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Healthcare Students' Perceptions of Simulation Education at an Urban University

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Georgia State University

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ACCEPTANCE

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Dedication

First and foremost, I thank God (Allah) for all the wisdom, strength, perseverance, and health that I blessed during this thesis as well as throughout my life. Second, I dedicate this work to my parents, who loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve. To my parents who has been a source of support, encouragement and inspiration to me during the challenges of graduate school and life. Thank you for always being there for me.

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HEALTHCARE STUDENTS' PERCEPTIONS OF SIMULATION EDUCATION AT AN URBAN UNIVERSITY

By

Fahad Holil Al Enazi

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Healthcare Students' Perceptions of Simulation Education at an Urban University

By

Fahad Holil Al Enazi, BSRT

(Under the Direction of Dr. Douglas S. Gardenhire)

ABSTRACT

BACKGROUND: Healthcare institutions use patient simulation as a standard aspect of training healthcare students with practical skills before they graduate and encounter with real patients. Simulation can foster the learning process of clinicians as it mimics clinical scenarios. To enhance the healthcare learning environment, it is essential to examine students' perceptions toward the use of simulation in healthcare programs and to which degree the simulation courses influence their learning process and will assist educators initiate an effective simulation course. **PURPOSE:** The study's purpose was to evaluate the perceptions of students' use of simulation in nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy programs. **Method:** Data were collected through a descriptive survey using a convenience sample. The survey presented in 4-point Likert-type scale and consisted of 10 questions. **RESULTS**: Two hundred and fifty students (N=250) were surveyed from five different programs; Physical therapy students accounted for 29.2%; followed by Nursing students 28%; Respiratory Therapy students 27.6%; Occupational Therapy students 7.6%; and nutrition students 7.2%. The majority of participants were female (70.4%) while male students represented 29.6% of the population. Almost 58% of participants reported that they did not have any experience working in a healthcare setting. The majority of students (95.2%) reported that they engaged in a clinical simulation experience in their healthcare program. The study findings indicate students' overall perceptions have a high agreement with the statement that simulation experience was a valuable learning experience with mean = 3.52 (SD ± .577). Students demonstrate a high agreement that simulation should be an integral part of clinical experience with a mean of 3.48 (SD ± .599). Moreover, Students reported that simulation debriefing experience support their understanding and reasoning (mean=3.47, SD ± .598). The study findings revealed that clinical experience have no significant effect on students' perception toward simulation. However, female students reported that they experienced more nervousness during simulation than male students (*P* value = 0.005). Moreover, students who had previous simulation experience reported more agreement that simulation was realistic than students who did not have any simulation experience (*P*= 0.049). **CONCLUSION:** Healthcare professional students have a good perception toward simulation education and feel that simulation should be integral part of education. Further studies with higher number of participants and different institutions is recommended.

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CHAPTER I

Introduction

Alinier (2007) used Shannon's (1975) definition of simulation and described it as a process that entails designing a model of a real system and conducting experiments with the model with the intent of understanding behavior. Healthcare institutions use patient simulation as a standard aspect of training and equipping health professionals with adequate practical skills before they enter into the real world of professional practice (Alqarni, 2015). The simulation experience has several benefits for students in that it improves students' knowledge acquisition apart from improving their technical and communication skills and decision making while carrying out clinical demonstrations (Ohtake, Lazarus, Schillo, & Rosen, 2013). Clinical simulation is an effective teaching strategy when compared to traditional classroom teaching because it helps nursing students develop the assessment skills required to evaluate patients (Cioffi, 2001). Thus, the use of simulation as an educational tool helps students practice various procedures in preparation for treating patients.

Many industries, including the armed forces, nuclear power, aviation, and space exploration have used simulation education to enhance performance (Hotchkiss, Biddle, & Fallacaro, 2002). Moreover, many healthcare students are requesting the use of simulation to enhance their training (Jeffries, 2012). Also, the nursing work environment recommends the use of simulation as a useful method that can support nurses in their ongoing acquisition of knowledge and skills (Cuff, 2014).

Cioffi (2001) stated that simulations can foster the learning processes of clinicians that mimic clinical reality. Such learning processes provide the learner with an opportunity to gain hands-on experience with the dimensions of clinical practice. The use of simulation deepens the

learning process (Dreifuerst, 2009). However, it does not replace actual clinical experience; rather, it supplements the subject matter that equips the learners with necessary skills that can be transferable to the real clinical setting. The practice situations can help the learners acquire increased self-confidence as well as improved clinical judgment.

Problem Statement

According to Aebersold and Tschannen (2013), simulations have been integrated into nursing and healthcare education programs for the past 20 years, although they have not been fully integrated into clinical training. Still, healthcare students' perceptions concerning the use of simulations in healthcare programs and how simulations influence their learning process are essential to help enhance learning environments. Consequently, studying these perceptions will help overcome difficulties students encounter in actual clinical settings. Thus, the development of an instrument that can evaluate students' perceptions of simulations would help educators initiate an effective simulation course that would be fully integrated into clinical training.

Purpose of the Study

The lack of literature about simulation education makes it necessary to conduct an informative study. The study's purpose was to evaluate the perceptions of students' use of simulation in nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy programs. The following research questions were used to address the study:

1. What are the perceptions of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students toward patient simulation programs?
2. How do simulation experiences affect the clinical practice of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students?
3. Does the simulation debriefing experience help nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students' understanding and reasoning?

4. How do students' perceptions toward simulation differ based on gender, simulation experience, and clinical experience?

Significance of the Study

The goal of the study was to aid in advancing patient simulation education in healthcare programs via the integration of simulation courses into curricula as a mandatory requirement before the students can enter real-world practice. Feedback from students on the use of alternative learning methods, including simulation, is crucial in improving programs that make use of clinical simulation in laboratory settings. Therefore, the study will assess the implementation of patient simulation courses in laboratory settings.

Definition of Terms

Human Patient Simulator

A human patient simulator is a lifelike mannequin that consists of advanced and adjustable computer controls for providing various physiological parameter results of an electrical, physical, and combinational nature. Those parameters are controllable with the use of automated software, and they respond to an evaluator's actions when a student performs an action (Rhodes & CURRAN, 2005).

Debriefing

Debriefing is the attempt to question or make sense of an experience or event to obtain useful information or knowledge. Debriefing that happens after a simulation experience is conducted under the guidance of a facilitator. Debriefing is the account individuals give after a simulation experience (Fanning & Gaba, 2007).

Facilitator

A facilitator is an individual who guides the study participants toward understanding as well as toward achieving the objectives of the study.

Assumptions

The following assumptions were used for this study of implementation of the simulation course:

1. The use of a simulation course would result in improvement in healthcare students' performance in real-world tasks.
2. Students will accept using simulations and cooperate to make the course successful.
3. A simulation course would result in improvement in students' self-confidence and clinical judgment.

Limitations

In any study one can expect limitations that are outside the control of the researcher. The following limitations were recognized by the researcher as being viable:

1. Students used in the study are from different programs and may have different experiences.
2. Students used in the study are at different program levels and may have different experiences.
3. Students may have had simulation training in the past.

Delimitations

The study was limited by the following factors:

1. There is not enough literature in this area of patient simulation programs.
2. It may not be generalizable to all healthcare fields or students in the United States.

CHAPTER II

Review of the Literature

The following literature review is a collection of recent studies regarding simulation in healthcare education. EBSCOhost, CINAHL, and PubMed databases used for this review. This chapter is organized according to the following main topics: integration of simulation in health profession education, classification of simulation, effective clinical simulation, simulation in medicine, simulation in nursing education, simulation in respiratory therapy, simulation in physical therapy, simulation for other health profession providers, and a summary of the chapter. The first topic covers the introduction of simulation uses in health education, with attention to the integration of simulation in health profession education over the past decades. The second topic consists of the classification of simulation. The third topic will cover the concept of simulation and its effective implementation for learning purposes. The next topics will focus on simulation in healthcare in reference to the students' perception of the simulation in medicine, nursing education, respiratory therapy, physical therapy, occupational therapy, and other healthcare areas. Lastly, the chapter will conclude with a summation as well as a review of the importance of simulation in healthcare learning.

