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The Use of High-fidelity Simulation in Psychiatric and Mental Health Nursing Clinical Education

Abstract

Background: High-fidelity simulation recreates real-life situations in a safe learning environment and encourages critical thinking in students. Published research in simulation in psychiatric/mental health nursing is sparse.

Methods: Four scenarios exemplifying drug or alcohol abuse utilizing the computerized, mannequin SimMan® were implemented. Students evaluated their learning experience following completion of the simulation via a 20-item, Likert-scale survey which included open-ended questions.

Results: Results were positive. Students rated all items on the survey as "agree" or "strongly agree" (Mean 4.77, SD=0.55).

Conclusions: High fidelity clinical education simulations are an effective means of facilitating student learning of psychiatric and mental health clinical experiences. Students found simulation to be a useful and engaging means by which to learn to care for clients with drug or alcohol abuse disorders.

Introduction

Simulated care has been utilized in nursing education for over 40 years (Nehring & Lashley, 2009). More recently, computerized technology has enabled increasingly sophisticated modes of simulated education such as computer games (e.g. Second Life®), virtual classrooms, and high-fidelity simulation mannequins (Brown, 2008; Guise, Chambers & Välimäki, 2012). 'Fidelity' refers to the degree that an experience closely imitates reality (Nehring & Lashley, 2009). High-fidelity clinical experiences (HFCEs) in nursing are simulation activities that closely recreate an actual health care situation. The HFCE requires the nurse or nursing student to draw upon his or her knowledge and problem-solving skills in order to make accurate decisions and implement the provision of care.

Typically, psychiatric and mental health (PMH) nursing, including the treatment of drug or alcohol addiction and dependency, is taught through traditional lecture plus concurrent hospital or community-based clinical experiences. Clients with PMH or behavioral disorders are regularly encountered in medical-surgical hospital settings but student nurses often lack the opportunity to care for this high-risk population during traditional clinical experiences (Brown, 2008; Kameg, Howard, Clochesy, Mitchell, & Suresky, 2010; Nehring & Lashley, 2009; Norman, 2001). Occasionally, trained actors who function as standardized patients are used to role-play a simulated client care situation and psychiatric and mental health nursing faculty have used standardized patients in place of "real" patients to help students learn assessment communication skills (Alexander & Dearsley, 2013; Guise et al, 2012; McNaughton, Ravitz, Wadell & Hodges, 2008). Less often, HFCE is used to teach PMH concepts and skills (McNaughton, et al, 2008). In general simulation has been used for teaching physical skills and competencies but there are few standardized patient care scenarios for use in psychiatric nursing (Brown, 2008).

Simulation can be used by faculty to connect course objectives and clinical competencies to learning outcomes, and to improve interpersonal, psychomotor, technical and interdisciplinary team work skills (Nehring & Lashley, 2009). Nursing education employs a combination of didactic lectures, discussion groups, in-class activities, and clinical experiences in order to teach pre-licensure nurses the basic knowledge necessary for making critical decisions when caring for clients in inpatient, outpatient, or community-based settings. Actual nursing hands on practice has increasingly been more inaccessible due to limited clinical sites, restrictions on student nurse activities, an increasing number of nursing students, a decreasing number of qualified faculty, and limited time availability for nurse training (Brown, 2008: Kameg, et al, 2010; Nehring & Lashley, 2009; Rutherford-Hemming, 2012). Additional problems encountered include potential risks to clients with high-risk procedures, a lack of opportunity to encounter rare or unusual client situations (Brown, 2008; Kameg et al, 2010; Nehring & Lashley, 2009), and increasing client acuity. Simulation offers many advantages for the nursing student. Simulation:

- Allows students to practice psychomotor skills and decision-making in a safe and realistic environment;
- Permits instructors to provide structure and consistency in client care encounters;
- Promotes teamwork;

- Provides opportunities to practice low frequency, difficult or high risk tasks eliminating risk to real clients;
- Increases confidence in providing care;
- Can accommodate different learning styles; and,
- Can increase self-efficacy in the student through experiential and affective learning (Brown, 2008; Kaakinen & Aarwood, 2009; Nehring & Lashley, 2009; Schoening, Sittner, & Todd, 2006).

