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Virtual Standardized Patient

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Abstract

Background: Higher education nursing programs include a physical/health assessment course that prepares graduates to provide excellent care based on data collected through assessment. Finding a teaching strategy that engages students as well as educates them in health assessment techniques is a challenge that all nurse educators share.

Objectives: The objectives of this study were to determine the level of engagement and learning that occurred with undergraduate and graduate students who participated in a health assessment course that included the use of an online virtual standardized patient (VSP).

Design: Quantitative, descriptive survey research was utilized to determine student nurses' perception of the use of VSP in a physical assessment course.

Setting/Participants: Students in a traditional on-campus BSN program and students in an online RN to BSN and MSN program were included in this study.

Methods: After receiving IRB approval, course leaders provided students a standardized questionnaire of two (2) multiple choice and six (6) Likert-style questions. The questions evaluated the participants' ease of use, comparison of interaction between online virtual and live human patients, ability to perform an exam on a virtual patient, and ability to communicate with a virtual patient. Questionnaires were administered to volunteers in the three identified health assessment courses (BSN, RN-BSN, and MSN). Also evaluated was the participant's perception of their ability to transfer knowledge from the VSP to the live patient. All students participated in the VSP with completion of the questionnaire optional.

Results: Findings in this study generally supported the educational value of using a virtual standardized patient in teaching both undergraduate and graduate students' health assessment. Variations between the groups were found.

Conclusion: Use of a virtual standardized patient is a positive teaching strategy for teaching health assessment in both undergraduate and graduate nursing programs.

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Introduction

Use of technology in education is a global phenomenon. In no academic discipline is this more evident than in healthcare professional education. Use of high fidelity patient simulators (HFS) in clinical simulation experiences (CSE) has increasingly become recognized as an effective clinical teaching strategy for undergraduate and graduate health professional programs and interprofessional education in the United States of America (USA) and internationally (Cross, & Wilson, 2009; Kirkman, 2013; Warren, et al., 2016; Lockeman et al., 2017; Dennis et al., 2017; Cant & Cooper, 2017; Gilette, et al., 2017). One reason for use of HFS in CSE includes the ability of nursing clinical instructors to expose students to uncommon and infrequently encountered realistic clinical situations (Kirkman, 2013). Other issues addressed by HFS in CSE are the significant shortage of academically qualified nursing faculty to supervise actual clinical experiences and increased competition for use of relevant clinical facilities (Jenkins & Schaivone, 2007; Nardi & Gyurko, 2013; Byrne & Martin, 2014; Fang & Bednash, 2014).

Use of trained persons to act as standardized patients (SPs) is a lower technological teaching strategy that predates HFS and continues to be in use to the present (Jenkins & Schaivone, 2007; May, Park & Lee, 2009; Bolstad, et al., 2012; Lin, et al., 2013; Kowitlawakul, et al., 2015; Downar, et al., 2017). In this teaching strategy volunteers (paid or unpaid) or peers are trained to 'act' as a patient in a specific clinical situation (Jenkins & Schaivone, 2007; Lin, Chen, Chao & Chen, 2013). Use of SPs (especially peers) when teaching both undergraduate and graduate level health assessment is common (Jenkins & Schaivone, 2007). More recently, virtual simulated patients (VSP) technology, merging the concepts of HFS and SPs, is being used in the education of health professionals. Hubal, et al. (2000) describe VSP as "a computerized virtual person who interacts with medical practitioners in much the same way as actors hired to teach and evaluate patient assessment, diagnosis, and interviewing skills." Essentially VSP uses computer patient avatars to act as SPs. In 2012 an innovative VSP was created at the Innovation Hub at the University of Florida at Gainesville (Haselhurst, 2015). This virtual standardized patient was designed to be used in graduate and undergraduate health assessment courses. In fall 2015 our college of nursing incorporated this VSP in undergraduate (traditional and RN to BSN and graduate nursing (RN to MSN and MSN) health assessment courses. While the faculty responsible for these courses felt this addition had the

potential to increase engagement and learning, there was a dearth of research on this technology.