Integration of Simulation in Health Profession Education

Health educators are moving from the traditional methods of education, such as classrooms, to content and practices that are safe and risk free. Technological advancement has resulted in improvements in healthcare education with the emergence and integration of these technologies. For example, the integration of simulation as a learning method has enabled students to proactively participate in the classroom. According to Alinier (2007), the use of simulation as an educational tool is not new, but its use has increased over the years because the

use of simulation would help to improve patient safety. Similarly, simulation technologies have become affordable and thus accessible to education facilities (Alinier, 2007).

Simulation can be used in a wide range of applications. In healthcare, simulation is ideal for placing students in safe yet realistic clinical scenarios (Alinier, 2007). The students interact with patient-like mannequins to experience various medical scenarios. Simulation in healthcare can thus be described as a training approach where healthcare students are engaged in a reality-like simulated medical environment. According to Scalese, Obeso, and Issenberg (2008), the students are expected to take charge of the scenario and make informed medical choices.

Classification of Simulation

Alinier (2007) described six types of simulation, known as technological simulation levels (0–5). The first type (level 0) employs written cases and patient information. This level is often used in classrooms and led by students. Level 0 is a written simulation (i.e., case studies) that includes patient information such as blood test results, x-rays, ECG printouts, and so on. In other words, level 0 does not require any particular equipment. Level 0 is a cost-effective type of simulation that can be used for a large number of students. However, this type of simulation provides unrealistic feedback.

The second type, level 1, is a three-dimensional model that focuses on the use of passive anatomical models learners can use for demonstration, practice of simple skills, and conduct of individual patient assessments. Level 1 is often used in classrooms or clinical skills rooms and is led by students or a trainer. This level involves basic mannequin-based simulation, or low-fidelity simulation models. Moreover, level 1 can be used repeatedly to practice avoiding patient discomfort. However, level 1 has a limited range of training functions and little or no interactivity.

The third type (level 2) involves the use of virtual reality (VR) and screen-based simulations. The screen-based simulations include simulation software, videos, DVDs, VR, and surgical simulators. Level 2 is often used in classrooms or multimedia/computer laboratories and is led by students or a trainer. Level 2 is typically used to help students to improve their cognitive and interpersonal skills. This level's cost is relatively low, with the exception of VR simulations. Moreover, this type of simulation can be used for a large number of students and is considered a self-learning type of simulation. Furthermore, it can be used to provide feedback on performance. However, level 2 provides unrealistic settings, and users of this type of simulation must be familiar with the software or the equipment.

The fourth type (level 3) involves the use of standardized simulated or real patients. Level 3 is used in clinical skills rooms or realistic simulation center settings and is led by students or a trainer. Level 3 is typically used to aid students in advancing their cognitive, interpersonal, physical assessment, and diagnostic skills. This type of simulation can be realistic, and it can be used to assess and provide feedback to students. However, level 3 should be used only for small groups of students, and patients have to be trained and briefed. Moreover, level 3 can be inconvenient for the students if the exercise repeated many times. Furthermore, this type of simulation is not valid for invasive procedures.

The fifth type (level 4) involves the use of full-body-size simulators, such as programmable mannequins, that are controlled by a computer. Level 4 is used in clinical skills rooms or realistic simulation center settings such as a simulated theatre, the intensive care unit (ICU), or ward, and it is preferably led by a trainer. The primary difference between levels 4 and 3 is that level 4 can be used for practicing invasive procedures. Level 4 is typically used as a full-scale simulation for training and demonstrations to assist students and to enhance their cognitive, interpersonal, physical assessment, diagnostic, and procedural skills. This type of simulation

provides realistic experience that can be used to apply a broad range of skills. Moreover, it can be used for multiprofessional training. However, level 4 requires several trainers for a relatively small group of students, and trainers must be familiar with the equipment. Furthermore, level 4 is a basic full-body-size simulator that is not fully interactive with the students.

The sixth type (level 5), also known as a high-fidelity simulation platform, involves the use of interactive, full-body-size patient simulators. Level 5 is the most advanced level of simulation, and it uses psychological features to imitate all the vital signs that can be monitored on a patient, such as body temperature, heart rate, and so on. Level 5 is used in realistic simulation center settings, and it is preferably led by students. Level 5 has the same uses as level 4, but it can be fully interactive and is more advanced. Moreover, level 5 has the same advantages as level 4. However, level 5 is more expensive, and requires several trainers who must be familiar with the equipment. Furthermore, level 5 is used for a relatively small group of students, and it is not very portable.

Effective Clinical Simulation

To achieve an effective clinical simulation and hence a productive performance, the student should understand that the use of simulation is different from real-life clinical scenarios. Sometimes, the use of simulation can give students the impression they are fully qualified and prepared for real-life scenarios. According to Alinier (2007), the misuse of simulation can lead to overconfidence, which can lead to poor performance. Poor performance can then lead to a lack of motivation, ambition, and confidence as the learner realizes that he or she lacks the expertise to operate in a real medical environment.

Ahmed, Al-Mously, Al-Senani, Zafar, and Ahmed (2016) conducted a cross-sectional observational study to evaluate the perception of medical teachers toward the integration and effectiveness of simulation-based medical education (SBME) in their curriculum. They found

that teachers acknowledged that effective SBME made learning enjoyable and effective and improved students' learning outcomes. Also, the findings correlated with previous findings on students' perceptions of SBME (Ganley & Linnard-Palmer, 2012; Nuzhat, Salem, Al Shehri, & Al Hamdan, 2014; Reese, Jeffries, & Engum, 2010). The findings revealed that first- and second-year students had an improved understanding of basic neuroscience concepts (Fitch, 2007). However, the study revealed a need for advanced training of medical teachers so they can utilize effective SBME in their curricula.

According to Hogg and Miller (2016), the effective use of simulation improves performance and confidence, thus enhancing efforts to save patients' lives and ensure their overall well-being. Learning institutions can adopt different simulation tools that ensure simulations are effective as a learning method (Hogg & Miller, 2016). The type of simulation and learning method that can be adopted depends on the students' academic levels (Hogg & Miller, 2016). For instance, learners at lower learning levels can learn with classroom teaching such as written cases (level 0). However, as the students advance, lessons must move to more advanced simulators to enhance the acquisition of clinical skills (Hogg & Miller, 2016). Simulations have been proven to provide learners with ideal ways to learn without putting patients' lives at risk (Hogg & Miller, 2016). According to Hogg and Miller (2016), the use of mannequins gives learners the chance to make errors and correct them before they finally attend a real-life patient. Similarly, the use of simulators allows different students to perform the same medical scenario. Trainers have the opportunity to manipulate the parameters of the scenario and thus expose learners to different behaviors and outcomes (Hogg & Miller, 2016).

However, Al-Mously, Baalash, Salem, and Mukaddam (2014) argued that the timing of the simulation exercise impacts its effectiveness regarding when introducing learners to simulation-based education. Al-Mously et al. (2014) argued that stimulation-based education

must be introduced at the early stages of learning for the student to exhibit better outcomes. An early start ensures students can transition from simulated learning to the actual clinical environment with ease. Al-Elq (2010)distinguished simulation learning as one of the most fundamental developments in the curricula of teaching and learning. All medical specializations need to embrace simulated learning to improve their skill acquisition and competencies (Al-Elq, 2010).

Effective clinical simulation also entails the adoption of a simulation-based interprofessional educational (Sim-IPE) program. Liaw, Zhou, Lau, Siau, and Chan (2014) conducted a study that involved the analysis of interprofessional learning using the simulation of patients whose health statuses were deteriorating. The study revealed that the Sim-IPE ensured better preparation of medical and nursing students because it enhanced communication. Communication is important in the management of patients, especially if the patient's health is deteriorating (Liaw et al., 2014). According to Liaw et al. (2014), communication and teamwork are critical skills that healthcare students must possess to execute their roles in any healthcare facility. In other words, poor communication can affect patient care and cause delays in the delivery of healthcare services to patients. Therefore, simulation can help learners integrate different communication strategies as they evaluate different medical conditions by using the Situation, Background, Assessment, Recommendation communication techniques (SBAR). SBAR tool enables students to discuss the patient's situation, collect background information on the patient and his condition, and assess the given problems (Liaw et al., 2014). The Sim-IPE also enhances team communication and the provision of feedback to enhance the provision of quality patient care (Liaw et al., 2014).

