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Faculty Development in High Fidelity Clinical Simulation

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Abstract: High fidelity simulation (HFS) is an educational format that demonstrates a realistic situational approach to learning. The purpose of this study was to evaluate the effect of a HFS educational action plan on faculty members' perceived comfort levels with utilization of HFS as an integrative teaching methodology.A sample of 42 educators from an accredited RN nursing school in the northeast was used. Data was collected using the Jones Faculty Comfort Assessment Tool.Results were presented using percentages, frequencies, and *t*-test. The findings revealed a statistically significant pre and post comfort level in the utilization of HFS with a $p<0.001$ following the educational component of the study; along with the reporting from faculty of the need for a simulation specialist, $p<0.001$; demonstration practice, $p<0.001$; the provision of a simulation committee, $p=0.008$; and a simulation workshop, $p<0.001$. Faculty did not demonstrate statistically significant results pre and post comparisons in the amount of time needed to plan, $p=0.664$; implement, $p=0.083$; and evaluate, $p=1.00$; the utilization of HFS; or the need for release time, $p=1.00$; or colleague collaboration, $p=0.103$. The results suggested that while nursing faculty feel the use of HFS is a viable teaching strategy, there is significant trepidation on their part in the comfort of its use. There is significant need for nursing programs to provide faculty with formal educational programs and support, to facilitate the use of HFS as a teaching strategy.

Keywords: simulation, simulation in nursing education, human simulation, HFS, faculty comfort levels in simulation, barriers to use of simulation.

INTRODUCTION

The landscape of nursing education has changed over time, along with factors that have influenced some of the changes. Today's key influences are (a) societal demands for safety and quality, (b) a need to recreate education of health professionals, (c) ethical considerations, (d) advances in technology, (e) professional shortages, and (f) a changing landscape for the delivery of patient care (Nehring, 2008). Consequently, nursing education must provide students with alternatives to traditional clinical settings.

High-fidelity simulation (HFS) is a process in which real life clinical situations are reproduced in a safe, controlled, learning environment. Overall, nursing educators are in agreement that simulation is an excellent alternative to the traditional clinical setting, providing effective learning experiences and facilitating the process of critical thinking (Cioffi, 2001). This change has stimulated the need to modify the role of the nurse educator to meet the demands of a changing environment.

The National Council of State Boards of Nursing (NCSBN) discusses "critical elements of nursing education" that are inclusive of HFS (NCSBN, 2006, p. 4). Learning through the use of simulation has been an integral part of the education process in other disciplines such as the aeronautics industry, the defense industry, and medical schools for decades, yet it is in its relative infancy in nursing education (Haskvitz & Koop, 2004). Nursing programs have been slow to adopt high fidelity human patient simulation as a major teaching strategy, incorporating HFS for approximately the last 10+ years (Waxman & Telles, 2009).High fidelity simulators provide an opportunity for increased supervision and mentoring of novice learners, thereby enhancing the utilization of preparation time prior to the clinical experience. In addition, it also addresses the ethical nature of practicing on human patients (Bremner, Aduddell, Bennett, & Van Geest, 2006). HFS provides a method to increase safety and decrease errors, improving clinical judgment, and is useful for teaching and evaluating specific clinical skills (Bearnson & Wiker, 2005). It is important to remember, it is not solely the use of simulation, but the techniques employed with simulation that can improve the teaching learning experience for faculty and students. Safety and competency are issues impacting education and ultimately health care. Simulation offers students a protected environment for learning, providing realistic opportunities to develop and nurture problem solving skills (Nehring, 2008).

LITERATURE REVIEW

The databases utilized for the literature search were CINAHL and PubMed. Keywords included: (a) simulation, (b) simulation in nursing education, (c) human simulation, (d) HFS, (e) faculty comfort levels in simulation, and (f) barriers to use of simulation. Approximately 45 of the articles were relevant to the topic search.

