Promoting Quality and Safety in Women’s Health Through the Use of Transdisciplinary Clinical Simulation Educational Modules: Methodology and a Pilot Trial

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\section*{ABSTRACT}

This manuscript presents the methodology used to assess the impact of a clinical simulation module used for training providers specializing in women’s health. The methodology presented here will be used for a quantitative study in the future. (Gen Med. 2012;9:S48–S54) © 2012 Elsevier HS Journals, Inc. All rights reserved.
INTRODUCTION

In the 1999 landmark report, To Err is Human: Building A Safer Health Care System the Institute of Medicine (IOM) challenged existing approaches to health care delivery and patient safety by suggesting sweeping redesign of the entire US health care system and outlining basic practice skills that all health care professionals should possess. In a 2001 report, Crossing the Quality Chasm: A New Health System for the 21st Century the IOM took the concept a step further, recommending that new education options be developed to ensure safety of patients and close the gap that impedes quality care. The report states, “There is a dearth of clinical programs with the multidisciplinary infrastructure required to provide the full complement of services needed.” In 2010 the IOM report, The Future of Nursing: Leading Change, Advancing Health recommended enhancement of student opportunities for interprofessional education and research exploring the most efficacious models for transdisciplinary educational opportunities.

To address the IOM’s concerns, Drexel University College of Nursing and Health Professions (CoNHP) and Drexel University College of Medicine (DUCOM) proposed a redesign of women’s health education to make use of multifaceted simulation in a transdisciplinary environment. The transdisciplinary approach helps to break down the barriers between professions so all health professionals focus on patients cooperatively. Through a focus on team cooperation, transdisciplinary care also encourages communication and interaction between health professionals. Through continuing cross-disciplinary communication, opinions are communicated effectively and mutually respected, both filling in gaps in care and helping to minimize inequities between providers. Furthermore, a transdisciplinary approach not only allows health care professionals increased decision making capability in patient care, but also through continuing cross-disciplinary education and regulated overlapping roles, greater efficiency and quality in patient care can be achieved. Only through a transdisciplinary approach can health care professionals reach “into the spaces between the disciplines to create positive health care outcomes through collaboration.”

SIMULATION TRAINING IN TRANSDISCIPLINARY EDUCATION

Simulation training enhances clinical competence and improves patient care. Simulated training of preconceptual counseling helps students identify the need to refer patients for medical or other support services. High quality prenatal care training improves maternal health and reduced the incidence of poor birth outcomes. Simulation training in transdisciplinary education improves maternal health and reduced the incidence of poor birth outcomes. Simulation training in transdisciplinary education through use of a simulation module receive rapid response team training program for obstetric and gynecologic emergencies, which supports the objectives outlined in the Healthy People 2020 initiative.

There are many women’s health crises that challenge members of emergency department and obstetrics and gynecology department teams. In regard to pregnancy these include insufficient management of shoulder dystocia, postpartum hemorrhage, amniotic fluid embolism, and airway compromise. These are major causes of poor neonatal outcomes. There are also critically important gynecologic emergencies, including uterine and ovarian disorders, pelvic pain, ectopic pregnancy, pelvic inflammatory disease, vaginal infections, and birth control-related thromboembolism, which require emergency department visits. With these in mind, we developed a transdisciplinary education model in women’s health.

MATERIALS AND METHODS

The four-part transdisciplinary education module in women’s health developed by CoNHP/DUCOM presents the most current scientific evidence for issues in women’s health care. This innovative program is funded by the Robert Wood Johnson Executive Nurse Fellows Program and combines...
diverse expert faculty instruction, multilevel simulation, and collaborative case study learning formats to educate medical students, residents, women’s health nurse practitioner students and family nurse practitioner students, physician assistant students, nurse anesthesia students, and undergraduate nursing students together in a collaborative setting.

The objectives and long-term goals of this program are to enhance knowledge of roles and responsibilities within the health care system, foster development of team building skills, improve health care team communication, reduce medical errors, and improve quality of patient care.

Training Environment and Resources

Our simulation space includes a debriefing/classroom, 10 outpatient rooms, and 2 inpatient/emergent care simulation rooms where activities can be taped and filmed. The laboratory is run by 1 director and staffed with 6 attendants. Both outpatient exam rooms and inpatient/emergent care space is available. There are 7 DUCOM professors of obstetrics and gynecology, 12 faculty members from the nursing discipline, and 1 faculty member from the physician assistants discipline participating. These 20 faculty members have 101 students (these numbers are representative of the participants the simulation was designed to accommodate): 3 medical students, 6 resident physicians from the Obstetrics and Gynecology Department, 58 undergraduate nursing students, 25 graduate nursing students, 5 physician assistant students, and 4 nurse anesthetist students.

