A Survey of Healthcare Simulation in the State of Oklahoma

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Introduction: Simulation is a critical tool that enables healthcare agencies and educational institutions to meet local, state, and national workforce education needs. In order to understand the current use of simulation and available resources at health professions schools in the state of Oklahoma, a comprehensive statewide assessment of simulation resources was conducted.

Methods: Administrators, faculty, and staff at health professions schools participated in an online statewide survey, replicated from the Florida Center for Nursing 2010 Nursing Simulation Resources in Florida survey.

Results: The overall survey response rate was 45.6%. Findings indicate that simulation is used to enhance the educational experiences of learners in a variety of clinical content areas, with a variety of equipment types and levels of fidelity, in various regions of the state both rural and urban. Simulation specialists and faculty in Oklahoma tend to be highly educated registered nurses. They modify and write their own scenarios and manage simulation experiences in dedicated space. Importantly, the majority of schools plan to increase the use of simulation.

Conclusion: The technology centers, community colleges, and universities have the opportunity and desire to collaborate and share simulation resources, partner to provide simulation faculty development, and work together to address fiscal challenges in order to prepare the healthcare workforce with the skills, knowledge, and clinical abilities necessary to care for all Oklahomans. Data collected from this simulation survey have increased the available evidence for informed decision-making by administrators and faculty at health professions schools in Oklahoma.

Key Words: Oklahoma, simulation, needs assessment, resources, health professions, healthcare workforce, faculty development, support, funding, statewide evaluation, nursing

Introduction

Many healthcare experts and leading professional societies advocate for the use of simulation to meet the needs of today's healthcare workforce. Simulation is an effective educational technique, and it can be used to augment traditional clinical experiences and reduce strain on clinical sites. It supports the development of critical skills required by nurses to provide safe patient care while they are engaged in the complex profession of healthcare (Conrad, Guhde, Brown, Chronister, & Ross-Alaolmolki, 2011; Seropian, Driggers, Taylor, Gubrud Howe, & Brady, 2006). The Commonwealth Fund (2003, p.15) report recommends, "the use of simulation at all levels in the education experience, from student's first encounters with clinical care to continuing education and certification of master clinicians."

The Society for Simulation in Healthcare (SSH) Accreditation defines simulation as a "technique that uses a situation or environment created to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of systems or human actions" (Palaganas, Maxworthy, Epps, & Mancini, 2015). Simulation categories include purpose (to achieve learning objectives), modality (simulator type), and methods (teaching, learning, assessment or research) (Palaganas et al., 2015). Simulation-based education was first used in healthcare for medical anesthesia training in the late 1960s (Dunn, 2004), and in

the late 1990s the commercialization of portable and affordable human patient simulators (Jeffries, 2007) brought simulation to nursing and health professions education.

Oklahoma, in particular, is a state in growing need of healthcare providers who have the skill, knowledge, and clinical ability to care for its complex and diverse patient population. Oklahomans have the fourth highest rate of death from all causes in the nation, the highest rate of death due to chronic lower respiratory disease, the third highest rate of death due to heart disease, and the fourth highest rate of death due to stroke in the nation (Oklahoma State Department of Health, 2014). Currently 63 out of 77 counties in Oklahoma are designated as primary care professional shortage areas (Oklahoma Hospital Association, 2015). It is predicted that the state will see the need for a 17.3% increase in the number of registered nurses, a 47.1% increase in personal care aids, a 13.6% increase in the number of nursing assistants, a 13.8% increase in licensed practical nurses, and a 43.6% increase in home health aides through 2022. Overall healthcare workforce needs are estimated to grow by 21.5% in the state through the same period (Oklahoma Employment Security Commission, 2015). A statewide assessment to understand the current use of simulation in the state of Oklahoma is essential for developing this healthcare workforce.

Simulation can allow nursing programs to expand by augmenting the availability of the clinical learning environment through clinical hour substitution. Currently, this substitution is not allowed by the Oklahoma Board of Nursing, although it is under consideration. Simulation also allows for increased faculty capacity (Richardson, Goldsamt, Simmons, Gilmartin, & Jeffries, 2014), important in a rural state such as Oklahoma with an average faculty age of 51 (AACN, 2015). Through the provision of

safe, high-quality simulation-based learning experiences, clinical placement and faculty shortages that hamper health professions program expansion can be addressed.