The topics that were identified in the literature review included: (a) incorporation of simulation technology into a nursing curriculum; (b) utilization of a framework to design, implement, and evaluate simulation as a teaching strategy; c) preparation of educators for simulation; (d) identification of faculty and student perspectives in the integration of simulation; and (e) identification of barriers to implementation strategies to increase utilization. The research articles can be divided into three categories: (a) nursing education, (b) barriers to use of HFS, and (c) preparation of educators for the use of HFS.

Nursing Education:

Thirteen articles addressed HFS in nursing education as it correlates to traditional versus complementary teaching methods, and the importance of integrating this pedagogy into both didactic and clinical components of nursing programs. Seropian, Brown, Gavilanes, and Driggers, (2004) stated that using simulation effectively requires (a) organization, (b) curricular thought, (c) skill in simulation, and (d) a vision that simulation is a new opportunity in health care and clinical experience. Jeffries and Rogers (2007) discussed the need to use a framework developed from theoretical and empirical literature, in order to facilitate the design, implementation, and evaluation process of HFS. Overall, nursing students identified simulation as a positive learning experience, stating that the experience helped diminish their stress on the first day of the clinical rotation (Bremner, Aduddell, Bennett, & VanGeest, 2006).

Barriers to Use of HFS:

Potential barriers that are actual and or perceived by nursing educators were identified in four articles. Adamson (2010) discussed lack of time for preparation and lack of support of faculty to run the HFS scenarios as significant barriers affecting educator use of simulation.

Nursing faculty perceptions of HFS had a direct correlation to the utilization of the pedagogy. Jensen, Johnson, Larson, Berry, and Brenner (2009) identified seven categories of challenges: (a) time, (b) training, (c) not applicable/attitude, (d) lack of space and equipment/scheduling the lab, (e) funding, (f) staffing, and (g) engaging all students while a few are involved in simulation. Promoting the integration of HFS in the nursing curriculum as didactic or clinical components of a course was a significant challenge that confronted faculty. Facilitating this process was an important component in promoting the utilization of this teaching strategy.

Preparation of Educators for the Use of HFS:

Four articles identified the importance of faculty development in the overall success of simulation programs. Waxman and Telles (2009) stated that having qualified instructors to run the simulations was more important than purchasing expensive equipment.

Blazeck (2010) stated that faculty expressed unnecessary anxiety and opposition to simulation due to the technology and their inexperience. Once the fear of simulation was removed, faculty would be more conducive to integrating the technology into the courses they teach. Blazeck discussed three points to present to faculty: (a) we are never sure where a student might take us in a scenario, (b) we handle this in clinical every day, with little control, and (c) now we control the patient, allowing us to control the consequences of student interventions and direct the learning. The key message in this educational process is "this is low risk." It is important to allow faculty to observe and experience the technology in a nonthreatening environment. The management of these challenges is important for facilitating the use of HFS in nursing education.

Framework:

The *Nursing Education Simulation Framework* was developed specifically for simulation in nursing education (Jefferies & Rogers, 2007). This framework consists of three spheres. Faculty and student characteristics along with educational practices are included in one sphere, which subsequently influences student outcomes (second sphere) and simulation design characteristics (third sphere). The simulation is then determined by the learning needs of the student. Each simulation is directly influenced by the availability of technology and the expertise of the faculty (Nehring, 2008). This framework enables nurse educators to develop models of clinical education, thereby offering more realistic teaching learning strategies. Due to the varying degrees of expertise in simulation the role of the mentor or "champion" must be adapted to the needs of the individual faculty. The National League for Nursing (NLN, 2006, p. 1) "advocates the use of mentoring as a primary strategy to establish healthful work environments and facilitate the ongoing career development of nurse faculty." Contemporary aspects of mentoring can perpetuate a more collaborative model of both peer and co-mentoring, thereby sharing knowledge and promoting empowerment. The more traditional peer mentoring occurs when faculty members pool their information and expertise and support each other. Co-mentoring is characterized by reciprocity and involves listening and being listed to, teaching as well as learning (NLN, 2006).

Purpose/Aim:

The purpose of this study was to evaluate the effect of an HFS education action plan that provided nursing faculty with the skills of effective utilization of HFS. The research question was: What is the effect of the HFS educational action plan on the faculty members' perceived comfort levels with utilization of HFS as an integrative teaching methodology?