Simulation in Medicine

Simulation-based education has become popular among trainees in medicine (Happel, Lease, Nishisaki, & Braga, 2015). In a study to evaluate the impact of simulation education in pediatric care, Happel et al. (2015) found simulation provides an ideal platform for trainees to gain and maintain skill competence. The trainees acquire essential skills they can implement in critical events such as those found in emergency departments. The trainees reported an improvement in their performance, especially when handling critical events. The trainees reported they had an improved understanding of when to call for assistance. The trainees also reported a better understanding of medical management and an increase in confidence levels. The ICU is a critical department where patient safety and well-being must take priority. According to a qualitative descriptive design by Ballangrud, Hall-Lord, Persenius, and Hedelin (2014), simulation provides realistic training that enables students to increase their awareness of clinical practice. Similarly, simulation helps students improve their understanding of structured work teams (Ballangrud et al., 2014). The ICU requires seamless teamwork to achieve patient safety, as one patient is handled by a team of healthcare professionals who must work as a team to ensure optimal patient management.

Parikh, Brown, White, Markert, Eustace, and Tchorz (2015) study also showed that students appreciate the introduction of simulation. According to Parikh et al. (2015), simulation helped improved interpersonal and psychosocial competencies during end-of-life training. Students perceived simulation-based end-of-life care training as a valuable learning experience. The simulation, coupled with formal assessment of the learner's communication skills and development of physician trust and empathy, helped encourage students at an early stage of their profession (Parikh et al., 2015).

Another study by Katowa-Mukwato, Andrews, Maimbolwa, Lakhi, Michelo, Mulla, and Banda (2014), examined medical students' perceptions and competence during their clerkships. The researchers conducted a cross-sectional survey study among fifth-, sixth-, and seventh-year medical students. The study found there was a significant increase in confidence levels due to simulation, hence improving students' overall performance. The medical students stated simulation aided them in being prepared for small clinical problems and being more productive during their clinical duty (Katowa-Mukwato et al., 2014). Similarly, Evans, Crimmins, Bonz, Gusberg, Tsyrulnik, Dziura, and Dodge (2014) conducted a study to assess the feasibility and effectiveness of a 12-week simulation-based clinical education course for medical students. The study reported that simulation enhanced medical students' confidence, decision-making skills, abilities to be effective leaders, communication skills, and management skills (Evans et al., 2014).

Simulation in Nursing Education

According to Parsh (2010), factors such as improvements in technology and shortages of clinical placement for learning students have pushed universities to adopt the Simulated Clinical Experience (SCE), which exposes nursing students to the reality of a clinical environment where they can then demonstrate procedures and engage in decision making and critical thinking. However, the effective use of SCE requires a qualified and experienced instructor. Parsh (2010) interviewed different nursing students regarding their opinions on what constitutes an effective instructor. The nursing students mentioned that the instructor must have effective teaching abilities to guide students in the SCE as well as in an actual clinical setting. According to the nurse learners, the instructor must guide students through the simulation learning process without necessarily helping out and giving solutions to every problem students face (Parsh, 2010). In other words, the instructor must be patient enough to allow students to evaluate the simulated

scenario, engage in critical thinking, and make their own decisions during the simulated scenario. The nurse students also seek instructors who can provide an effective evaluation of students (Haraldseid, Friberg, & Aase, 2015; Parsh, 2010). The instructors must give positive, direct, and energetic responses and demonstrate a genuine desire to see students excel during the simulation (Haraldseid et al., 2015; Parsh, 2010).

In the analysis of the use of simulators versus learning using the traditional setting, nurse students gave equal importance to both platforms (Haraldseid et al., 2015; Raymond-Dufresne, Brazil, Johnson, & Nielson, 2016). Simulation education prevent several issues that may occurred with the use of the traditional clinical setting. For instance, in the clinical setting, the instructor may not be with the student at all times. In fact, the instructor may walk students through a procedure just once and not repeat the process again. In contrast, the use of simulations gives learners the opportunity to learn a procedure and repeat it as many times as necessary (Haraldseid et al., 2015). Additionally, nurse students argue that the traditional clinical setting provides other factors learners must consider. For instance, learners have to consider the patient's mental state, privacy, and the sensitivity of the situation (Raymond-Dufresne et al., 2016). In contrast, the use of simulators eliminates these factors unless it is a mandatory part of the learning process (Raymond-Dufresne et al., 2016). Irrespective of the differences, nursing students appreciated that both settings provide learners with a foundation where they acquire knowledge they can implement in the real world (Raymond-Dufresne et al., 2016).

Alinier, Hunt, Gordon, and Harwood (2006) conducted a study to determine the effectiveness of simulation on the training of nursing students. Using full-scale and realistic medical simulation, the study revealed intermediate-fidelity simulation as a useful training technique. The technique allowed small groups of learners to train in a safe and controlled environment. The use of mannequins enabled the learners to actualize a real medical situation

(Alinier et al., 2006). The students thus learned how to react to different medical situations when handling critical patients. The training equipped students with minimum technical and nontechnical skills before they were assigned actual practical settings (Alinier et al., 2006).

Landeen, Pierazzo, Akhtar-Danesh, Baxter, van Eijk, and Evers (2015) acknowledged that simulation learning has become widely accepted as a learning methodology in nursing education. In a study designed to determine student and faculty perception of the use of simulation in nursing education, Landeen et al. (2015) found faculty members perceived simulations as new learning opportunities. Faculty members surveyed acknowledged that times have changed and people have a better understanding of the strengths and limitations of using simulation. The faculty thus perceived simulation as the best alternative to using live patients for learning in nursing education (Landeen et al., 2015).

Madhavanprabhakaran, Al-Khasawneh, and Wittmann (2015) also conducted a nonexperimental quantitative survey to determine nursing students' perceptions of preclinical simulation-based training (PSBT). The study revealed that students perceived PSBT as an innovation that enhanced their knowledge, skills, and patient safety practices. The students also indicated that the innovation helped them boost their confidence levels and thus gain confidence to handle real patients. Overall, the findings facilitated the adoption of simulation as part of the curriculum in medical learning institutions (Madhavanprabhakaran et al., 2015).

Simulation in Respiratory Therapy

Most students specializing in respiratory therapy integrate simulation as a learning tool into their education. Walsh, Gentile, and Grenier (2011) found that simulation provides students with an ideal learning platform. According to the study, respiratory therapists agreed that the use of simulation provided them with training opportunities that would not have been available without it. A majority of the respiratory therapists also acknowledged the need for trainees to

undertake a specialty exam to verify their mastery and determine their level of competency (Walsh et al., 2011).

A report by Barnes, Kacmarek, Kageler, Morris, and Durbin (2011) acknowledged respiratory therapists need to adapt to the changing healthcare industry. According to their report, clinical department educators and affiliates must adopt simulation in their education venues to develop the competency of the current workforce. In addition, clinical simulation techniques are useful for teaching and assessing whether trainees have acquired new knowledge, skills, and attitudes needed for enhanced healthcare delivery (Sigalet, Donnon, & Grant, 2012). For instance, specific respiratory therapy techniques such as the use of mechanical ventilator simulators are effectively taught using simulation (Sigalet et al., 2012).

MacIntyre (2004) highlighted the numerous respiratory system simulations and modeling tools respiratory therapy students can use during their training. Simulators and respiratory models range from the simplest forms to sophisticated models. According to MacIntyre (2004), there are three main types of simulators: signs and symptoms simulators, anatomical models, and physiological models. The signs and symptoms simulators range from human actors to computer-controlled mannequins. Respiratory therapy students can adopt different clinical scenarios and use the signs and symptoms simulator to make effective clinical decisions. While anatomical modeling simulates basic human anatomy, physiological models include processes such as carbon dioxide production and oxygen consumption. The three forms of simulations improve the understanding of diseases and their processes and ways of managing them (MacIntyre, 2004).

Alhaykan (2015) highlighted the perceptions of respiratory therapy students in the implementation of simulations in educational laboratory settings. Alhaykan (2015) conducted a survey in which he found students had a positive perception that the simulation helped them

understand concepts, was a valuable learning experience, stimulated their critical thinking, and was realistic. Moreover, according to the study, students agreed that the knowledge gained from simulation sessions can be transferred to the clinical setting. Alhaykan (2015)stated most students agreed that because of simulation, they would be less nervous in clinical settings. Furthermore, respiratory care students agree that simulation course should be included in the curriculum (Alhaykan, 2015). Moreover, respiratory therapy students stated that debriefing sessions after simulation experiences supported their understanding and reasoning. Alhaykan (2015) argued that debriefing sessions are an important phase of simulation sessions that result in effective simulations.