The purpose of this paper is to describe the implementation of four simulated HFCE psychiatric nursing situations involving drug or alcohol abuse that could be encountered by the practicing nurse in a general hospital setting. A second intent is to connect the simulation scenarios to student learning through the principals of experiential learning and reflective practice.

Review of the Literature

The published research that exists in simulation of PMH nursing or integrated behavioral/physical health is sparse. What does exist is limited by low sample sizes, differing approaches to HFCE simulation, and variable evaluation methods (Brown, 2008; Kameg et al, 2010 Nehring & Lashley, 2009; Norman, 2001). Kameg et al (2010) specifically focused on the use of high-fidelity human simulation on the self-efficacy of communication skills in nursing students by comparing two groups of students (n=38): one group who received traditional lectures on communication skills; and one group who received lectures plus high fidelity simulation. The study utilized a Likert scale with answers ranging from 1 "strongly disagree" to 4 "strongly agree". The researchers concluded that senior level nursing student's self-efficacy with regard to communicating with clients who have a mental illness was higher in the simulation group. The items that the students had the most agreement on were as follows:

- The students viewed simulation as a valuable learning experiences;
- The students believed simulation should be included routinely in the curriculum; and,
- The knowledge gained from the simulation could be transferred to the clinical setting.

However, the students were highly inconsistent in their opinions that simulation could be a substitute for real-life experience in the hospital setting. Student anxiety and stigma towards mental illness is a real concern in the PMH clinical setting (Brown, 2008; Kameg et al, 2010), and the lack of knowledge or opportunity to practice caring for individuals who are intoxicated, who have overdosed, or who are experiencing drug/alcohol withdrawal symptoms is problematic (Norman, 2001). It is also difficult for instructors to evaluate student nurses' communication skills in one-on-one interactions in the clinical setting due to privacy concerns (Brown, 2008).

Use of high-fidelity simulation can help to address all of these problems: a) Students can practice caring for clients with high risk or infrequently encountered psychiatric or behavioral problems; b) simulation scenarios can be observed, stopped and guidance given to students; and c) anxiety can be reduced by encouraging a supportive, formative learning environment. Learning theories can help to support the development of simulation experiences.

Learning Theories and Their Application to Simulation

Experiential learning theory addresses the process of creating knowledge through experience (Kolb, Boyatzis & Mainemelis, 2000). In experiential learning, the student reflects on situations, develops cognitive models based on this reflection, and then makes decisions about actions to be taken. The student is continually confronted with sets of learned abilities to be used in a specific situation. Reflection and review are essential components to this aspect of learning. Experiential learning theory is based in part on cognitive learning theory, which states that learning focuses on two internal mental processes (perception of the situation and information processing), maturational development, and social context (Rutherford-Hemming, 2012).

Social constructivism is another important framework in order to understand student learning. Constructivism states that knowledge is created when individuals attach a meaning to an experience (Attig, 2001). This meaning-making is an active, dynamic process that occurs through dialogue, collaboration, and cooperation between instructors and learners and within student groups. This becomes important when looking at the structure of developing a simulation experience for the student nurse. Meaning-making correlates with experiential learning theory at the information-processing level of learning (Rutherford-Hemming, 2012).

Reflective practice is the process whereby students engage in thoughtful self-regulation of their own learning (Schön, 1983). Consistent with other adult learning theories, reflective practice assumes that students are motivated to succeed. Schön (1983) states that this is accomplished through experiencing progressively complex simulations that require increasing experiential competency. The reflective practitioner learns by observing, doing, reflecting (debriefing), and then re-doing. This iterative learning process reinforces experiential rehearsal. Norman (2001) stated that the debriefing session following the clinical experience is, "The most important part of the simulation..." (p. 372) as this is the time during which students review, assess, and reflect on their own clinical performance.

Simulation activities in nursing have been addressed from both a teaching paradigm and a learning perspective. Kaakinen and Arwood (2009) carried out a systematic review of nursing simulation literature focusing on learning theories. The authors examined 120 articles that discussed the use of simulation in nursing. Of these articles, 104 did not reference any learning theories, 94 discussed using simulation as a teaching method, and the remaining 16 utilized learning theories as a theoretical foundation. From a teaching perspective, simulation "...is a planned experience that provides specific goals, methods and objectives for teaching outcomes" (Kaakinen & Arwood, 2009, p. 12) while learning refers to "...the processes by which the student changes skills, knowledge and dispositions through a planned experience" (Kaakinen & Arwood, 2009, p.1). In other words, teaching is about the 'what' of nursing practice while learning is about understanding the 'why'.