Literature Review

Although research on the VSP is sparse, the research that has been done indicates that students do report increased confidence, specifically when later taking a health history and performing a health assessment on a live patient (Bigelo, et al., 2014; Miskovsky & Miller, 2014; Mawhirter & Klainberg; 2014). Furthermore, faculty indicate that use of the VSP allows them to more effectively evaluate student learning (Kelley, 2015). Barnett, et. al. (2016), indicated that VSP was effective in increasing student self-confidence in medication documentation but demonstrated no benefits beyond that of paper case studies.

Other researchers have examined the effect VSP has on the development of clinical reasoning skills in nurses (Forsberg, et al., 2014; Forsberg, et al., 2016) and found that use of this technology is effective in developing clinical reasoning skills. Washburn, et al. (2016) found in a pilot study with social work students that VSP improved diagnostic accuracy and clinical interviewing skills. Botezatu, et al. (2010) found that VSP could be used confidently for medical student learning and evaluation as did Leung et al. (2015) in an anesthesia course. Finally, a study with pharmacy students in the US found that a combination of VPS and a pre-class video lecture (flipped classroom) was effective as an active learning strategy (Lichvar et al., 2016).

Purpose

The purpose of this study was to determine the level of engagement and learning that occurred with undergraduate and graduate students who participated in a health assessment course that included the use of a virtual standardized patient.

Methods

Design

Quantitative, descriptive survey research was utilized to determine student nurses' perception of the use of VSP in a physical assessment course. The independent variable identified was the use of a VSP and the dependent variable was the student responses.

Participants

For this study, participants were college level students enrolled in one of three classes: a pre-licensure traditional face-to-face baccalaureate of science in nursing (BSN) physical assessment course, online registered nurse-baccalaureate of science in nursing (RN-BSN) physical assessment course or online master of science in nursing (MSN) advanced physical assessment course. In each of these courses, a virtual standardized patient was used to supplement learning material. Participants' educational level varied based on the course level they were enrolled in, i.e., undergraduate versus graduate. Participants were recruited via email distributed through the learning management system by the respective course leader(s). The email included an electronic informed consent form. All enrolled students had the option to confidentially participate in a survey once informed consent was obtained. A total of sixty-one (61) students completed the survey.

Procedure

Prior to conducting the research and after Institutional Research Board approval, researchers discussed the study with individual course leaders. Once their approval to assist in the research was obtained, course leaders were provided a standardized email to send out to all enrolled students in the three identified physical assessment courses (BSN, RN-BSN, and MSN). The email initially explained the research study to the enrolled students and contained an electronic informed consent as well as a link to a confidential survey. If students agreed to participate, the survey provided consisted of two (2) multiple choice and six (6) Likert-style questions that could take up to five minutes to complete. An initial email was sent by course leaders mid-semester followed by a reminder email approximately two (2) weeks later. The survey was closed at the end of the physical assessment course (end of the semester).

Instrument

The eight (8) question survey included the following. One question determined the participant's course enrollment (multiple choice). Six Likert scale questions evaluated the participants ease of using the web-based program, interaction comparison between the virtual and live patient, ability to perform an exam on a virtual patient, and the ability to communicate with the virtual patient. Also evaluated was the participant's perception of their ability to transfer knowledge from the VSP to the live patient. One last question (multiple choice) evaluated the participant's preference in performing a head-to-toe physical assessment, on a VSP or a human.

Results

Eligible participants in this study included all traditional and online nursing students enrolled in a Health and Physical Assessment course, including 38 MSN students, 28 RN-BSN students, and 110 traditional BSN students. An overall survey response rate of 35% was achieved ($n = 61$), the final sample consisted of 11 RN-BSN students, 13 MSN students, and 37 traditional BSN students. The response rate for MSN students was 34%, RN-BSN students 39%, and traditional BSN students 34%.