Another study by Alqarni (2015) identified the perceptions of respiratory therapy students about patient simulation education. The study's purpose was to find out whether patient simulation education enhanced respiratory therapy students' enthusiasm and confidence. Alqarni found most of the students strongly agreed that patient simulation education is highly helpful and effective. The students also agreed that patient simulation education helped them enjoy and learn more about respiratory therapy. Alqarni (2015) stated that patient simulation education helped students have an effective learning environment. Respiratory therapy students felt patient simulation education helped them perform necessary tasks confidently in the clinical setting (Alqarni, 2015).

Simulation in Physical Therapy

Simulation can be used in physical therapy to improve individuals' behavioral, technical, and cognitive skill performance. In education, this form of simulation has been a valuable tool for reinforcing course content. Studies have shown that incorporating a simulated experience into a particular clinical course enhances physical therapist students' confidence and student satisfaction (Ohtake et al., 2013; Pritchard, Blackstock, Nestel, & Keating, 2016; Shoemaker,

Platko, Cleghorn, & Booth, 2014; Shoemaker, Riemersma, & Perkins, 2009). According to Ohtake et al. (2013), environments such as ICUs may make physical therapy students feel unsatisfied and unprepared. Simulation allows physical therapy students to be more prepared and motivated. Simulation in physical therapy education proved an effective experience as an educational tool for students (Ohtake et al., 2013). According to the study, physical therapy students felt self-assured in their practical, interactive, and intellectual performance, which eventually led to high satisfaction. Moreover, the students had a positive perception of the integration of simulation, and the majority of students agreed that the physical therapy curriculum would be improved through the combination of simulation practices (Ohtake et al., 2013).

Another study by Shoemaker et al. (2009), provided a brief introduction to and evaluated the use of high-fidelity human simulation (HFHS) as a teaching tool in physical therapist educational programs. Shoemaker et al. (2009) stated that HFHS can have a significant impact on students' confidence about practice in real-life clinical scenarios. According to the study, physical therapy students felt simulation provided them with a real-life clinical scenario and helped them be more prepared and qualified in the clinical setting. According to Shoemaker et al., there was no evidence from any health profession that the use of HFHS resulted in insignificant or inferior learning outcomes.

Similarly, Pritchard et al. (2016) found simulation had an effective outcome on the development of physical therapy students. Pritchard et al. also found students have positive perceptions toward simulation and feel more confident that they are prepared for clinical settings. The study also indicated that physical therapy students' clinical and interprofessional skills were enhanced as a result of simulation. Physical therapy students also stated that learning with simulations is an effective tool in physical therapy education (Pritchard et al., 2016).

Simulation in Occupational Therapy Education

Simulation in occupational therapy education has been shown to increase problem solving, communication, critical reasoning, and decision-making skills among students (Classen & Brooks, 2014; Shoemaker et al., 2014). According to Classen and Brooks (2014), occupational therapists often refer patients to use simulator programs for assessment and intervention purposes. Classen and Brooks stated that clinicians and older adults have positive perceptions of the use of simulators in clinical settings. Moreover, simulation in occupational therapy education has been shown to be an effective tool to enhance occupational therapist student confidence and training (Shoemaker et al., 2014). Further, occupational therapy students stated that simulation-based interprofessional education sessions helped them be more comfortable and confident in collaborating with other healthcare professionals (Shoemaker et al., 2014).

Simulation in Other Healthcare Providers

O'Donnell, Goode Jr, Henker, Kelsey, Bircher, Peele, Bradle, Close, Engberg, and Sutton-Tyrrell (2011) argued simulation intervention can be useful in improving clinical events such as patient transfers. In medicine, learners must acquire critical hands-on skills to ensure the patient's safety is upheld. For instance, the issue of patient transfers is critical for patient safety. Similarly, healthcare providers can experience injuries during patient transfers (O'Donnell et al., 2011). Simulation can provide learners a platform to learn effective practices for patient transfers. The study demonstrated an improvement of patient transfer skills as well as an improvement in knowledge and attitude. Nurses admitted they hated the process of patient transfers because it put them at risk of musculoskeletal injuries (O'Donnell et al., 2011). However, exposure to simulation in the exercise resulted in improvement. Learners acknowledged they acquired knowledge in injury prevention, patient transfer, and improved communication by using simulation (O'Donnell et al., 2011).

Quilici, Bicudo, Gianotto-Oliveira, Timerman, Gutierrez, and Abrão (2015) also found that faculty consider simulation education an effective assignment and learning tool in healthcare programs. The study stated that universities and other healthcare institutions have shown interest in constructing simulation centers to train healthcare students. Moreover, the students also acknowledged that simulation is among the best learning and training tools. Simulation also helps students minimize their mistakes when in contact with patients, and it improves their clinical and logical thinking, which is critical in establishing the best methods of patient care (Quilici et al., 2015). Olesinski, Brickell, and Pray (1998) further pointed out that simulation helped students prepare for practice in a clinical environment. In a study at the University of Kentucky center for rural health, clinical laboratory science students indicated that simulations helped them sharpen their interaction skills with physicians (Olesinski et al., 1998). According to the study, students also appreciated the extent of stress to which simulation exposed them.

Moreover, another study done by Abraham and Singaram (2016) to evaluate the perception of students towards the clinical skill laboratory. The students acknowledged that experiencing different types of stress allowed them to learn how to deal with them in an actual clinical setting (Abraham & Singaram, 2016). The students also indicated that simulation in the laboratory allowed them to see how different laboratory testing methods came together to produce a test result. Overall, the students agreed that simulation improved their confidence in handling assigned tasks (Abraham & Singaram, 2016).

Kenaszchuk, MacMillan, van Soeren, and Reeves (2011) also analyzed the integration of simulation as a learning tool for interprofessional education. Interpersonal training allows for the exploration of collaborative ways to improve communication in clinical care. Furthermore, Rice (2015) found that simulation-based team training enhanced teamwork attitudes, perceptions, and overall performance of learners. Specifically, Rice analyzed simulation-based training in the care

of trauma patients who require coordinated intensive care to optimize their chances of survival. The students found that simulation-based team training enhanced team communication, which in turn translated to improved patient care (Rice, 2015).

Simulation-based learning is also essential in training professionals in neonatal resuscitation. According to Amin, Aziz, Halamek, and Beran (2013), the prompt initiation of appropriate neonatal resuscitation skills is critical in assisting neonates who were experiencing breathing difficulties. Neonatal respiratory distress is common in neonates as they transition to life outside the uterus. Amin et al. found that simulation increased the perception of the trainee's knowledge, skills, and confidence to undertake actual neonatal resuscitation (Amin et al., 2013).

Summary

Healthcare educators are integrating simulation-based learning in their curricula to enhance the acquisition of critical skills. The introduction of simulation-based learning in healthcare is bound to translate into improved patient care, quality care delivery, and enhanced patient safety (Houghton, Casey, Shaw, & Murphy, 2012). Medical simulation involves the creation of a learning environment where the learning process occurs through the use of technological devices, mannequins, or simulated patients. The simulated patients and mannequins are presented with symptoms of a disease. The learners then review the "patient," gather the history of the illness, and prescribe the next course of action (Houghton et al., 2012).

Medical-based simulation helps students act out real-life medical situations in preparation for real-life clinical scenarios. The integration of simulation as part of the learning process enables healthcare students to perform medical procedures on models under the observation and guidance of their tutors. The method thus eliminates the occurrence of errors (Haraldseid et al., 2015). Simulation learning is also important because it provides a platform for repeated learning, thus enhancing accuracy and retention of the procedure (Abraham & Singaram, 2016). As a

result, students leave their learning institution with the confidence that they can handle real medical situations in real healthcare settings. While a medical-based simulation will never replace real-life clinical experiences, it provides students with an ideal learning opportunity before they graduate (Abraham & Singaram, 2016).