Simulated situations can activate the same learning processes as do traditional clinical education. Students are exposed to clinical situations and they must draw on their knowledge in order to make meaning of what they are seeing, formulate ideas and opinions based on their observations, make decisions (plans) as to their actions, reflect on these decisions, and then carry out actions. HFCE scenarios can act as triggers for the development of those skills and allow students to practice the process of nursing care in a methodical and structured setting. This author discusses four client scenarios that students utilized in learning about substance withdrawal, intoxication and overdose - all high risk mental health situations that students do not often have the opportunity to encounter in a supervised clinical environment during their academic training.

Methods

Research Design

The research design for this study is a descriptive, post-test only design.

Sample

Scenarios were conducted with 19 undergraduate students and 1 graduate (psychiatric nurse practitioner) student (n=20). The undergraduate students were in the first semester of their junior year. Each simulation involved 2 or 3 students. The students were randomly assigned to the role of "charge nurse", "nurse", or "observer"; and were also randomly assigned to one of the four simulations. If functioning as an observer, the student was in the room during the simulation and they adopted the role of "friend" or "family", but they were instructed to participate minimally (they were allowed to ask questions of the other participants during the simulation and to express concern or anxiety). The simulations occurred once during the 7th week of an eight-week clinical rotation. There were two clinical rotations during a semester term. This was purposeful as it was felt that the students would have less anxiety and feel better prepared if they had already had at least 50 hours of real life clinical experience in a psychiatric and mental health setting. Clinical rotations that all students participated in or observed prior to the simulation included an adult, inpatient psychiatric unit; an outpatient therapy program; a pain management clinic; a residential dementia program; and a child/adolescent psychiatric residential treatment program. The graduate psychiatric nurse practitioner student participated as a "family member/significant other" during all four of the scenarios in the first clinical rotation.

Setting and Procedures

HFCE simulations have three parts: the design of the scenario, which includes the learning objectives; a preliminary "script" or role-play for the scenario that provides cueing for the students enacting the role of family/significant other and for any ancillary healthcare personnel worked into the script; and plans for debriefing that includes open-ended questions and challenge questions for the students to discuss. Scenario design requires a planned process on the part of the clinical instructor. The National Advisory Council on Nurse Education and Practices has recommended that all faculty members be oriented on the use of simulation (Nehring & Lashley, 2009). As an example, the Indiana University School of Nursing requires new faculty to complete 36-hours of high-fidelity simulation immersion and mastery, which includes the development and implementation of at least one high-fidelity simulation scenario during the workshop.

For this project, four HFCE simulation scenarios were developed by the instructor to enhance student learning and practice in the care of clients experiencing drug intoxication or withdrawal in a traditional medical environment. Scenarios included: a) an adult male client withdrawing from alcohol in an inpatient, medical-surgical unit; b) an adolescent male client admitted to a

pediatric unit following inhalant abuse; c) an adult female client in the emergency room experiencing psychosis as a result of hallucinogen intoxication; and, d) an obtunded adult male client seen in the emergency department following an overdose of opioids.

The simulation activities were implemented in an undergraduate, baccalaureate nursing program at Indiana University. The simulations occurred in a controlled, laboratory setting and they utilized the high-fidelity, computerized full-body mannequin SimMan®. SimMan® has a number of realistic functions including the ability to program both verbal and physiological responses to the user. Verbal responses can be pre-programmed using the available options that come with the model, or they can be communicated in real-time by the operator, who is usually the clinical or nursing lab instructor. The four simulation scenarios developed by the PMH nursing instructor were pre-programmed into the SimMan® with assistance from the simulation center's assistant plus real-time verbal communications were used. All four simulations were videotaped by the assistant, and then the videos were played back following the simulation to the student participants and peers for group discussion and reflection. Students gave written consent for the video-taping. Exempt status was obtained from the university's institutional review board prior to the activity. Table 1 provides an overview of each simulation while Box 1 provides information on the overall learning outcomes for the HCFE simulation activity.

