2 = .03$.

4. Results
RQ1

Results revealed that the mean of the exit HESI exam sub-scores on the safe, effective environment for students who attended structured clinical debriefing during clinical rotation were statistically higher when compared to the mean scores of the students who attended traditional debriefing (M = 777.6 vs. 695.4). A One-Way ANOVA was used to test the hypothesis that provided evidence to reject the null hypothesis (H01). The research studies by Hu *et al.* (2021) [18] emphasized that maintaining a safe, effective environment and safety culture in healthcare settings are essential to reducing medical errors.

RQ2

Results revealed that the means of the exit HESI exam sub-scores on the nursing concept safety for students who attended the structured debriefing during clinical rotation were significantly higher when compared to the mean of the students who attended the traditional debriefing (M =816.5 vs. 689.6). A One-Way ANOVA was used to evaluate the hypothesis that provided evidence to reject the null hypothesis (H02). The research studies conducted by Abusaksaksa *et al.* (2020) [1] and Safati *et al.* (2018) [23] recommended adding effective teaching strategies to educate nursing students regarding clinical safety concepts to enhance the prevention of medical errors in healthcare settings.

RQ3

Results revealed that the mean exit HESI exam sub-scores on the QSEN for students who used structured clinical debriefing during clinical rotation was higher than those who used traditional debriefing (M =755.2 vs 702.7). A One-Way ANOVA was used to test the hypothesis that provided evidence to reject the null hypothesis (H03). The integration of QSEN competencies into the nursing curriculum was recommended in a study conducted by Cengiz and Yoder (2020) [12] to assess nursing students' perception of QSEN competencies. Results from the study could catalyze for nurse educators to include effective teaching strategies to educate students regarding promoting clinical safety and the prevention of medical errors.

5. Conclusion

The results of Research Questions 1, 2, and 3 suggested that an increase in the mean sub-scores on the safe, effective environment, nursing safety concept, and QSEN competencies for students who attended structured clinical debriefing are associated with a higher confidence level using structured debriefing as a teaching strategy in the under-graduate nursing curriculum. The statistical analysis resulted in a moderate to a strong association between the type of debriefing and exit HESI exam sub-scores of the clinical safety components. Additionally, the QSEN mean scores were highest, with the least variability for the students who attended structured and traditional debriefing. Integrating effective teaching strategies to teach clinical safety concepts is essential in cultivating efficient future nurses who provide safe and quality patient care.

When comparing debriefing methods, the study results revealed a statistically significant differences in the exit HESI exam sub-scores among senior-undergraduate nursing students. Further evaluation of the hypothesis was performed using a One-Way ANOVA that rejected null hypotheses for all research questions. The findings from this study empowered the use of structured debriefing during nursing students' clinical rotations. The study findings may also help nurse educators to adopt faculty-led structured debriefing during clinical rotation when revising the nursing curriculum. It is evident from the study results that the inclusion of structured debriefing helps nursing students better understand clinical safety concepts. There remains enormous potential for studies to be conducted to evaluate the effectiveness of structured debriefing and its impact on nursing students` ability to prevent medical errors and provide safe and quality patient care.

6. References

1. Abusaksaksa Y, Vember H, Modeste R. Perceived occurrence of medication administration errors among nursing students at a higher education institution in