Recently, in Oklahoma, attention was focused on healthcare simulation by the publication of a landmark study, *The NCSBN National Simulation Study: a Longitudinal, Randomized, Controlled Study Replacing Clinical Hours With Simulation in Prelicensure Nursing Education* by Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries (2014). This study reports substantial evidence that high-quality simulation experiences can replace up to 50% of clinical hours to produce comparable end-of-program results and graduates who are ready for clinical practice.

While the literature identifies simulation as a proven educational technique, the lack of usage and resource data as well as a limited statewide simulation information structure, present challenges to health professionals, school administrators, and faculty in Oklahoma when they attempt to make informed decisions regarding investments in healthcare simulation.

Simulation needs assessment surveys were conducted in Florida (Sole, Guimond, & Amidei, 2013), Oregon (Seropian, Driggers, Taylor, Gubrud Howe, & Brady, 2006), California (Waxman, Nichols, O'Leary-Kelley, & Miller, 2011), and the Canadian province of British Columbia (Qayumi et al., 2012), and provided significant insight into statewide needs in the areas of faculty development, training, equipment, space, resources, future needs, and challenges. The 2010 analysis of simulation resources, needs, and plans in Florida, conducted by the Florida Center for Nursing, found that simulation can assist in the growth of the nursing workforce by providing clinical substitution and that, therefore, greater use of simulation was planned by 61.6% of survey respondents

(Sole, Guimond, & Amidei, 2013). The survey also found that opportunities existed in Florida to develop regional collaborations and statewide alliances that could help address funding, sustainability, equipment, faculty staffing, and development challenges.

Sixty-seven technology centers, community colleges, and public and private universities educate the Oklahoma's healthcare workforce, and until *A Survey of Healthcare Simulation in the State of Oklahoma* (replicated from the 2010 Florida Center for Nursing Survey) no comprehensive statewide assessment of simulation use and resources had been conducted. It was unknown how simulation is coordinated and staffed, what equipment is utilized, how much simulation space exists, how simulation is developed, implemented, and evaluated, and what needs and plans exist for simulation at these schools. The purpose of the current project was to understand the current use of simulation and available resources at health professions schools in the state of Oklahoma.

Methods

Survey Development

The Florida Center for Nursing *2010 Nursing Simulation Resources in Florida* survey, by Mary Lou Sole, Mary Elizabeth Guimond, and Christina Amidei was used for the survey of healthcare simulation in the state of Oklahoma. Permission to replicate the survey was granted from corresponding author, Mary Lou Sole PhD, RN. Selected survey questions from the Florida Center for Nursing Survey were modified to apply to Oklahoma and the health professions school participants. In addition to demographic data, Florida Center for Nursing survey topics were Coordination/Staffing, Inventory, Simulation Laboratory Space and Operating Hours, Simulation Use, Simulation Scenario

Development, Implementation of Simulation, and Needs and Plans (FCN, 2010).

Survey Design, Sample, Distribution

This cross-sectional survey, *A Survey of Healthcare Simulation in the State of Oklahoma* received Yale University Institutional Review Board (IRB) exemption and was developed, administered, and the statistically analyzed using an online survey analysis tool (Survey Monkey). The survey questions were tailored to the participant's responses using skip logic. All questions were voluntary. If the participant indicated that their school was not using simulation, the survey skipped to the topic of Needs and Plans.

An electronic letter of invitation including a hyperlink to the survey was sent to the survey participants, administrators from 39 post-secondary educational institutions and 29 technology centers (n=68) offering a health professions program (technology center, college, and university) in Oklahoma from December 2015 through January 2016. Participant email addresses were obtained from the Oklahoma Department of Career and Technology Education and a website search of the health professions school information.

Due to low numbers of responses over the holiday season, the survey completion deadline was extended twice and an email was sent with the new completion deadline, the electronic letter of invitation, and the survey hyperlink. Phone calls were made to the health professions schools to remind them to complete the survey based on phone numbers available on the school websites.