	Case scenario	Location of the client	Family or significant other	Medical complications	Nursing objectives specific to this scenario	Complicating factors
1	Adult male client with alcohol (ETOH) withdrawal	Medical- surgical unit	Spouse	 ✓ Fractured right ankle ✓ Pain ✓ ETOH withdrawal symptoms 	 Recognize the signs and symptoms of ETOH withdrawal Effectively manage pain 	Anxious wife
2	Adolescent client admitted following inhalant abuse	Pediatric Inpatient unit	Mother	 ✓ Semi- conscious ✓ Bloody nose ✓ Cough 	 Recognize the signs and symptoms of inhalant abuse Parent education regarding discharge planning/resources for drug abuse in teens 	Lack of knowledge about drugs by mother
3	Adult female with a hallucinogen overdose	Emergency Department	Female friend	 ✓ Acute psychosis ✓ Signs of possible sexual assault 	 Recognize the signs and symptoms of hallucinogen overdose Facilitate the initiation of an emergency psychiatric detention 	Refusal to cooperate with care
4	Adult male client with an opioid overdose	Emergency Department	Female friend	 ✓ Obtunded client ✓ Respiratory distress 	 Assess level of consciousness using the Glasgow Coma Scale Recognize and treat an opioid overdose 	HIV positive

Box 1 Nursing Care Objectives for Integrated Simulation Scenarios

At this completion of this simulation experience the student will be able to:

- 1. Assess the mental and physical health status of a client with a psychiatric or behavioral disorder
- 2. Demonstrate use of therapeutic communication skills
- 3. Develop a safety plan for the client with a psychiatric or mental health disorder
- 4. Include family/significant other in the planning of care
- 5. Communicate effectively while exchanging information with the attending physician/nurse practitioner
- 6. Administer PRN medications orally, intramuscularly, or intravenously

A combination of pre-programmed and instructor voiced verbal responses and vital sign adjustments was used. This allowed the clinical instructor to vocalize delusional statements and to increase the client's level of agitation; thus, increasing the realism of the situation and also the sense of urgency and anxiety felt by the students. During the scenario, students were given a brief shift report and handed a client chart, and then were asked to perform a nursing assessment and implement prioritized nursing care as judged appropriate. Scenarios required students to telephone the on-call healthcare provider for "orders" and to administer medications. Students were not advised of the objectives of the simulation beforehand. Scenarios were terminated by the instructor when the objectives were met, or when it became clear that the students did not know what to do next. The duration of each simulation was between 20 and 25 minutes. Each simulation was videotaped, and then was played back in its entirety with the clinical group. Following playback, open-ended questions were used to elicit thoughts and feelings from the student nurses, and the observers were asked to provide general observations and commentary on the objectives. This process of review and discussion formed the reflective practice component of the debriefing period.

Analysis

The simulated experiences were evaluated anonymously by the students using a survey instrument developed by the instructor. This 20 question tool used a 5-item, Likert-scale with answers ranging from strongly disagree (1) to strongly agree (5). The tool included items that assessed objectives for the entire simulation experience, objectives specific to the individual scenarios, and experiences about the simulation experience overall. No reliability testing was performed for the instrument. Expert validity was determined through consultation with two nursing faculty who incorporate simulation activities into their courses and are members of the Area Health Education Centers (AHEC) Simulation Consortium. Students were also asked to provide at least one comment regarding their experience of the simulation. Quantitative data were analyzed by descriptive statistics. The final open-ended question was evaluated from a qualitative perspective noting common themes and observations made by the participating students but due to the small sample size, no coding was done.

Results

This section is divided into a description of the demographics of the sample, followed by a discussion of the survey results and the qualitative information obtained.

Twenty students participated in the activity. Students were predominantly female (n=19) and were very homogeneous in ethnicity (White = 19, White/Asian = 1). All of the undergraduate students were in a traditional bachelor of science in nursing program. Ages ranged from 21 to 35. In contrast to some university undergraduate programs, several of the students were married and/or had at least one child. All of the students came from a number of small, regional towns or cities in a rural to semi-rural setting.