western cape, South Africa. Africa Journal of Nursing and Midwifery. 2020; 22(2).
Doi: https://doi.org/10.25159/2520-5293/6957
2. Agency for Healthcare Research and Quality. Debriefing for clinical learning, 2019b. https://psnet.ahrq.gov/primer/debriefing-clinical-learning
3. Agency for Healthcare Research and Quality. Nursing and patient safety, 2021. https://psnet.ahrq.gov/primer/nursing-and-patient-safety
4. Allahbakhshian A, Ostovar S, Gholizadeh L, Dizaji S, Sarbakhsh P, Ghahramanian A. Comparison of the effects of debriefing methods on psychomotor skills, self-confidence, and satisfaction in novice nursing students: A quasi-experimental study. Journal of Advanced Pharmaceutical Technology & Research. 2018; 9(3):107.
Doi: https://doi.org/10.4103/japtr.japtr_291_18
5. American Association of Colleges of Nursing. AACN fact sheet, 2019. https://www.aacnnursing.org/News-Information/Fact-Sheets/Nursing-Fact-Sheet
6. American Nurses Association. Culture of safety - ANA community, 2019. https://community.ana.org/pages/cultureofsafety?ssopc=1
7. American Society of Advanced Nurses. Nurse staffing and patient safety. The Journal of Advanced Practice Nursing, 2015. https://www.asrn.org/journal-advanced-practice-nursing/1403-nurse-staffing-and-patient-safety.html
8. Bastable SS. Nurse as educator: Principles of teaching and learning for nursing practice (5th ed.). Jones & Bartlett learning, 2017.
9. Billings DM, Halstead JA. Teaching in nursing: A guide for faculty (5th ed.). Elsevier, 2020.
10. Bradley C, Johnson B, Dreifuerst K. Debriefing: A place for enthusiastic teaching and learning at a distance. Clinical Simulation in Nursing. 2020; 49:16-18. Doi: https://doi.org/10.1016/j.ecns.2020.04.001
11. Centers for Disease Control and Prevention. Fast Stats, March 2, 2021. https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm
12. Cengiz A, Yoder LH. Assessing nursing students' Perceptions of the QSEN competencies: A systematic review of the literature with implications for academic programs. Worldviews on Evidence-Based Nursing. 2020; 17(4):275-282.
Doi: https://doi.org/10.1111/wvn.12458
13. Doughty K. Incorporation of QSEN competencies in clinical. QSEN Institute, 2020. https://qsen.org/incorporation-of-qsen-competencies-in-clinical/
14. Farzi S, Shahriari M, AHRQ S. Exploring the challenges of clinical education in nursing and strategies to improve it: A qualitative study. Journal of Education and Health Promotion. 2018; 7(115).
Doi: https://doi.org/10.4103/jehp.jehp_169_17
15. Florida Board of Nursing. Practical and registered nurse program, 2023. https://floridasnursing.gov/licensing/practical-and-registered-nurse-education-program/
16. Gray JR, Grove SK, Sutherland S. The practice of nursing research: Appraisal, synthesis, and generation of evidence (8th ed.). Elsevier, 2017.
17. Ha EH. Effects of peer-led debriefing using simulation with case-based learning: Written vs. observed debriefing. Nurse Education Today. 2020; 84, 104249.
Doi: https://doi.org/10.1016/j.nedt.2019.104249
18. Hu S, Wang T, Ramalho N, Zhou D, Hu X, Zhao H. Relationship between patient safety culture and safety performance in nursing: The role of safety behavior. International Journal of Nursing Practice. 2021; 27(4).
Doi: https://doi.org/10.1111/ijn.12937
19. Keating SB. Curriculum development and evaluation in nursing education (4th ed.) Springer, 2017.
20. Laerd Statistics. One-way ANOVA - An introduction to when you should run this test and the test hypothesis, 2018. https://statistics.laerd.com/statistical-guides/one-way-anova-statisticalguide.ph
21. National Council of State Boards of Nursing. Ongoing research. NCSBN, 2021. https://www.ncsbn.org/ongoing-research.htm
22. Rodziewicz TL, Houseman B, Hipkind JE. Medical error reduction and prevention. StatPearls, 2021.
23. Sarfati L, Ranchon F, Vantard N, Schwiertz V, Larbre V, Parat S, et al. Human-simulation-based learning to prevent medication error: A systematic review. Journal of Evaluation in Clinical Practice. 2018; 25(1):11-20.
Doi: https://doi.org/10.1111/jep.12883
24. World Health Organization. Patient safety fact file, 2019. https://www.who.int/features/factfiles/patient_safety/patient-safety-fact-file.pdf?ua=1