CHAPTER III

Methodology

In this study, the researcher explored students' perceptions of the use of simulation courses in healthcare education. The researcher examined the perceptions of and the impacts on healthcare professional students in the fields of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy. The completion of this study included the use of a survey as a means of establishing the necessity of carrying out a simulation course before clinical practice in hospitals. The survey for this study was given to healthcare professional students in the nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy programs at a southeastern urban university. This chapter presents a discussion of the methods and procedures adopted in the development of this study.

Research Questions

1. What are the perceptions of healthcare students toward patient simulation programs?
2. How does the simulation experience affect clinical practice of healthcare students?
3. Does the simulation debriefing experience help students' understanding and reasoning?
4. How do students' perceptions toward simulation differ based on gender, simulation experience, and clinical experience?

Instrument

The survey adopted for this study was originally designed by Howard, Englert, Kameg, and Perozzi (2011) and modified by Alhaykan (2015). The rationale behind the selection was to conduct and integrate the adoption of high-fidelity simulation of humans as a teaching model as well as the use of an active learning paradigm in the course of the nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy programs. The survey was modified and

edited to ensure it provided the most accurate assessment of students' perception of using simulation in healthcare education as a mandatory curriculum prerequisite leading to a clinical practice course. Before using the survey instrument, permission was sought from the author and once obtained, it was modified via the use of the Q-sort method to appraise students' perception of using simulation in healthcare education as a mandatory prerequisite in the clinical course curriculum. A four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) was used to assess responses in the collection of the students' perceptions (see Appendix A).

According to Grove and Burns (2005), reliability and validity are employed in referring to accuracy as well as consistency relating to the instrument used in the study. In the initial study, the Cronbach's alpha measure of internal consistency was .85, which was an indication the instrument used was reliable. Further, the study employed the 4-point Likert-type to assess the perception of the students on the simulation, and the validity of the instrument was authenticated by a panel of healthcare professionals.

Research Design

The study employed a descriptive exploratory research design with a self-reporting survey. According to Brown (2009), a survey research is a process that involves answering to questions and is considered a common type of descriptive research. The objective of the survey is to employ questionnaire interviews as the core means of collecting data from a sample and consequently report on the population used in the study (Portney & Watkins, 2008). According to Portney and Watkins (2008), one of the main advantages of survey research is that it assembles a large amount of information from many individuals using only one instrument. Therefore, this study used the survey design to collect data from healthcare students on their perceptions relating to the use of simulation in healthcare education.

Sample

A convenience sample was used in this study as participants were chosen according to availability. The population will be from undergraduate and graduate students who are enrolled in nursing, respiratory therapy, nutrition, physical therapy, and occupational therapy programs at a southeastern urban university. Exclusion criteria included participants who does not received any clinical simulation sessions while in their current healthcare program.

Protection of Human Subjects

The study proposal will be submitted to Georgia State University Institutional Review Board (IRB) for approval. Methods for human subjects' protection were implemented. Study participation will be voluntary with consent assumed on return of a completed survey. Confidentiality will be implemented as no names or personal identifying information will be used for data collection.

Procedure

After obtaining IRB approval, the researcher assigned a date to distribute the survey. The researcher personally administered and distributed the self-reporting survey to participants, which helped minimize bias. The survey included a cover letter with clarifications about the study and the instrument survey. To ensure anonymity and confidentiality of each participant, the survey instrument included no identifying questions.

Data Collection

The analysis of the collected data was via the use of the Statistical Packages for the Social Sciences (SPSS) program, version 22. Descriptive statistics were implemented as percentage, frequency, mean, and standard deviation in the identification of the differences in the perceptions of healthcare students on the use of simulation in healthcare education. Scores were computed for each of the questions, and higher scores meant greater agreement in the use of simulation education, whereas lower scores indicated less agreement in the use of simulation education.

Cover Letter

The development of the cover letter occurred after reviewing various styles of previous similar published surveys (Portney & Watkins, 2008). The cover letter was created and sent to the thesis chair for review and examination. (Appendix B)

Chapter IV

Findings

The purpose of this chapter was to evaluate students' perceptions toward implementation of simulation in healthcare education and to differentiate between students' perceptions based on various factors such as gender, simulation experience and clinical experience. Demographic information of the sample and results of the descriptive statistical analyses are provided. Statistical analysis was conducted using Statistical Package for the Social Sciences 22 (SPSS 22).

Research Questions

1. What are the perceptions of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students toward patient simulation programs?
2. How do simulation experiences affect the clinical practice of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students?
3. Does the simulation debriefing experience help nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students' understanding and reasoning?
4. How do students' perceptions toward simulation differ based on gender, simulation experience, and clinical experience?

Demographic Findings

The study was conduct in a southeastern urban university, where nine classes at the were selected to participate. A convenience sample was used in this study. A total of 250 subjects from five programs participated; nursing, respiratory therapy, nutrition, physical therapy, and occupational therapy. The majority of the respondent were physical therapy students n=73 (29.2%); followed by nursing students n=70 (28%); respiratory therapy students n=69 (27.6%); nutrition students N=19 (7.6%); and occupational therapy students n=19 (7.6%). Female

respondents were 176 (70.4%) while male respondents were 74 (29.6%). The participants' age range between 20-52 years, and their mean age and standard deviation (SD) were (26 ± 5.451). (See Table 1)

Table 1a: Participants' Characteristics

	Total	Nursing	Nutrition	Occupational Therapy	Respiratory Therapy	Physical Therapy
	N (%)	N (% of total)	N (% of total)	N (% of total)	N (% of total)	N (% of total)
Male	74 (29.6)	11 (15.7)	1 (5.3)	2 (10.5)	31 (44.9)	29 (39.7)
Female	176 (70.4)	59 (84.3)	18 (94.7)	17 (89.5)	38 (55.1)	44 (60.3)
Number of participant	250 (100)	70 (28)	19 (7.6)	19 (7.6)	69 (27.6)	73 (29.2)

Table 1b: Participants' Characteristics; (Age)

	Total	Nursing	Nutrition	Occupational Therapy	Respiratory Therapy	Physical Therapy
Age Range	20-52	21-48	22-52	21-33	20-50	22-44
Mean (SD)	26 (5.451)	25.60 (5.943)	26.95 (7.020)	24.32 (2.868)	26.61 (5.699)	26.01 (4.730)

Students are categorized into two groups of participants; undergraduate (bachelor) and graduate (master and doctorate) students. More than half of the participants were graduate students (n=140, 56%) while undergraduate students were 44% (n=110). The respondents' level of program that they were enrolled in while taking the survey are: Bachelor degree n=110 (44%), Master degree n= 67 (26.8%), and Doctorate degree n=73 (29.2). One hundred and twenty students (40%) were in their first year of the healthcare program; followed by one hundred and three students (41.2%) were in their second year of the healthcare program and twenty-nine students (10.8%) were in their third year of the healthcare program. (See Tables 2).

Table 2a: Level of program

	Total	Nursing	Nutrition	Occupational Therapy	Respiratory Therapy	Physical Therapy
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Bachelor	110 (44)	70 (100)	-	-	40 (58)	-
Master	67 (26.8)	-	19 (100)	19 (100)	29 (42)	-
Doctorate	73 (29.2)	-	-	-	-	73(100)

Table 2b: Year in program

	Total	Nursing	Nutrition	Occupational Therapy	Respiratory Therapy	Physical Therapy
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
First year	120 (48)	-	19 (100)	19 (100)	42 (58)	40 (54.8)
Second year	103 (41.2)	43 (61.4)	-	-	27 (42)	33 (45.2)
Third year	27 (10.8)	27 (38.6)	-	-	-	-

In regards to the survey's item asking students about their clinical experience, more than half of the respondent self-declared that the did not have any experience working in a healthcare setting prior to entering the healthcare program (n=143, 57.2%) while 42.8% (n=107) of the respondents recorded that they had experience working in a healthcare setting prior to entering the healthcare program. (see Table 3).

Table 3: participants' healthcare clinical experience prior to entering the healthcare program

	Total	Nursing	Nutrition	Occupational Therapy	Respiratory Therapy	Physical Therapy
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
YES	107 (42.8)	17 (24.3)	7 (36.8)	10 (52.6)	31 (44.9)	42 (57.5)
NO	143 (57.2)	53 (75.7)	12 (63.2)	9 (47.4)	38 (55.1)	31 (42.5)

Regarding the survey's items asking student about their simulation experience prior to entering their healthcare program as well as their simulation experience while they are in their current healthcare program, 33.6% (n=83) of the participants self-reported that they had clinical simulation sessions prior to entering their healthcare program while 66.4% of the participants reported that they did not participated in any clinical simulation sessions prior to entering their healthcare program. However, 95.2% (n=238) of student self-reported that they receive at least one clinical simulation session while they are in their current healthcare program. On the other hand, 3.2% (n=8) of student self-reported that the did not received any clinical simulation sessions while in their current healthcare program and were excluded for not meeting the inclusion criteria for the study, which reduced the total number of participants to (n=242). (See Table 4).