Results

Participants

An attempt was made to send the survey invitation to two administrators at each of the 68 health professions schools in Oklahoma so at least one participant from each school would be represented. These participants were emailed the electronic survey invitation; 11 emails were undeliverable. The survey was completed by 31 participants representing unique schools. The overall response rate was 45.6%.

Simulation use was identified by 93.5% of participants (n=29). Table 1 shows the program type(s) offered by the participant's health professions school. Technology centers, offering practical nursing programs of study, were represented by 39.3% (n=11) of survey participants. Community colleges/technical universities offering associate degree professional nursing were represented by 35.7% (n=10) of participants. Universities providing different educational tracks were also represented; including traditional baccalaureate nursing education (21.4%, n=6), registered nurse to bachelor of science in nursing (10.7%, n=3), and master's level or higher education (10.7%, n=3).

Substitution of Clinical Time

Unlike Florida, the State of Oklahoma does not permit the use of simulation as a substitute for clinical hours in a nursing education program. Accordingly, survey participants were not asked to report clinical substitution hours. When asked the total number of simulation hours in the nursing program, an analysis of responses on hours of simulation use per program indicated that simulation is used for a mean of 60 hours, with a range of 0-159.5 hours.

Types of Simulation Equipment Available

Twenty-eight of the participants representing Oklahoma schools reported that they use a variety of simulation equipment. Static manikins, generally considered low-fidelity, were used at all schools (n=28). Task trainers, such as an anatomical model for practice, were used at 27 schools. Medium to high fidelity patient simulators were used at 25 schools and standardized patients were used at 20 schools. Haptics systems (n=9) and virtual reality (n=6) were utilized less often.

Coordination, Staffing, and Training

Simulation coordinators are a part of simulation laboratory/center staffing at Oklahoma schools, with identified job titles of Simulation Coordinator, Simulation Specialist, Simulation Lab Faculty, Nursing Skills Lab Coordinator, and Simulation Director. At 18 of the schools, the simulation coordinator is a registered nurse. Results indicated that 16 of the coordinators work full-time (36 hours/week or more). The majority of coordinators are master's degree prepared (n=19). All coordinators (n=19) received simulation training that included learning activities such as hands-on simulation workshops (n=16), vendor-sponsored training (n=15), and conferences/continuing education (n=16).

Technical and Other Support Personnel

Individuals with the sole responsibility for setting up, operating, repairing, and programming simulators (technical support personnel/simulation technicians) were utilized at two of the schools. A faculty member/educator, other than a simulation

coordinator or technical support personnel, was assigned to assist with simulation at 17 of schools. These personnel also receive specific education and training related to simulation, which they receive at a higher rate (n=17) than technicians (n=3) but less than simulation coordinators (n=19). Free text responses from participants indicate that these personnel are faculty required to assist with simulation.

Simulation Space

When considering simulation space at health professions schools in Oklahoma, twenty of survey participants indicated that their schools have a dedicated laboratory/center for simulation. The average size of simulation laboratories/centers is 1,514 square feet and the average room size is 5 rooms. Simulation laboratories/centers in Oklahoma average 12 hours of use per week, Monday through Friday. There was no usage reported on weekends. Use of simulation space by outside groups was reported by eight of laboratories/centers with an average use of 1.6 hours per week. Fees for using simulation center space were charged by five schools, with free text responses of "varies" in response to the question of "average hourly rate ($/hour)". One school has a mobile simulation unit.

Funding

The main funding source for simulation centers and equipment at health professions schools in Oklahoma is the school budget (n=21). Table 2 indicates additional funding sources for simulation at these schools.

Clinical Applications of Simulation

As shown in Table 3, medical-surgical, maternal-newborn, and critical care were the most common clinical content areas enhanced by simulation in schools in Oklahoma. All participants reported using simulation for medical-surgical, maternal-newborn, and critical care skills practice, demonstration, and validation of competency. The use of simulation for critical thinking and decision-making was the second most common approach used by participants. With the exception of pre-op/anesthesia, participants reported plans to use simulation for clinical substitution in all clinical category/course areas.

