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Concept Analysis Paper: Simulation in Nursing Education

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Abstract *- Simulation is an instrument that is utilized to increase production. The history of simulation started from World War II. In 1969, the third conference was conducted on the application of simulation into the healthcare system (Goldsman, Nance, & Wilson, 2009). Patient safety is the top priority in the healthcare system for delivering high-quality care. Simulation helps to ensure patient safety since it allows staff and students to promote their skills in a safe environment that is mimic to real practice (Fawaz, &Hamdan-Mansour, 2016). The importance of simulation in nursing has been mentioned in the literature. It has been shown that it develops knowledge and improves the nursing practice. However, there are implications of this analysis for nursing. More research studies should be done to identify if nursing students are able to transform knowledge and skills that they have learned in the simulation experience to real clinical settings(Zapalska, Brozik, & Rudd, 2012). From my assumption, there are a lot of students that have problems with skills. So, simulation can help the students to improve their knowledge and skills and make them more competent in performing them. The goal of this analysis was to examine the concept of simulation as a learning method in the education of nursing students. Also, to comprehend and know the attributes of the simulation concept from the literature review. Simulation is defined as "an imitation of some real thing, state of affairs, or process" (Rosen, 2008, p.1). Also, there are other definitions of simulation that provided an understanding of what simulation experience represents. Antecedents, defining attributes, and consequences are provided further understanding of the simulation concept. Defining attributes of the simulation concept helps nursing educators to develop an understanding of both the process and outcomes of using simulation as a learning method. This will identify the appropriate methods of using simulation in preparing nursing students for real clinical practice.*

Keywords: *simulation, nursing, education, skills Concept Analysis Paper: Simulation*

I. INTRODUCTION

A. Identifying the Concept

a) Background and Importance of Simulation: Simulation is an instrument that is utilized to increase production. The history of simulation started from World War II when two mathematicians: "Jon Von Neumann and Stanislaw Ulam" had a problem with the behavior of neutrons. It was difficult for them to do trial experimentation because it is complicated and costly. Then, they decided to use computer simulation until they reach an outcome regarding the neutrons problem. After that, computer simulation became very popular, and it has been used in the business field (Goldsman, Nance, & Wilson, 2009). From 1950 to 1955, flight simulation has been used to maintain pilots' licenses (Rosen, 2008).

In 1967, the first conference was held about the General Purpose Simulation System (GPSS), and it was an application on the machine. In 1968, the second conference was held in New York about the application of simulation (simulation and human behavior, reliability, some statistical considerations, and simulation tutorial). In 1969, the third conference was conducted on the application of simulation into the healthcare system. The fourth conference was established to discuss simulation tutorials. The fifth conference had more tutorials bout simulation. After that, simulation was included as a course in many schools. In 1977 conference included two sessions on military and agricultural systems. In 1981, the simulation had a depth description of the General Purpose Simulation System (GPSS). Simulation is considered an important tool, and it had been used in various settings: military, healthcare system, education, and it became very popular since it is not costly like experimentation and it is good for preparation (Goldsman, Nance, & Wilson, 2009).

b) Discussion of the Significant of Simulation

Patient safety is the top priority in the healthcare system for delivering high-quality care. Simulation helps to ensure patient safety since it allows staff and students to

promote their skills in a safe environment that is mimic by real practice. Simulation can reduce medical errors such as infection, injury, and medication administration errors. "Further, it allows enhancement of a safety nursing training culture in nursing programs" (Fawaz, &Hamdan-Mansour, 2016, p. 38). Simulation can increase medication administration competence. A study that done by Jenkins, Akman, Astroth, Pohl, & Jacobs in 2018on eighty-five nursing students in their first semester of a baccalaureate degree. Nursing students were randomly assigned to an intervention group who received (simulation session) or a control group (a traditional practice session). Medication administration was assessed using Medication Administration Safety Assessment Tool. The results of the study have shown that the intervention group had an improvement in medication administration competence than the control group (Jenkins et al., 2018).