Presimulation Training

There are 4 parts to presimulation training: (1) online and live lectures on women’s health topics delivered by COM/CoNHP faculty members; (2) online women’s health case presentations with faculty feedback and online discussion; (3) live women’s health case presentations with faculty member-directed feedback and live discussion; and (4) basic science, published clinical trials, simulation literature, and other studies related to the topic of women’s health care.

Simulations

We utilize multifaceted simulation using high-fidelity mannequin simulators, computer software, simulated anatomic plastic models, and task trainers used for three-dimensional presentations of pelvic anatomy with clinical correlation for obstetrics and gynecology. The simulation mannequin training uses life-sized high-fidelity human patient simulators. Working in multidisciplinary teams fosters teamwork, an increased appreciation for patient safety, and the importance of closed loop communication. Debriefing sessions encourage critical self-reflection that can be taped and reviewed for further learning. We also use live patients. The use of live patient models further training by developing: (1) communication skills training with patient safety focus on domestic violence issues; (2) physical exam skills training and assessment; and (3) feedback and debriefing, including digital recording for evaluation and self-reflection on skill acquisition. Structured debriefing immediately follows the simulated scenario and is based on the model from The Center for Medical Simulation at Harvard. The training model on which the program is based is presented in Figure 1.

Students participate in simulation modules paired with lectures that cover the training objectives shown in the Table. Each module begins with a presimulation lecture, which is followed by a clinical simulation, and the module concludes with a postsimulation debriefing and 2-way evaluation. The clinical parameters of each simulated patient examination are developed by clinical faculty. Each is intended to be representative of clinical cases likely to be handed by students, but do not precisely mirror actual cases. Each student currently participates in at least 1 lecture, clinical simulation, and debriefing for each of the learning objectives in the Table. Although most students participate in each simulation scenario once, some participate in each more than once. The modules each student experiences are similar, but they may differ depending on the faculty and staff members who developed and prepared the simulation. As the program continues to develop, we will use
preliminary data to further standardize training regimens.

Outpatient scenarios include 3 emergent ectopic history and physical exams, 2 gravid histories, and 5 situations in which bad news must be delivered. Inpatient/emergency room patient scenarios include 1 ectopic pregnancy that eventually becomes unstable and requires a code for stabilization and 1 complicated spontaneous vaginal delivery requiring emergent neonatal care. These were chosen from many developed by our team for the first pilot study. The 3 outpatient scenarios were carried out in 10 outpatient rooms and the 2 emergent care scenarios were conducted in emergent care/inpatient rooms. The pilot experience occurred over an 8-hour period. In all, 101 students working with 20 faculty members underwent simulation training and evaluation.

Table. Assessment measures for integrating improvement and safety knowledge used in the Women’s Health Transdisciplinary Education Through Simulation module.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Measurement</th>
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<tr>
<td>1. Develop effective communication skills among medical students, physician assistant, and nurse practitioner students to minimize adverse events and enhance quality care.</td>
<td>Standardized patients used to develop and evaluate medical history taking skills in a simulated environment; objective structured clinical examinations</td>
</tr>
<tr>
<td>2. Develop teamwork skills among medical students, physician assistant students, and nurse practitioner students and use these skills to develop treatment protocols, emergency protocols, and follow-up protocols.</td>
<td>Standardized patients, high fidelity patient simulators, and case-based scenarios with digital recording to provide feedback to students and faculty.</td>
</tr>
<tr>
<td>3. Improve clinical skill performance of medical students, physician assistant students, and nurse practitioner students via practice, repetition, and guided feedback.</td>
<td>Faculty assessment utilizing task trainers and patient simulator mannequins</td>
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<tr>
<td>4. Implement electronic medical record keeping and hand-held device use in clinical training to reduce medical errors and promote evidence-based care.</td>
<td>Computer-based assessment</td>
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Postsimulation Training

Following successful completion of the didactic and simulation components of the Women’s Health Communications Module, each student is assigned to a clinical training site. Faculty preceptors and clinicians guide and evaluate student performance in the clinic setting using objective measures of skills and knowledge. In addition, the project team conducts midpoint and annual student surveys. Trained simulated patients assist faculty members in student evaluation, focusing their feedback on areas of improvement and safety indicators. Training objectives and assessment measures are shown in the Table.