Faculty-to-student ratios per simulation scenario varied. The most common ratios reported were 1:3, 1:4, and 1:6.

The use of video recording during simulation was reported by twelve of the participants. Thirteen participants indicated that the primary use of the video recording was for debriefing. The routine use of a formal debriefing period following the simulation scenario was reported by twenty-four participants while only eight participants review video recordings during debriefing.

Scenario Development

Participants reported using a variety of approaches to simulation scenario development and use of implementation materials. The most common approaches were to modify scenarios developed by others (n=20) and write own scenarios (n=20). Participants also reported using "open-source" or shared scenarios developed by others (n=18) and using pre-packaged scenarios developed or provided by the vendor (n=17).

All participants reported that the scenarios are developed with specific learning objectives.

Future Plans for Simulation

All participants, regardless of simulation use, were asked about future plans. Several areas of growth were identified. Participants from sixteen health professions schools in Oklahoma indicate plans to increase the use of simulation in the curriculum. Other responses included plans to purchase additional materials such as medium/high fidelity manikins (n=15), simulation scenarios (n=10), and equipment such as cameras to facilitate implementation of simulation (n=14). Ten participants identified plans to hire additional personnel to coordinate/implement simulation. These personnel included faculty (n=9) and technical support staff (n=7). Plans for the establishment of new or additional space for simulation were identified by seven participants.

Challenges and Needs

When participants were asked to identify challenges and/or barriers to using simulation in their school, lack of knowledge of faculty was identified as the greatest challenge (n=14). Identified areas of educational need included hands-on training for implementing simulation (n=21), training on how to incorporate simulation into curriculum and courses (n=18), simulation scenario writing (n=18) and simulation scenario editing (n=14).

Lack of time dedicated to offering simulation (n=13) was also a significant challenge for schools in Oklahoma. Participants also reported challenges related to

inadequate financial resources to support simulation and a lack of technical support (n=10). When asked to identify areas of need, the majority of participants (n=23) identified technical support (n=16), the evaluation of outcomes related to simulation (n=16), and the development of models for funding/sustainability (n=15) for their schools.

Discussion

The technology centers, community colleges, and universities that educate Oklahoma's healthcare workforce use simulation to enhance the educational experiences of learners in a variety of clinical content areas, with a variety of equipment types and levels of fidelity, in various regions of the state both rural and urban. Simulation specialists and faculty in Oklahoma tend to be highly educated registered nurses. They also modify and write their own scenarios and manage simulation experiences in dedicated space at their respective health professions school. Importantly, these schools use simulation to validate learner competencies thus preparing the healthcare workforce with the skills, knowledge, and clinical abilities necessary to care for all Oklahomans.

The results of this statewide survey suggest that these health professions schools will continue to dedicate fiscal and human resources towards the use of healthcare simulation and that they have plans to increase the use of simulation at schools. This may be in anticipation of the proposed Oklahoma Board of Nursing (OBN) rule change that will allow the use of simulation as a clinical replacement and in response to the findings of the NCSBN National Simulation Study (2014).

Opportunities exist in Oklahoma for health professions schools to collabor the development of educational programs for faculty and technicians, potentially increasing the ability of schools to provide high-quality simulation and further enhance the expertise of the personnel responsible for delivering simulation to learners. The majority of participants indicate that their school would participate in a simulation alliance if one was available, and narrative responses indicate the desire of participants to network, share ideas and scenarios, develop a standardized approach to high-quality simulation, and address concerns related to equipment and budget.

It is worth noting that a number of similarities and differences exist between the findings of the Florida and Oklahoma surveys. It should be recognized that the Florida survey (Sole, Guimond, & Amidei, 2013) also included hospital participants whereas the Oklahoma survey did not. There are also significant differences between the states themselves. For example, the state population of Florida in 2010 was 18.8 million residents (U.S. Census, 2010) and the most recent census indicates that Oklahoma has 3.8 million residents (U.S. Census, 2014). In addition to demographics, other differences include post-secondary education structure and funding and State Board of Nursing regulations.