Also, simulation is essential in nursing education since it enhances students' critical thinking, problem-solving skills, confidence, experience, and decision-making skills. In 2015, a study was done by Shin, Ma, Park, Ji, & Kim on 237 students from three universities in Korea. All participants were enrolled in a pediatric nursing practicum between February and December 2013. The three universities (A, B, C) have been used the same simulation scenarios, evaluation tools, and equipment. One simulation session was given to students in school A, school B was exposed to two simulation sessions, whereas students at school C completed three simulation sessions. The results revealed that school C had the highest score in critical thinking skills gains (2.45), followed by 1.50 at School B and 0.66 at School A (Shin et al., 2015).

In 2015, a study was done by Weatherspoon, Phillips, and Wyatt on 117 nursing students in bachelor nursing programs to identify the effects of stimulation on clinical judgment skills. The results showed that interactive electronic simulation (EIS) could enhance the clinical judgment skills among nursing students. Another study that was done by Fawaz &Hamdan-Mansour in 2016 on 56 nursing students from two private universities in Lebanon to examine the effect of simulation on the clinical judgment and motivation of students. The results revealed that simulation improved the clinical judgment scores from 22.1 (control group) to 29.5 (intervention group). Also, it increased the motivation scores from 161.6 (control group) to 198.6 (intervention group) among nursing students.

In 2016, a study was done by Au, Lo, Cheong, Wang, & Van on undergraduate nursing students in nursing colleges in Macau. The study showed that more than 70 % of the students had a positive attitude toward simulation experience since it helped them to enhance their professional knowledge and their self-confidence (Au et al., 2016). Moreover, in a study done by Gamble (2017), 28 nursing students had a simulation session that included some critical medication errors and some medical complications; through this process, nursing students were able to identify these problems and founded solutions to them. This process helped students in improving their problem-solving and decision-making skills.

Also, it has been shown in the research studies that simulation can reduce errors in flights and increase flying skills. In 2016, a study that done by Socha et al. on 35 student pilots to examine the effect of a flight simulator on the flying skills among student pilots. The participants have completed 11 flight hours on a flight simulator, one hour on the Diamond DA40 aircraft, three hours on a simulator, and lastly, two flight hours in real traffic. The results revealed that students have an improvement in flying skills, and the error ratio of maneuver performance has been decreased. They concluded that flight simulators are an effective tool for experiencing flying skills.

Simulation has also been used for training in military medical stings. "Simulators are ideal in the military medical setting to maximize exposure and realistic response to medical decision making while minimizing time away from primary operational duties" (Dorlac, & Bishop, 2014, p.1). They will have medical scenarios, they will perform it, and then they will have immediate feedback to improve their performance. Moreover, simulation can be used to conduct more research studies for improvement. "In addition to its role in individual and team education, simulation is being used in research and quality improvement programs, as well as in high-stakes testing to evaluate clinical competency" (Dorlac, & Bishop, 2014, p.1).

II. IMPLICATIONS OF SIMULATION'S ANALYSIS FOR NURSING

The importance of simulation in nursing has been mentioned in the literature. It has been shown that it develops knowledge and improves the nursing practice. However, there are implications of this analysis for nursing. More research studies should be done to identify if nursing students are able to transform knowledge and skills that they have learned in the simulation experience to real clinical settings(Zapalska, Brozik, & Rudd, 2012). One more thing that should be investigated is whether a simulation environment will increase the nursing students' stress or not. Few research studies have shown that there is a relationship between students' stress and simulation experience. "However, more high-quality studies are needed to investigate techniques that can be implemented to decrease the negative effects of simulation stress on nursing students" (Cantrell, Meyer, &Mosack, 2017, p.1). Moreover, another implication of this concept analysis for nursing is to know more definitions, develop tools, and improve my teaching style. Also, to emphasize the effects of the simulation concept on nursing students and its contribution to nursing education and practice. I am a nursing faculty, and I would

like to analyze the concept of simulation to identify its effectiveness as a teaching strategy.

III. ASSUMPTIONS

From my assumption, there are a lot of students that have problems with skills. So, simulation can help the students to improve their knowledge and skills and make them more competent in performing them.

IV. AIMS OF THIS ANALYSIS (WHAT WILL BE CREATED FROM THIS ANALYSIS)

The goal of this analysis was to examine the concept of simulation as a learning method in the education of nursing students. Also, to comprehend and know the attributes of the simulation concept from the literature review.