Setting/Sample:

An accredited northeast associate degree RN nursing program, which has an articulation agreement with the local state university, was used for the evaluation. A sample set of 42 volunteer educators participated in the study.

Methodology/Measurement Tool:

This pretest/posttest descriptive analysis utilized The Jones Faculty Comfort Assessment Tool (JFCAT) prior to the implementation of the HFS education action plan, and again after the program had been implemented. The JFCAT was distributed to the participants' pre and post intervention. The reliability summary for the JFCAT reflected a Cronbach Alpha of 0.91. Validity for this instrument had been established through a matrix developed by Jones with validation by three simulation specialists, each employed in a different setting (Jones, 2005).

The survey contained closed end items regarding respondent demographics and previous experience with simulation. The tool asked for level of expertise in the utilization of HFS as identified by novice, advanced beginner, competent, or proficient. Respondents were asked to identify their comfort levels in relation to specific instructional uses of technology in the classroom. They were also asked to rate their degree of comfort in various uses of HFS as a teaching

method. A 5 point response scale was utilized (1 = no comfort up to 5 = total comfort). Time evaluation was asked in relation to planning, implementing, and evaluating the HFS. A scale of ¼ release time, ½ release time, ¾ release time, and full-time release were choices. Respondents were asked to identify necessary support systems in relation to their comfort levels. A 5 point response scale was used (1 = no assistance to 5 = great assistance). Several open ended items were also included in the tool to gather expanded comments regarding specific themes related to HFS. Data were collected and compiled representing the pre assessment phase of the project. Permission was granted for use of this tool from the author, Amy L. Jones RN, EdD, assistant professor and simulation coordinator at South Dakota State University.

RESULTS

Sample Demographics:

The majority of the members of the faculty (66.7%) held the position of Instructor. A Master of Science degree was held by the majority (83.3%) of the faculty members. There was a split in the employment status of the faculty with 58.3% being part-time and, (41.7%) being full-time. A majority of the participants (75%) practiced nursing for 15+ years. The majority of respondents had worked as educators for either 6-14 years (41.7%) or 15+ years (33.3%). Years in teaching were divided as follows: (a) 0-2 years (16.6%), (b) 3-5 years (25%), (c) 6-14 years (37.5%), and (d) 15+ years (20.8%). A majority (75%) of faculty members rated themselves at the novice level for HFS expertise. There majority (50%) of participants rated their overall level of comfort at a level 2 (1 = no comfort, 5 = total comfort). The nursing courses that the faculty taught were divided as (29.1%) first semester course, (16.6%) second semester course, (25%) third semester course, and (29.1%) fourth semester course. The data described are presented in Table 1.

Table 1: Demographic Data

Characteristics	Frequency	Valid Percentage
Current Position		
Instructor	16	66.7
Assistant Professor	4	16.7
Associate Professor	1	4.2
Full Professor	3	12.5
Type of Degree		
Master of Science	20	83.3
Education Doctorate	1	4.2
Doctorate of Nursing Practice	3	12.5
Employment Status		
Part-time	14	58.3
Full-time	10	41.7
Years of Nursing Practice Experience		
3-5 years	1	4.2
6-14 years	5	20.8
15+ years	18	75.0

Faculty Comfort level:

The research questions were compared pre and post-survey utilizing a paired samples t- test method rating their comfort level from 1 = No Comfort to 5 = Total Comfort. The pre/post comparisons of comfort level for questions 1 – 12 were all statistically significant with a $p< 0.001$. Each of the identified areas demonstrated a significant increase in faculty comfort levels following the educational program component of the research study. The results of this data can be found in Table 2.