All survey instrument items addressing the objectives of the study were rated high (Table 2). The highest rated items included, "I believe that simulation is an effective way to practice psychiatric and mental health nursing" (Mean 4.79, s=0.55), and "This simulation activity was appropriate to my level of learning (neither too difficult nor too easy)" (Mean 4.79, s=0.55).

Survey Item	Mean	SD
1. Assess the mental status of a client with a psychiatric or mental health disorder	4.47	0.62
2. Demonstrate therapeutic communication skills	4.47	0.70
3. Develop a safety plan for the client with a psychiatric or mental health disorder	4.26	0.94
4. Include family/significant other in planning of care	4.26	0.88
5. Communicate effectively while exchanging information with prescribing practitioner	4.47	0.70
6. Administer PRN medications orally, intramuscularly, or intravenously	4.26	0.94
7. I feel confident that I can recognize the signs and symptoms of alcohol withdrawal	4.21	0.71
8. I feel confident that I can accurately assess pain in a hospitalized client	4.79	0.55
9. I feel confident that I can recognize signs of acute inhalant intoxication/delirium	4.26	0.65
10. I feel confident that I can do parent education: discharge planning for teens' drug abuse	4.32	0.67
problems		
11. I feel confident that I can recognize acute delirium psychosis induced by hallucinogens	4.37	0.77
12. I feel confident that I can facilitate the initiation of an emergency psychiatric detention	4.42	0.61
13. I feel confident that I can assess level of consciousness using the Glasgow Coma Scale	4.26	0.73
14. I feel confident that I can recognize signs and symptoms of an opioid overdose	4.21	0.71
15. I believe that simulation is an effective way to practice psychiatric and mental health	4.79	0.55
nursing		
16. This simulation experience enhanced my learning of psychiatric and mental health	4.68	0.59
nursing		
17. This simulation activity was well-organized	4.68	0.84
18. This simulation activity was appropriate to my level of learning (neither too difficult	4.79	0.55
nor too easy)		
19. Simulation activities reflect real-life client care experiences	4.74	0.67
20. Simulation activities stimulate critical thinking and decision-making skills	4.74	0.57

Table 2: Student Evaluations of Simulation Scenario

The student learning process was reflected in qualitative statements made during evaluation (Box 2). Positive statements made by the students included: "The experience went well. I liked that I was able to be in the family member role - that gave me a different perspective on nursing care"; "I think it was a good way for us to assess whether we can apply what we learned"; and, "It

helped me see situations I haven't yet been exposed to in the actual setting." Statements that were more negative included, "Simulations usually make me nervous because I'm in a new environment and I don't know where everything is in it", and "I prefer real clients".

Box 2: Feedback from Students on Simulation Experience

Positive Comments

- Simulation activities are an excellent/effective teaching tool
- I would like to do more!
- Excellent! Very well put together. I learned a lot from it!
- The experience went well. I liked that I was able to be in the family member role. That gave me a different perspective on nursing care.
- I think it was a good way for us to assess whether we can apply what we learned.
- Good experience.
- We need to do this more often!
- The simulations were helpful in activating critical thinking & decision-making skills.
- It helped me be/see situations I haven't yet been exposed to in the actual clinical setting.

Other Comments

- Need Pixus[®] (medication) machine in client room/med room.
- I prefer real clients.
- Need more simulation dates.
- I think everyone should participate as a nurse.
- Simulations usually make me nervous because I'm in a new environment and I don't know where everything is in it.

The overall feedback from the students in the end-of-the semester course evaluations was likewise very high and several students stated that they would like to see more simulation activities incorporated into their clinical education.

Discussion

Learning outcomes and objectives were measurable and were assessed directly by the students. Self-efficacy was high for all items. Student verbal feedback was very positive and students expressed that this type of learning was stressful but fun. By making the simulations formative rather than summative (no grades were assigned), student anxiety was reduced and the students felt more open to asking questions or admitting to errors without fear of recrimination in the form of academic demerits.

Some inconsistencies occurred during implementation of the four scenarios. In the first scenario, the telephone system was not operational and the students had to make adjustments in order to "call for orders". However, this did serve to increase the realism and challenge the critical thinking/problem-solving abilities of the students involved in that scenario. Utilizing the sole graduate student as a family member was a valuable asset in maintaining fidelity as she did not break character during the scenario; however, she was only available for one of the two

simulation days. In the second clinical rotation, undergraduate nursing students served as family member/significant other and they tended to be more timid in asking questions of the nurses or in demonstrating anxiety. Additionally, using the pre-programmed SimMan® technology did not allow for many verbal choices. The instructor-voiced statements and responses to students lagged in immediacy and sounded artificial at times. On the other hand, the ability to have the manikin response verbally to students' questions was a valuable asset for the scenario.