RESULTS

It was evident from this pilot study that transdisciplinary simulation training provides an opportunity for mentoring across undergraduate and graduate studies as well as across disciplines. Students who participated were attuned to collaboration, respectful communication, and safety principles. Participants provided positive feedback about the program structure and length of the training.

Long-Term Goals

Sustaining this program for the long-term will require full support from the leadership of each college, which will be facilitated by the Transdisciplinary Project Committee. Project team members disseminate the results of their project work both internally and externally and are responsible for keeping current with their own discipline’s practice standards related to quality improvement and safety and bringing updates to ongoing meetings. This will allow the team to draw from the best of each discipline to bring a coordinated effort to the transdisciplinary program. Cooperative efforts with clinical partners such as Hahnemann University Hospital and the Drexel University physician practices will assist in the assessment of students.

The team intends to incorporate quality improvement and patient safety via recruitment of additional faculty and guest lecturers. Ongoing communication with faculty preceptors at the clinical site will identify any deficits or areas that need improvement. Quality improvement and patient safety assessment questions will be included in the Colleges’ postgraduate surveys so that the effects of this program on clinical practice can be documented and improved.

DISCUSSION

We believe our program is unique in that it is a collaboration of the medical, nursing, and health professions and educates students in a simulated clinical environment.

Both DUCOM and CoNHP realize the importance of developing and implementing transdisciplinary education to improve the quality and safety of health care delivery. Team training through simulation empowers the individuals best able to correct a problem to take responsibility for the solution.3 Fostering an environment where groups of students from several disciplines work and learn together provides opportunities to overcome bureaucratic dysfunction. Both DUCOM and CoNHP have set as a priority the development of curricula and learning designs that incorporate a team approach, using innovative teaching technologies, to the delivery of health care. In addition, both schools have invested in human and technology resources to enhance faculty and staff knowledge of patient safety. The most notable investments have been in the construction of simulation centers at multiple sites. These permit students to learn and practice communication skills, procedures, and other skills such as conflict resolution and team building using computerized mannequins or live patient actors until competency is confirmed through objective evaluation and feedback. Participants practice patient histories and physical exams on live models, work together as a team with a computerized birth simulator, and view personal performance data on archived digital recordings accessible online.

DUCOM houses 1 of just 21 National Centers of Excellence in Women’s Health designated by the US Department of Health and Human Services. Nursing and physician assistant programs, the two CoNHP programs partnering with DUCOM in this project, are among the first in the country to use
Web-based distance education and human simulation experiences, and to require student use of an iPod personal digital assistant (Apple Inc., Cupertino, CA) to access information at the point of care for the purpose of improving quality and safety.

The major challenges encountered during the pilot study were the time intensive nature of the undertaking and training, scheduling constraints, and the laboratory space and staffing commitments.

The most important measures of the success of this project long-term will be feedback from clinical sites regarding students of all disciplines basing decisions on evidence-based practice, students utilizing teamwork skills and effective communication in the clinical arena, all team members becoming better patient advocates, and all students remaining receptive to feedback for the benefit of patient safety. These are hard to measure but we are putting the infrastructure in place to look at long-term outcomes in our health care system.

In the pilot trial, most evaluation data was qualitative (the exception was simple completion data). We are in the process of creating an objective evaluation system that may include time to completion, a set of rated error criteria, written pre- and post-tests to evaluate student mastery of both lecture topics and simulation instructions, and accuracy of oral presentation by students to faculty or staff overseeing the training modules. By refining, expanding, and continuously evaluating this program, we hope to create a model that can be replicated for use in other specialties.

Moving forward, the Drexel/RWJ Women’s Health Transdisciplinary Simulation team will integrate prebriefing to set the stage for learning in a safe environment, introduce the expectation of critical self-reflection during debriefing, and establish a fiction contract between students and faculty members. A fiction contract is an agreement between students and faculty members to embrace their roles and to be emotionally and actively engaged with their team and the scenario.

CONCLUSIONS

Our project aimed to improve patient outcomes by training students in appropriate case management and standardizing clinical guidelines for proper care. Students who get women’s health transdisciplinary education through use of a simulation module receive rapid response team training program for obstetric and gynecologic emergencies and gives student clinicians an opportunity to work collaboratively toward improving patient outcomes and overall safety. Team members from each discipline who participate in a transdisciplinary education program in women’s health will be trained in effective communication skills, team leadership, and situation awareness skills. Based on the results of this pilot study, we are preparing to implement a more standardized, objectively evaluated trial. We will use this study to guide the development of an expanded program, with attention to the strengths and weaknesses of the small pilot study explained here.

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CONFLICTS OF INTEREST

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REFERENCES


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