When comparing the groups regarding the ease of navigation and ability to learn using the virtual clinical experiences software the results were similar, with 100% of MSN answering strongly agree or agree, 91% of RN-BSN answering strongly agree or agree, and 86% BSN students answering strongly agree or agree. Fewer MSN students (46%, $n = 6$) strongly agreed or agreed that the VSP was comparable to a live patient than those students in the RN-BSN (82%, $n = 9$) and BSN (73%, $n = 27$). Interestingly, a higher percentage of students enrolled in the traditional BSN program (92%; $n = 34$) felt confident in their ability to perform a head to toe physical examination on a live patient than those enrolled in the MSN program (84%; $n = 11$) and the RN-BSN program (73%; $n = 8$). Conversely, a higher percentage of MSN students (100%, $n = 13$) felt confident in their ability to perform a focused (systems) assessment on a live patient than those RN-BSN students (82%, $n = 9$) and BSN students (86%, $n = 32$). Regarding the ability to effectively communicate with the VSP, 62% ($n = 8$) of the MSN students answered strongly agree or agree, 91% ($n = 10$) of the RN-BSN students answered strongly agree or agree and 70% ($n = 26$) of the BSN students answered strongly agree or agree. When asked about the ability to transfer learning from the VSP assessment to a live patient assessment 92% ($n = 12$) of MSN students strongly agreed or agreed, 91%

(n = 10) of the RN-BSN students strongly agreed or agreed and 96% (n = 32) of the BSN students strongly agreed or agreed (Table 1). Lastly, students were asked if they preferred to demonstrate their assessment skills to their instructor on a live patient or a VSP. Forty-six percent of MSN students preferred a VSP, while 55% RN-BSN students and 19% BSN students preferred a VSP (Table 2).

Table 1 Student Responses to Survey Questions 2 – 8

	Strongly agree/Agree	Neither agree or disagree	Strongly disagree/Disagree
Q1 – VSP Software is easy to navigate and learn.			
MSN	100%		
RN-BSN	91%	9%	
BSN	87%	5%	8%
Q2 - My interaction with the VSP is comparable to that of a real patient.			
MSN	46%	31%	23%
RN-BSN	82%	9%	9%
BSN	73%	8%	19%
Q3 – I am confident in my ability to perform a complete head-to-toe physical examination on a live patient.			
MSN	84%	8%	8%
RN-BSN	73%	18%	9%
BSN	92%	3%	5%
Q4 – I am confident in my ability to perform a focused (systems) physical assessment on a live patient.			
MSN	100%		
RN-BSN	82%	9%	9%
BSN	86%	14%	
Q5 – I am able to communicate effectively with the VSP.			
MSN	62%	15%	23%
RN-BSN	91%		9%
BSN	70%	16%	14%
Q6 – I am able to transfer what I am learning from assessing the digital standardized patient to my current clinical setting.			
MSN	92%		8%
RN-BSN	91%	9%	
BSN	86%	14%	

Table 2 Student preference for VSP versus Live Patient

	Virtual Standardized patient	Live Patient	Either
MSN	46% (n=6)	31% (n=4)	23% (n=3)

RN-BSN	55% (n=6)	18% (n=2)	27% (n=3)
BSN	19% (n=7)	41% (n=15)	41% (n=15)

Discussion

Overall this research supports the positive findings from several studies (Bigelo, Pardee, Kuzma, & Boucher, 2014; Miskovsky & Miller, 2014; Mawhirter & Klainberg; 2014; Kelley, 2015). Students' responses indicated that the VSP was easy to navigate and comparable to a live patient. Respondents indicated increased confidence in their ability to perform a head to toe physical examination and effectively communicate with a live patient. This was consistent with the findings from (Mawhirter & Klainberg; 2014; Kelley, 2015). Transfer of learning from the VSP to a live patient was reported to be good, consistent with Kirkman (2013). Finally, regarding the assessment of student learning a majority of students felt the VSP was comparable to the live patient assessment, however, although 73% of BSN students felt the VSP was comparable to the live patient, only 19% preferred assessment using the VSP versus a live person. The programs will continue to use online virtual standardized patients in physical assessment courses.

This study did not explore the role that VSP could have in the development of clinical reasoning and thus did not support the literature that examined this relationship (Forsberg, et al., 2014; Ying, et al., 2014; Forsberg, et al., 2016). This examination could be a very useful area of further research.

Conclusion

Based on the data, use of a virtual standardized patient has positive educational effects and is a positive teaching strategy for teaching health assessment in both undergraduate and graduate nursing programs.

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