Limitations to the methodology of this study include the small sample size. This made the survey results less anonymous than is optimal. Although the data was de-identified, students may have felt that their instructor would know who they were by their responses. Additionally, the small sample reduced the power of the findings and tended to minimize differences in scale between 3's, 4's and 5's on the survey tool. The survey instrument used was developed specifically for this educational activity and was not subjected to reliability testing. Additionally, experiential learning theory suggests that a pre-test/post-test model is most accurate for measuring student learning (Kaakinen & Arwood, 2009). In this study, a post-test only design was utilized. Students were relatively homogenous, more mature and from a rural setting. This may indicate that student development for this group was not comparable to a more traditional large university setting in a major city containing a metropolitan medical center. Generalizability of the findings is limited to similar students with similar backgrounds.

Future Research Implications

Continued research into the best methods for delivering nursing clinical education should be done. Psychiatric and mental health nursing has utilized simulation predominantly in the form of role-play or communication skills with standardized patients (Brown, 2008). This study has shown that high-fidelity technology using pre-programmed manikins, such as SimMan®, are also an effective means of teaching nursing assessment, critical thinking and care implementation. More pre-test and post-test designs are needed to measure the effectiveness of the activity in improving clinical decision-making. More research into alternate methods of clinical education in (e.g., virtual patients, simulated classrooms) and more sophisticated simulation manikins in a variety of settings is also needed. Comparison studies of simulated care to "real life" clinical education would add further evidence of the utility of simulations to augment and enhance learning in nursing students.

Implications for Nurse Educators

Nurse educators can and should begin actively incorporating simulated activities into their curricula. Students respond positively to HFCE experiences and find that they enhance their learning. Faculty can closely monitor student decision-making and reflective practices in a more controlled environment than can usually be managed in the typical 1:10 instructor to student ratio found in most clinical settings. By developing several pre-planned, scripted and well-designed HFCE's, nursing educators can ensure quality and continuity in clinical education that can help them to guide students toward safe and effective nursing practice. Finally, in rural areas and other places where psychiatric and mental health resources are scarce, simulation provides a necessary means by which students can practice critical nursing assessment skills in a high risk population.

Conclusion

The purpose of this paper was to describe the utilization of simulated psychiatric nursing situations involving drug or alcohol abuse that may be encountered by the practicing nurse in a general hospital setting. Four scenarios involving clients with drug or alcohol intoxication, or withdrawal, were presented. These simulations incorporated aspects of nursing assessment, critical thinking, medication administration, patient or family teaching, and managing the emotions of clients or their significant others. A second intent of this paper was to connect the simulation scenarios to student learning utilizing specific learning theories. Students were able to experience clinical situations that required them to assess, analyze, reflect and draw upon previous knowledge in order to plan and implement care. Student feedback indicated that they recognized the importance of the simulated clinical situations in improving their confidence and problem-solving abilities, and in developing empathy for family members.

Simulation is an effective means of augmenting real-life clinical experiences for undergraduate nursing students. Simulation scenarios are complex, intentional teaching tools which require an understanding of experiential, constructivist, and reflective learning theories to maximize student learning. High-fidelity clinical experience simulations are especially useful for helping students to practice and learn nursing care with infrequently encountered or high risk situations. Nurses in the medical-surgical and emergency room settings commonly encounter patients experiencing psychiatric and mental health problems. HFCE provides a means to practice caring for these patients prior to these encounters. In this study, HFCEs were utilized to help students develop critical decision making and communication skills in working with clients experiencing drug or alcohol abuse disorders in the acute care setting. Student feedback was overwhelmingly positive and indicated that this was a valuable and worthwhile learning activity. Simulation should not be thought of as a poor replacement for missing or inadequate clinical experiences; rather, simulation itself is an extremely important resource tool that should be incorporated into all psychiatric and mental health nursing clinical education practices.

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