Table 2: Comfort Level Pre and Post Survey

Paired Samplest Test	Mean	Standard Deviation
Pair 1 Question 1		
Utilizing HFS for supplemental lecture		
Pre Comfort	1.70	1.08
Post Comfort	3.00	0.97
Pair 2 Question 2		
Utilizing HFS to replace lecture		
Pre Comfort	1.41	0.82
Post Comfort	2.04	0.85
Pair 3 Question 3		
Utilizing HFS to replace lab hours		
Pre Comfort	2.12	1.07
Post Comfort	3.04	0.85
Pair 4 Question 4		
Utilizing HFS as clinical make-up		
Pre Comfort	2.58	1.24
Post Comfort	3.75	0.67
Pair 5 Question 5		
Utilizing HFS as replacement for clinical hours		
Pre Comfort	2.12	1.19
Post Comfort	2.91	0.82
Pair 6 Question 6		
Utilizing HFS to provide active-learning		
Pre Comfort	2.45	1.17
Post Comfort	3.45	0.72
Pair 7 Question 7		
Utilizing HFS to promote feedback		
Pre Comfort	2.50	1.10
Post Comfort	3.58	0.71
Pair 8 Question 8		
Utilizing HFS to promote collaboration		
Pre Comfort	2,33	0.91
Post Comfort	3.30	0.58
Pair 9 Question 9		
Utilize HFS to promote high-expectations		
Pre Comfort	2.29	0.95
Post Comfort	3.25	0.53
Pair 10 Question 10		
Utilize HFS to promote diversity in learning		
Pre Comfort	2.50	0.83
Post Comfort	3.62	0.49
Pair 11 Question 11		
Utilize HFS to improve time-on-task		
Pre Comfort	2.62	1.01
Post Comfort	3.19	0.71
Pair 12 Question 12		
Utilize HFS to improve student/faculty interaction		
Pre Comfort	2.45	1.02
Post Comfort	3.41	0.65

*Cronbach's Alpha for this sample was: Pretest comfort = 0.973 and Posttest comfort = 0.936

Time Evaluation:

Faculty members were asked to assess the amount of time they would need to plan, implement, and evaluate the utilization of HFS in the courses they teach. The criteria were based on Full-Time Equivalent (FTE) release of time, 0.25, 0.50, 0.75, and 1.00 (full semester).

Questions 1 – 3 pre and post-comparisons of time evaluation did not demonstrate statistically significant results for the pre and post- evaluation: Q1 (plan HFS), $p= 0.664$; Q2

(implement HFS), p=0.083; and Q3 (evaluate HFS) p=1.00. The results of this data are demonstrated in Table 3.

Table 3: Time Evaluation

Paired Samples Test	Mean	Standard Deviation
Pair 1 Question 1		
Plan of HFS		
Pre Time	2.54	0.77
Post Time	2.50	0.72
Pair 2 Question 2		
Implementation of HFS		
Pre Time	2.29	0.75
Post Time	2.16	0.56
Pair 3 Question 3		
Evaluation of HFS		
Pre Time	1.75	0.84
Post Time	1.75	0.73

Support Systems:

Research questions Q1 –Q 6 asked the faculty members to rate the support systems of faculty simulation specialist, release time for teaching, colleague collaboration, demonstration practice, faculty simulation committee, and simulation workshop in relation to their comfort level. Faculty perception of these support systems was rated on a 5-point Likert scale of 1 = no assistance and 5 = total assistance.

Pre and post comparisons of faculty perceived support systems was statistically significant = Q1 (faculty simulation specialist), p< 0.001; Q4 (demonstration practice), p<0.001; Q5 (faculty simulation committee), p=0.008; Q6 (simulation workshop), p<0.001. Not statistically significant were Q2 (release time from teaching), p=1.00; and Q3 (colleague collaboration), p=0.103. Data results are presented in Table 4.