Table 4: Participants' experience on simulation..

		Total	Nursing	Nutrition	Occupational Therapy	Respiratory Therapy	Physical Therapy
		N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Prior to entering the healthcare program at GSU	YES	84 (33.6)	9 (12.9)	5 (26.3)	11 (57.9)	29 (42)	30 (41.1)
	NO	166 (66.4)	61 (87.1)	14 (73.7)	8 (42.1)	40 (58)	43 (58.9)
While in your current program at GSU	YES	242 (96.5)	70(100)	12 (63.2)	19 (100)	67 (97.1)	70 (95.9)
	NO	8 (3.2)	-	4 (50)	-	1 (12.5)	3 (37.5)

Finding Related to Research Question 1

The survey explains in details overall healthcare students' perception regarding patient simulation programs and the students' perceptions toward patient simulation programs from different majors including; nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy. The findings were tabulated and presented in table 5, which includes the item number on the survey and a description of the questions. The table shows mean score and

standard deviation (SD) of the overall healthcare students' perception as well as the students' perceptions from nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy.

Table 5: Findings Related to Research Question 1: Students' perception toward simulation

Item No.	Description:	Total	Nursing	Nutrition	OT	RT	PT
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
S2	Was a valuable learning experience	3.52 (.577) *	3.39 (.644)	3.33 (8.16)	3.42 (.507)	3.54 (.529)	3.70 (.462) *
S3	Helped to stimulate critical thinking	3.50 (.599)	3.49 (.608) *	3.40 (.828)	3.32 (.478)	3.43 (.630)	3.64 (.512)
S5	Knowledge gained can be transferred to the clinical setting	3.50 (.548)	3.41 (.551)	3.74 (.834) *	3.47 (.513) *	3.53 (.532)	3.59 (.496)
S1	Simulations helped them better understand concepts	3.48 (.639)	3.29 (.705)	3.33 (.816)	3.26 (.452)	3.56 (.665) *	3.67 (.473)
S6	Experienced nervousness during simulation	3.15 (.877)	3.39 (.786)	2.80 (1.082)+	2.63 (.684)+	3.07 (.903)+	3.21 (.866)
S4	Was realistic	3.09 (.747)+	2.96 (.824)+	3.07 (.799)	3.21 (.631)	3.29 (.648)	3.00 (.742)+

SD: Standard Deviation, OT: Occupational Therapy, RT: Respiratory Therapy, PT: Physical Therapy,
(*): Highest Score, (+): Lowest Score
Note. Means are based on a 4-point, Likert-type scale in which 1 indicates strongly disagree and 4 indicates strongly agree. Scores above 2.5 indicate agreement with the statement.

Table 5 ranks the results of overall students' perception toward simulation from highest mean scores to lowest mean score and to according to the number of survey's items. Table 5 breaks down survey responses to the first six items on the survey which were asking the participants about their simulation experience. Overall, healthcare students self-reported a positive response to most of the first six items on the survey. Healthcare students demonstrated the strongest agreement to the statement that "simulation was a valuable learning experience" with a total mean score of M=3.52 and standard deviation of (SD ± .577). On the other hand, healthcare students demonstrate the least agreement response to the statement that "simulation was realistic" with a total mean score of M=3.09 and standard deviation of (SD ± .747). (See table 5).

Nursing students self-reported a positive response to the first six items on the survey. They demonstrated the strongest agreement to the statement that "simulation helped to stimulate critical thinking abilities" with a mean score of M=3.49 and standard deviation of (SD ± .608). Furthermore, they showed the least agreement to the statement that "simulation was realistic" with a mean score of M=2.96 and standard deviation of (SD ± .824) (See table 5).

Moreover, the study shows that nutrition students have a positive response toward simulation. Nutrition students demonstrated the strongest agreement to the statement that "knowledge gained through simulation can be transferred to the clinical setting" with a mean score of M=3.74 and standard deviation of (SD ± .834). Nevertheless, Nutrition students' least agreement was to the statement that "I was nervous during the simulation experience" with a mean score of M=2.80 and standard deviation of (SD ± 1.082) (See table 5).

Likewise, occupational therapy students show a positive perception toward simulation, and their highest agreement was toward the statement that "knowledge gained through simulation can be transferred to the clinical setting" with a mean score of M=3.47 and standard deviation of (SD ± .513). However, occupational therapy students' least agreement was to the statement that "I was nervous during the simulation experience" with a mean score of M=2.63 and standard deviation of (SD ± .684) (See table 5).

The study also reported that respiratory therapy students have a positive perception toward simulation, and their highest agreement was that simulations helped them better understand concepts with a mean score of M=3.56 and standard deviation of (SD ± .656), while respiratory therapy students' lowest agreement was to the statement that "I was nervous during the simulation experience" with a mean score of M=3.07 and standard deviation of (SD ± .903) (See table 5).

Physical therapy students' perception was positive toward simulation experience, and their highest agreement was that "simulation was a valuable learning experience" with a mean score of M=3.70 and standard deviation of (SD ± .462)., while their lowest agreement was to the statement that "simulation was realistic" with a mean score of M=3.00 and standard deviation of (SD ± .742). (See table 5).

Finding Related to Research Question 2

The second research question asked, "How does simulation experiences affect the clinical practice of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students?" Table 6 breaks down survey response regarding how simulation experience affect clinical practice. Data results were tabulated and ranked by items from highest to lowest mean scores. Overall, healthcare students indicated high agreement with the statement that simulation should continue to be an integral part of the clinical experience with a total mean score of M=3.48 and standard deviation of (SD ± .599). On the other hand, healthcare students indicated disagreement toward the statement that "simulation can be a partial substitute for clinical experiences in the hospital" with a total mean score of M=2.43 and standard deviation of (SD±.828). (See table 6).

Similarly, the students' perceptions toward patient simulation programs from each majors of the following majors; nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy have the highest agreement to the statement that "simulation should continue to be an integral part of the clinical experience", and their perception was mostly disagreement to the statement that "simulation can be a partial substitute for clinical experiences in the hospital". (See table 6).

Table 6: Findings Related to Research Question 2 in rank order: Students' perception of how simulation experience affect clinical practice

Item No.	Description:	Total Mean (SD)	Nursing Mean (SD)	Nutrition Mean (SD)	OT Mean (SD)	RT Mean (SD)	PT Mean (SD)
S9	Simulation should continue to be an integral part of the clinical experience	3.48 (.599) *	3.30 (.598) *	3.27 (.884) *	3.37 (.597) *	3.44 (.583) *	3.76 (.432) *
S7	Because of simulation, I will be less nervous in the clinical setting when providing care for similar patients	3.00 (.768)	2.74 (.829)	3.20 (.962)	3.26 (.452)	2.96 (.818)	3.19 (.621)
S8	Can be partial substitute for clinical experiences	2.43 (.828)+	2.43 (.894)+	2.07 (.704)+	2.79 (.631)+	2.57 (.834)+	2.27 (.779)+

SD: Standard Deviation, OT: Occupational Therapy, RT: Respiratory Therapy, PT: Physical Therapy,
(*): Highest Score, (+): Lowest Score
Note. Means are based on a 4-point, Likert-type scale in which 1 indicates strongly disagree and 4 indicates strongly agree. Scores above 2.5 indicate agreement with the statement.

Findings Related to Research Question 3

The third research question asked, "Does the simulation debriefing experience help nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students' understanding and reasoning?" Table 7 breaks down survey response regarding simulation debriefing sessions. Table 7 demonstrates that the majority of students agree that simulation debriefing experience supported students' understanding, reasoning, and ability to perform in the clinical sitting with a total mean score of M=3.47 and standard deviation of (SD ± .598). Physical therapy students have the highest agreement with a mean score of M=3.56 and standard deviation of (SD ± .528), followed by nutrition students (3.47 ± .834), respiratory therapy students (3.44 ± .608), nursing students (3.43 ± .627), occupational therapy (3.37 ± .496). (See table 7).