In both states, low-fidelity equipment is routinely available. Oklahoma survey participants in 2015 reported a greater use of medium- to high-fidelity simulators (89%) and virtual reality (23%) than did Florida participants in 2010 (55% and 13.5%). This difference may be a result of the increasing popularity of simulation in health professions education, increased simulator and virtual reality type and availability, and market price changes in the 5 years between surveys.

According to the Florida survey, 50.5% of schools had dedicated simulation space. In Oklahoma, this number reached 80%. Participants in both states indicated plans to increase the use of simulation and identified plans to expand simulation space.

In both Florida and Oklahoma the majority of simulation coordinators are registered nurses, hold a master's degree and are employed full-time. It is likely that this is a direct result of the type of population surveyed. However, as nursing faculty shortages increase and schools look to expand the use of simulation and space, this may be an area where schools can examine alternative staffing models. Incorporating the use of simulation technicians has the potential to increase faculty availability and build efficiencies within the simulation center. This may also address the need for technical support, identified as a need by participants in both states. While most coordinators in both states received training in simulation, lack of faculty knowledge in schools was identified as an area of challenge and need (Florida, 48%; Oklahoma, 56%).

Funding for simulation was recognized as a challenge and a need in both surveys. In both Florida and Oklahoma, the main funding source for simulation was the institutional budget and participants in both states identified inadequate financial resources and lack of financial support as a challenge.

Summary

Data collected from this survey have the potential to increase the effectiveness of healthcare workforce planning and have increased the available evidence necessary for informed decision-making by administrators and faculty at health professions schools in Oklahoma. Survey findings suggest a desire for developing a statewide simulation

alliance in Oklahoma and the need for technology centers, community colleges, and universities to collaborate in order to advance the use of simulation in health professions education statewide.

There is a significant need for health professions schools and states to understand and evaluate simulation use and resources in order to plan for healthcare workforce program development and growth, address clinical site and faculty capacity, develop and revise statewide educational policy, and manage fiscal and human resources. There are numerous opportunities for further research when assessing simulation at the state level. Gaps identified in the healthcare simulation literature include a lack of proven models for simulation program development, implementation, and collaboration, and challenges in capturing measurable improvements in capacity through the use of simulation. Further challenges include the opportunity to address lack of consistency in political and regulatory support for simulation, the need for further research on simulation delivery and outcomes, ensuring equal access to simulation for all learners, and the impact of statewide simulation consortiums on workforce development.

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Tables

Table 1 Type of Health Professions School		
Answer Options	Percent	Number
LPN/Technology Center	39.3%	11
ADN	35.7%	10
BSN	21.4%	6
RN to BSN Completion	10.7%	3
Master's and Higher	10.7%	3
	Answered Question 28	
	Skipped Question 3	
Note. LPN- licensed practical nursing program; ADN- associate degree nursing program; BSN-bachelor of science in nursing program; RN-registered nurse. Schools may offer more than one program type. This question allowed participants to select all that apply.		

Table 2 Simulation Center and Equipment Funding		
Answer Options	Percent	Number
School Budget	84.0%	21
Collaborative Agreement with Other Agency(ies)	8.0%	2
State Funding	4.0%	1
Federal Funding	0.0%	0
Grants	52.0%	13
Private Foundations	20.0%	5
Fee for Service	8.0%	2
Other	12.0%	2
	Answered Question 25	
	Skipped Question 6	
Note. "Other" responses included private donations, family foundations. This question allowed participants to select all that apply.		

Table 3 Simulation Use by Clinical Category/Course		
Answer Options	Percent	Number
Maternal-Newborn	84.6%	22
Pediatrics	57.7%	15
Medical-Surgical	96.2%	25
Perioperative/Anesthesia	26.9%	7
Critical Care	61.5%	16
ED/Trauma/Disaster Preparedness	57.7%	15
Mental Health	30.8%	8
Outpatient/Home Health	19.2%	5
Other	19.2%	5
	Answered Question 26 *Skipped Question 5*	
Note. "Other" responses included hospice, clinic, long term care, skills, pharmacology. This question allowed participants to select all that apply.		