V. DEFINITIONS

Simulation is defined as "an imitation of some real thing, state of affairs, or process" (Rosen, 2008, p.1). Another definition, simulation "is a technique (not a technology) to replace and amplify real experiences with guided ones, often "immersive" in nature, that evoke or replicate substantial aspects of the real world in a fully interactive fashion" (Lateef, 2010, p. 1). Additional definitions by dictionary are as the following: "the act or process of simulating", "the imitative representation of the functioning of one system or process by means of the functioning of another", "a computer simulation of an industrial process", or "examination of a problem often not subject to direct experimentation by means of a simulating device" (Merriam-Webster, n.d., p. 1). Another definition by the University of Nottingham(2006): "Simulation is the process of designing a model of a real system and conducting experiments with this model for the purpose of understanding the behavior of the system and/or evaluating various strategies for the operation of the system" (p.5). The operational definition of the simulation depends on the measurable tools. Related concepts are acting, role play, imitation, training, and experience. My own definition: a simulation is a good tool for training a group of individuals to be more competent.

VI. IMPLEMENTED CRITERIA (DEFINING ATTRIBUTES OF SIMULATION CONCEPT)

One significant attribute is: to consider the simulation an effective method, and it should be reflective for the real clinical practice. Simulation is mimic the real experience that is guided by organized structure to enhance nursing student's knowledge, performance, and skills (Gaba, 2004). Another attribute is that simulation should engage students in active learning through interaction instead of passive learning. Simulation gives opportunity to students to be engaged, for example, in performing skills, medication errors, and some medical complications to increase their problem-solving skills instead of receiving traditional lectures (Gamble, 2017). Another important attribute is that simulation must be an authentic representation that gives students the opportunity to integrate knowledge (theory) to practice. Simulation increases the knowledge, understanding, and critical thinking among nursing students and enhances their skill performance (Shin et al., 2015). The last attribute is that simulation should be structured on providing repetition and continuous feedback. Giving nursing students the opportunity to repeat the simulation that is followed by structured feedback will increase their confidence (Au et al., 2016).

VII. DEVELOPMENT OF CASES

I developed the following cases based on the previously mentioned attributes:

A. Model Cases

Model case of simulation concept exists in the literature review. In a study done by Zarifsanaiey et al. (2016), 40 nursing students had ten simulation sessions in the lab, and each session took 2 hours. A clinical condition was presented to them to practice the theoretical learning from the previous lecture. Nurse educators provided all the necessary equipment(patient's record, needed equipment for procedure, and reference books containing clinical setting and strategic questions) that are used in real clinical practice. Nursing students used the ten mannequins in the lab, and they had a real scenario to address the objectives, which integrate theory to practice. The students actively repeated the skills many times, alternating their roles to ensure equal participation from all students, and the nursing educator was the facilitator in supervising the students and providing them with feedback. Nursing educators asked questions to assess their understanding and engage them in the evaluation of their own and colleagues' performance. In the end, students had the chance to reflect on this learning experience.

Comment:

In this model case, nursing students have active participation in an authentic representation of reality to integrate theory to practice. Students had the chance to repeat the skills, evaluate their own and colleagues' performance, reflect on this experience, and receive appropriate feedback.

B. Borderline Cases

Forty nursing students spent two hours in the simulation lab to practice skills after taking a theoretical lecture using equipment that was used in real clinical practice. The nursing educator practices the skill many times, creating an authentic context. The students do not have active participation, but they observe the procedure done by the educator. At the same time, the nurse educator asks questions during the session to assess students' understanding.

Comment:

The borderline case is similar to the model case, but students were not actively participated in the session; they only observe the procedure. The nurse educator used questioning to engage the students in a degree of participation in the session. This experience didn't give the

opportunity for students to integrate the theory to practice through the application. Also, they didn't evaluate and reflect on the learning experience.

C. Related Cases

After a theoretical lecture about specific care or skill, forty nursing students are given access to a credited website to watch an online video. The video shows nursing staff performing skills and providing care for patients. The nurse educator requested the students to watch the video, so they can visualize the procedure that has been discussed in the lecture.