Table 7: Findings Related to Research Question 3: Students' perception toward debriefing experience.

Item No.	Description:	Total Mean (SD)	Nursing Mean (SD)	Nutrition Mean (SD)	OT Mean (SD)	RT Mean (SD)	PT Mean (SD)
S10	Debriefing experience supported my reasoning and ability to perform in the clinical setting.	3.47 (.598)	3.43 (.627)	3.47 (.834)	3.37 (.496)	3.44 (.608)	3.56 (.528)

SD: Standard Deviation, OT: Occupational Therapy, RT: Respiratory Therapy, PT: Physical Therapy
Note. Means are based on a 4-point, Likert-type scale in which 1 indicates strongly disagree and 4 indicates strongly agree. Scores above 2.5 indicate agreement with the statement.

Findings Related to Research Question 4

The fourth research question asked, "How do the students' perceptions toward simulation differ based on gender, simulation experience, and clinical experience?" This research question was developed later, after the data analysis was obtained, to obtain more knowledge about the students' perception differences based of their gender, clinical experience, and previous simulation experience.

When looking to the difference between participants' perception toward simulation in term of gender, the score of the survey's statement that "I was nervous during the simulation experience" was significantly different between genders with a score of (*P* value= 0.05); with a female score of (3.27±.790) and a male score of (2.88±1.006). On the other hand, there were no significant score differences between genders in the other survey's statements. (See table 8).

Table 8: Findings Related to students' perception of simulation by Gender

Item No.	Description:	Male N=72 Mean (SD)	Female N=170 Mean (SD)	*P* value
S1	Simulations helped them better understand concepts	3.51 (.671)	3.46 (.626)	.357
S2	Was a valuable learning experience	3.53 (.581)	3.52 (.578)	.942
S3	Helped to stimulate critical thinking	3.50 (.557)	3.49 (.618)	.865
S4	Were realistic	3.11 (.640)	3.08 (.788)	.986
S5	Knowledge gained can be transferred to the clinical setting	3.50 (.531)	3.51 (.557)	.929
S6	Experienced nervousness during simulation	2.88 (1.006)	3.27 (.790)	.005 *
S7	Because of simulation, I will be less nervous in the clinical setting when providing care for similar patients	3.07 (.738)	2.97 (.780)	.392
S8	Can be partial substitute for clinical experiences	2.47 (.888)	2.41 (.804)	.563
S9	Simulation should continue to be an integral part of the clinical experience	3.56 (.554)	3.44 (.615)	.201
S10	Debriefing experience supported my reasoning and ability to perform in the clinical setting.	3.44 (.528)	3.48 (.627)	.420

(*): Significant: P value <0.05

In terms of clinical experience prior to entering the healthcare program, there were no significant score differences between participants' perception toward simulation. (See table 9).

Table 9: Findings Related to students' perception of simulation by with and without experience working in a healthcare setting prior to entering the healthcare program

Item No.	Description:	YES N=102 Mean (SD)	NO N=140 Mean (SD)	*P* value
S1	Simulations helped them better understand concepts	3.44 (.725)	3.50 (.569)	.908
S2	Was a valuable learning experience	3.49 (.625)	3.55 (.541)	.604
S3	Helped to stimulate critical thinking	3.45 (.639)	3.53 (.568)	.406
S4	Were realistic	3.07 (.707)	3.11 (.775)	.594
S5	Knowledge gained can be transferred to the clinical setting	3.50 (.576)	3.51 (.530)	.981
S6	Experienced nervousness during simulation	3.01 (.970)	3.26 (.790)	.071
S7	Because of simulation, I will be less nervous in the clinical setting when providing care for similar patients	3.04 (.807)	2.97 (.739)	.370
S8	Can be partial substitute for clinical experiences	2.52 (.793)	2.36 (.850)	.135
S9	Simulation should continue to be an integral part of the clinical experience	3.51 (.625)	3.45 (.579)	.299
S10	Debriefing experience supported my reasoning and ability to perform in the clinical setting.	3.44 (.623)	3.49 (.581)	.637

With regard to previous simulation experience prior to entering the healthcare program, there were significant difference on the statement that "simulation was realistic" ($P = 0.048$), with a positive respond of (3.23±.669) and a negative respond of (3.02±.775). On the other hand, there were no significant score differences in the other survey's statements. (See table 10).

Table 10: Findings Related to students' perception of simulation by with and without simulation experience Prior to entering the healthcare program

Item No.	Description:	YES N=83 Mean (SD)	NO N=159 Mean (SD)	*P* value
S1	Simulations helped them better understand concepts	3.51 (.632)	3.46 (.644)	.563
S2	Was a valuable learning experience	3.57 (.522)	3.50 (.605)	.576
S3	Helped to stimulate critical thinking	3.53 (.612)	3.48 (.594)	.425
S4	Were realistic	3.23 (.669)	3.02 (.775)	.048*
S5	Knowledge gained can be transferred to the clinical setting	3.55 (.524)	3.48 (.561)	.362
S6	Experienced nervousness during simulation	3.02 (.950)	3.22 (.832)	.149
S7	Because of simulation, I will be less nervous in the clinical setting when providing care for similar patients	3.10 (.806)	2.95 (.745)	.107
S8	Can be partial substitute for clinical experiences	2.55 (.785)	2.36 (.845)	.066
S9	Simulation should continue to be an integral part of the clinical experience	3.53 (.570)	3.45 (.613)	.330
S10	Debriefing experience supported my reasoning and ability to perform in the clinical setting.	3.47 (.612)	3.47 (.593)	.898

(*): Significant: P value <0.05

Chapter V

Interpretation of Findings

This chapter will present a discussion of findings that is presented in Chapter IV. The chapter is divided into six major sections including; overview of the study, discussion of findings, implications for research, recommendation for future research, limitations of the study, and conclusion.

Overview of the study

The purpose of this descriptive study was to explore the perception of healthcare students toward implementation of simulation in healthcare education. Data were collected from five healthcare programs in a southeastern urban university. The research questions leading this study were:

1. What are the perceptions of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students toward patient simulation programs?
2. How do simulation experiences affect the clinical practice of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students?
3. Does the simulation debriefing experience help nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students' understanding and reasoning?
4. How do students' perceptions toward simulation differ based on gender, simulation experience, and clinical experience?

The survey instrument used in this study was originally designed by Howard et al. (2011). Their purpose was to implement and integrate the use of high-fidelity human simulation as a teaching and active learning strategy throughout the undergraduate-nursing curriculum. The survey was reviewed and modified using a Q-sort method to evaluate the healthcare students' perception of using simulation courses. An expert panel of respiratory therapy educators at a

southeastern urban university completed the revisions and modifications. The committee members met and discussed each item of the instrument and finalized a survey of ten questions. (Appendix A).

Discussion of Finding;

Findings Related to Research Question 1

The first research question asked, "What are the perceptions of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students toward patient simulation programs?" The overall results of this study revealed that healthcare students responded positively that the simulations helped them better understand concepts, was a valuable learning experience, helped to stimulate critical thinking, and was realistic. Moreover, the participants showed a high agreement that knowledge gained from simulations can be transferred to the clinical setting. The study also revealed that healthcare students experience nervousness during simulation. The reason of this results is may due to the lack of clinical and simulation experience as reported in the demographic information. These findings are similar to what academic programs have reported in other literature toward simulation (Alinier et al., 2006; Classen & Brooks, 2014; Howard et al., 2011; Ohtake et al., 2013; Shoemaker et al., 2014). Additionally, multiple studies acknowledged that an effective simulation based medical education made learning enjoyable and effective and improved students' learning outcomes (Ahmed et al., 2016; Ganley & Linnard-Palmer, 2012; Nuzhat et al., 2014; Reese et al., 2010). Madhavanprabhakaran et al. (2015) revealed that simulation-based training enhance nursing students' knowledge and skills. Alqarni (2015) found that respiratory therapy students strongly agreed that patient simulation education is highly helpful and effective. Also, Alhaykan (2015) found respiratory therapy students experience nervousness during simulation and had a positive perception that simulation helped them understand concepts, was a valuable learning experience, stimulated

their critical thinking and was realistic. Likewise, Howard et al. (2011) found that nursing student experience nervousness during simulation and had a positive perception toward simulation.