Table 4: Support Systems

Paired Samples Test	Mean	Standard Deviation
Pair 1 Question 1		
Faculty Simulation Specialist		
Pre Support	4.16	0.76
Post Support	4.75	0.44
Pair 2 Question 2		
Release Time for Teaching		
Pre Support	3.41	0.82
Post Support	3.41	0.65
Pair 3 Question 3		
Colleague Collaboration		
Pre Support	3.12	0.79
Post Support	3.29	0.62
Pair 4 Question 4		
Practice Demonstration		
Pre Support	3.70	0.90
Post Support	4.45	0.65
Pair 5 Question 5		
Faculty Simulation Committee		
Pre Support	2.83	1.09
Post Support	3.16	0.86
Pair 6 Question 6		
Simulation Workshop		
Pre Support	3.58	0.82
Post Support	4.79	0.41

CONCLUSIONS

While the initial survey rating of comfort levels in the use of HFS by faculty were low, results demonstrated a positive rise in post-survey outcomes of these levels. Following the educational program there were statistically significant increases in faculty comfort levels related to the utilization of HFS in the following areas: (a) supplement of lecture, (b) replacement of lecture content, (c) replacement of laboratory hours, (d) clinical make-up, (e) replacement of clinical hours, (f) provision of active-learning, (g) promotion of student collaboration, (h) promotion of higher expectations of students, (i) promotion of diversity in learning, (j) improvement of time-on-task, and (k) improvement of student/faculty interaction.

Faculty members did not demonstrate statistically significant pre- and post-comparison of time evaluation necessary to plan, implement, and evaluate HFS. However, they did identify they would need 0.50 FTE release time to plan and implement HFS for the semester, and 0.25 FTE release time for the evaluation process.The utilization of a simulation specialist, demonstration practice, faculty simulation committee, and simulation workshop were identified by faculty as beneficial in relation to perceived support systems in the use of HFS. Not statistically significant, were release time for teaching and colleague collaboration.Descriptive comments in Part F of the survey were not included, as none of the 24 completed post-survey questionnaires provided usable information.

STUDY LIMITATIONS

A limitation of the study is that the sample population (n=42) was small, from a single nursing program. The sample was primarily educators in an associate degree program with an MSN educational level. Additionally, the majority of the faculty were at the instructor rank. While the study identified years of nursing practice, it did not specify years of teaching experience specifically, which may have a direct implication on the study overall.

IMPLICATIONS TO PRACTICE

Change can bring about a certain level of stress and disruption that is uncomfortable, particularly when it impacts curricular changes. Due to the expanded interest and potential pedagogical mandates, nursing programs need to provide an educational program for their nursing faculty that facilitates an environment of “low risk” and increased comfort levels.

This survey and educational program about perceived comfort levels in the utilization of simulation technology can provide important information regarding the application and integration of HFS throughout the nursing curriculum. Identification of perceived barriers is essential to facilitate the initial process in the successful adoption of HFS as a teaching method. Through acknowledgment of faculty concerns and adequate training this process can enhance teaching practices and subsequently student learning.

Faculty development is critical to the success of any simulation program, and having qualified instructors to run the simulations is more important than purchasing expensive equipment. The ultimate goal is to foster competency in the pedagogy of simulation in order to enable educators to deliver quality education to students. HFS has become an

educational tool that is used to bridge the gap between clinical and the didactic component of nursing education courses. Many colleges of nursing are utilizing simulation as an educational strategy to assist nursing students in the translation of lecture content and its subsequent application to the clinical setting. This method of presenting information to the learner places an increased emphasis on critical thinking, stimulating problem solving at higher levels of analysis, synthesis and evaluation. The education and training of nursing faculty to HFS is vital in order to provide an optimal teaching-learning experience for today's nursing student.

Comfort levels with this technology can become a significant barrier preventing faculty from embracing and utilizing HFS. A faculty educational program, along with pre- and post- comfort assessment can assist in facilitating acceptance and integration of HFS into the nursing courses. Faculty members are more likely to attempt to utilize HFS if they are given an adequate time frame to prepare and appropriate support systems such as a simulation specialist on-site.

FUTURE RESEARCH

Future research is needed on the impact faculty comfort levels have on the use of HFS as an educational, integrative methodology. These studies need to demonstrate a more diverse cross sectional population of faculty from multiple associate and baccalaureate nursing programs; in addition to levels of faculty educational preparations inclusive of philosophy doctorate (PhD), education doctorate(EdD), and doctor of nursing practice (DNP).

CONFLICT OF INTEREST

The author reports no conflicts of interests in this work.

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