Comment:

This case is a similar example of the simulation but does not contain any critical attributes to the concept of simulation.

D. Contrary Cases

Forty nursing students were given a reading list of sources by a nursing educator about specific skills and care.

Comment:

The concept of simulation is clearly not demonstrated in this case.

VIII. IDENTIFY ANTECEDENTS AND CONSEQUENCES

The antecedents of simulation concept as a learning method in the education of nursing students have been identified as:

- The need to offer a simulation experience.
- Nursing educators who deliver the simulation sessions must have the ability to provide realistic learning for students.
- The learning environment that was created by nursing educators must be interactive where students' evaluation and reflection can occur.
- The quality of the simulation session must be standardized that to motivate nursing students to actively engage and learn.

The consequences and outcomes of the simulation concept are as the following: improvement in critical thinking skills, problem-solving skills, knowledge, competence, confidence, self-efficacy, and decision-making abilities. Borg Sapiano, Sammut, & Trapani (2018) found that simulation improves knowledge and performance among nursing students during patients' deterioration. Akhu-Zaheya, Gharaibeh, &Alostaz (2013) revealed that simulation is very effective in the knowledge acquisition of nursing students, and it enhances their self-efficacy. Zarifsanaiey, Amini, &Saadat (2016) stated that nursing students had higher performance and critical thinking abilities after integrating the simulation training into the nursing curriculum. The simulation also supports the development of problem-solving skills, confidence, and communication among nursing students (Burns, O'Donnell, &Artman, 2010). In addition, it is noticed that simulation enhances the decision-making skills among students after their exposure to simulation experience (Fawaz, &Hamdan-Mansour, 2016).

IX. DEFINE EMPIRICAL REFERENTS

A. Reflection of Attributes by Referents

The empirical referents for the defining attributes, which by their existence demonstrate the occurrence of the simulation concept as the following:

- Authentic representation
- Active participation
- Integration
- Repetition, evaluation, and reflection

An empirical referent for the simulation concept can be an authentic representation which is an accurate representation of facts. Another empirical referent is the ability to demonstrate active participation. The third empirical referent is the ability to successfully integrate theory to practice. The last empirical referent is having the opportunity of repetition, evaluation, and reflection.

B. Reflection of Tools by Referents

There are many tools that have been mentioned in the literature which measure the consequences of the simulation concept. The knowledge assessment tool that composed of 12 multiple-choice questions from the "standard BLS algorithm of the Australian Resuscitation Council" that was published by Flinders University in 2010 was used to assess the knowledge among both undergraduate and graduate nursing students at Jordan University. Moreover, the self-confidence and efficacy were assessed by the "self-confidence emergency response tool," which was established by Arnold et al. in 2009 (Akhu-Zaheya et al., 2013). In another study, Burns (2010), the attitudinal instrument as the "Health Professional Simulation Education Assessment Tool" developed by O'Donnell, Goode, et al. (2006) was used to assess cognitive ability, affective domain, psychomotor, communication skills, and safety perceptions among nursing students. In addition, critical thinking skills and performance were evaluated using "California Critical Thinking Ability Questionnaire B (CCTST) and Objective Structured Clinical Examination (OSCE)". The reliability of CCTST was reported to be between 0.78 and 0.80, and the validity of OSCE was approved by five faculty members (Zarifsanaiey et al., 2016). In a study done by Fawaz &Hamdan-Mansour, (2016), it has been used Lasater Clinical Judgment Rubric (LCJR) to assess the clinical judgment skills and the critical thinking of the Motivated Strategies for Learning Questionnaire (MLSQ) to assess the motivation.

X. CONCLUSION

The aim of this paper was to define and understand the concept of simulation as a method that is used in the education of nursing students. The analysis identified how the concept of the simulation was revealed in the available literature. The various definitions of simulationprovidedan an understanding of what simulation experience represents. Antecedents, defining attributes, and consequences are provided further understanding of the simulation concept. This analysis revealed that simulation is a dynamic concept that needs an evaluation to discover its effectiveness as a learning strategy. Defining attributes of the simulation concept helps nursing educators to develop an understanding of both the process and outcomes of using simulation as a learning method. This will identify the appropriate methods of using simulation in preparing nursing students for real clinical practice.

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