Findings Related to Research Question 2

The second research question asked, "How do simulation experiences affect the clinical practice of nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students?" the participants responded positively that simulation should continue to be an integral part of the clinical experience healthcare programs. These findings are similar to what other literature reported that a majority of students provided a positive response regarding implication of simulation as a mandatory course in the curriculum (Alhaykan, 2015; Howard et al., 2011; Medley & Horne, 2005; Nuzhat et al., 2014). The study revealed that healthcare students responded positively, and that they will be less nervous in the clinical setting because of simulation. This is support findings of other studies in which healthcare student provided positive feedback that students experience less nervousness because of simulation (Alhaykan, 2015; Alqarni, 2015; Howard et al., 2011; Ohtake et al., 2013). Similarly, Evans et al. (2014) and Katowa-Mukwato et al. (2014) found that simulation enhance healthcare students' confidence. However, students did not agree with the statement that simulations can be a partial substitute for actual clinical experiences. This finding are similar to other findings, in which healthcare students disagree that simulation should be substituted for clinical experiences (Alhaykan, 2015; Howard et al., 2011).

Finding Related to Research Question 3

The third research question asked, "Does the simulation debriefing experience help nursing, respiratory therapy, physical therapy, nutrition, and occupational therapy students' understanding and reasoning?" The responses to this question agreed that debriefing experience

after simulation supported their understanding and reasoning. Other studies have reported similar findings in which students considered debriefing helpful when discussing and evaluating skills used in simulation activity. (Alhaykan, 2015; Kable, Arthur, Levett-Jones, & Reid-Searl, 2013; Reese et al., 2010).

Finding Related to Research Questions 4

The third research question asked, "How do students' perceptions toward simulation differ based on gender, simulation experience, and clinical experience?" With regard to clinical experience, the study revealed that there were no significant score differences between students who had a clinical experience before entering the healthcare program and students who does not have any clinical experience before entering the healthcare program. In term of gender, the study found that female students (N=170) experience more nervousness during simulation than male students (N=72) with a p value of (p=0.05). This finding is similar to other literature stating female students displayed lower levels of self-confidence than male students (Instone, Major, & Bunker, 1983). In term of previous simulation experience prior to entering healthcare program, participants who had previous simulation experience (N=159) respond more positively to the statement that "simulation was realistic" than those who did not engage in any previous simulation experience (N=83) with a p value of (P=0.048). Moreover, Those significant score differences may due to the difference in sample size between the two groups. Nevertheless, there were no other significant score differences between healthcare students' perception toward simulation in term of previous simulation experience and gender. However, further research is recommended to explore those factors.

Implication for Research

The findings of this study help that healthcare programs recognize the requirement for implementation of simulation course as a mandatory requirement prior to clinical practice.

Another significant finding was the importance of perception of healthcare students toward simulation and debriefing session to promote healthcare educators to enhance students' confidence, skills, and clinical reasoning abilities. The study also allows healthcare educators among different healthcare professions to recognize students' opinions, areas of strengths, demanding improvement. The study also provides assessment, evaluation, and feedback for healthcare educators who use simulations in their teaching. Finally, findings of this study will contributes to past investigations of healthcare students' perception towards simulation.

Recommendation for Future Research

Future research is recommended due to lack of research that address healthcare students' perceptions toward simulation. Moreover, replication with larger number of participants from various disciplines and level of education are recommended. The addition of faculty, hospital staff and clinical preceptors is also recommended in the future.

Limitation

The present study was limited by different factors. This sample of the study was selected from only one institution and also the sample size of the study was relatively small in comparing to all healthcare professional students at urban universities. Therefore, the results of this study cannot be generalized.

Conclusion

Healthcare students place value on and have a positive perception toward simulation. The result of this study support the idea of implantation of simulation throughout healthcare program curriculum. The study findings support the important of simulation and debriefing sessions to supported students' understanding, reasoning, and ability to perform in the clinical. Moreover, this study supports the idea that simulation is an effective teaching strategy, as evidenced by

positive responses from students that simulation should be included in the curriculum. However, healthcare students did not feel simulation should totally substitute for all clinical experiences.

Appendix A: Simulation Evaluation Instrument

PART 1: Demographics

1. What is your age? _____
2. What is your gender?
    A. Male B. Female
3. In which healthcare professional program are you currently enrolled?
    A. Nursing
    B. Nutrition
    C. Occupational Therapy
    D. Respiratory Therapy
    E. Physical Therapy
    F. Other
4. Level of program you enrolled in:
    A. BS
    B. MS
    C. Doctorate (PhD/DPT/DNP)
5. List your specific program (example: MS Nurse Practitioner):

    _____
6. Year in program:
    A. First
    B. Second
    C. Third
    D. Other _____
7. Did you have experience working in a healthcare setting prior to entering the healthcare program at GSU?
    A. Yes (Number of years _____) B. No
8. Did you have experience with clinical simulation prior to entering the healthcare program at GSU?
    A. Yes B. No
9. Have you engaged in a clinical simulation experience while in your current program at GSU?
    A. Yes B. No

PART 2: Please circle the response that best describes how you feel about the simulation course.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Simulation(s) in my program at GSU helped me to better understand concepts in the clinical setting.	1	2	3	4
2. Simulation(s) in my program at GSU provided me a valuable learning experience.	1	2	3	4
3. Simulation(s) helped me to stimulate critical thinking abilities.	1	2	3	4
4. Simulation(s) was realistic.	1	2	3	4
5. Knowledge gained through my simulation(s) can be transferred to the clinical setting.	1	2	3	4
6. I was nervous during my simulation experience(s).	1	2	3	4
7. Because of my simulation experience(s), I will be less nervous in the clinical setting when providing care for similar patients.	1	2	3	4
8. Simulation experience(s) can be a partial substitute for clinical experiences in the hospital.	1	2	3	4
9. Simulation should continue to be an integral part of the clinical experience.	1	2	3	4
10. Debriefing after the simulation experience supported my reasoning and ability to perform in the clinical setting.	1	2	3	4

Thank you for participation and completing this survey!

Appendix B: Informed Consent

Dear Respiratory Therapy Student,

You are invited to participate in a research study because you are an undergraduate or graduate healthcare student who has participated in a simulation course. The purpose of this study is to identify the healthcare students' perceptions of simulation courses.

The research is being conducted by Fahad Al Enazi as a part of the requirements of the master's degree in respiratory therapy from the Department of Respiratory Therapy at Georgia State University, under the guidance of Dr. Doug Gardenhire, Chairman of the Department of Respiratory Therapy. You will receive no direct benefit from participating in this study, but the information acquired will be valuable to healthcare instructors in improving simulation courses to be more effective in facilitating student learning processes.

If you decide to contribute in this study, you will be asked to complete the following survey. The survey should take approximately 10 minutes to complete. Please note that your participation in this study is strictly voluntary, and you may simply refuse to participate. You may also stop taking the survey at any time without any consequence or loss of benefits to which you are otherwise entitled; hence, you can submit the survey at any time.

Please note that your contribution will be strictly confidential. In order to achieve confidentiality, no names or codes will be used to identify you or your paper. Surveys will be destroyed after all surveys have been collected to assure confidentiality. Moreover, please note that your survey will be used for research purposes only. Your completion and submission of the survey indicate that you agree to participate in this study. We hope that you will finish the survey. However, you can withdraw from this study at any time, skip questions, or even submit a blank survey.

The information from this study may be published in journals and presented at professional meetings. There is no cost to participate in this study in any way aside from the time

spent in completing it. Likewise, there is no compensation or known risk associated with your contribution. Please note that you may submit a blank survey if you are uncomfortable about completing the survey.

If you have any questions about this research, now or in the future, please contact Fahad Al Enazi at falenazi1@student.gsu.edu or Dr. Doug Gardenhire at dgardenhire@gsu.edu. The department's mailing address can be found at the bottom of this page. You may also contact Georgia State University. You may also contact Ms. Susan Vogtner in Georgia State University's IRB office at svogtner1@gsu.edu.

If you are 19 years of age or older and agree to the above, please proceed to the survey. When finished, please place your survey in the designated envelope in the room.

Thank you in advance for your cooperation. Your participation makes a significant contribution to the future of healthcare education.

Sincerely,

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