THE INTEGRATION OF SIMULATION INTO UNDERGRADUATE NURSING CURRICULUM

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Introduction

The emergence and expansion of computer technology has led to the development of innovative educational tools for health professionals such as simulation technology and patient simulators. A patient simulator places the learners in a realistic simulated environment that allows the students to apply their skills and knowledge to solving real-life problems. Simulation-based learning has been incorporated into the undergraduate nursing programme at NUS since 2007 to enhance student learning. This teaching methodology is used at several levels of the undergraduate nursing course, from simple to complex scenarios involving the development of cognitive, technical and teamwork skills. This article describes the integration of simulation-based learning at all levels in the Bachelor of Science (Nursing) programme with the aims of:

1. deepening students’ learning,
2. integrating the clinical skills that students have learnt,
3. facilitating the transition from classroom to clinical practice, and
4. promoting patient safety in acute care.

Deepening Students’ Learning

The use of a variety of teaching strategies can enhance learning by capitalising on the differences in learning needs and styles (Penn, 1996). Simulation technology incorporates a variety of teaching strategies to teach students about the real world of nursing. These strategies include using cases, role playing, observing the simulated role play and reviewing video clips of simulated sessions. Simulation-based learning, which employs a variety of teaching strategies, can accommodate students’ diverse learning styles (Jeffries, 2002). Visual and auditory learners can benefit from observing students’ participation in clinical situations during the role play. The kinesthetic learners, who prefer to learn through a more hands-on manner, will benefit from the role play that involves the demonstration of nursing skills (Comer, 2005) during the simulation.

For each simulation session, four to five students from the group are asked to participate in the role play (See Figure 1), while the rest of the students remain in a room to observe the scene through live video streaming. The facilitator plays different roles in the scenario. At the start of a session, he/she often acts as the morning staff nurse calling the afternoon team nurses to receive their handover reports. Through the reports, students come to know the case history of the simulated patient and familiarise themselves with the patient’s documents such as clinical charts and inpatient medication records, which the students are expected to review in order to manage the case effectively. During the simulation, the facilitator may assume the doctor’s role to facilitate the simulation’s progress. By participating in the role play, the facilitator is able to control how the simulation progresses and provide cues to the team to enhance the realism of the simulation.

Role playing in a simulated scenario creates opportunity for the students to become immersed in a realistic environment. Assuming the role of another person through acting requires the student to participate actively (both mentally and physically) in the learning process (Nikendel et al., 2005). By immersing themselves in the role of the nursing staff, students gain valuable insights on how their skills and knowledge are relevant to their field of work. During the role play, the participants interact with one another to make decisions on appropriate nursing interventions. Although not as engaged as participants involved in the role play, the observers learn by watching the live video of the simulated role play. The real time visual experiences provide the observers with valuable clinical learning experiences. Wannan and York (2005) report that students’ knowledge could be acquired either by watching a video or through role play.

Figure 1. Role playing of a simulation scenario.
The students are usually involved in a simulated scenario lasting no longer than 20 minutes. This is followed by a debrief in which all students (both participants and observers) are engaged in a discussion after reviewing the video recording of the scenario (See Figure 2). During the discussion, students learn through reflection, group interaction and questions from the facilitator. Reviewing the video provides students with the opportunity to re-visit their actions and therefore, assists them in evaluating their own performances (Rhodes & Curran, 2005). During the debrief with the simulator instructor, students share their experiences in the role play, critique their own or other students’ actions and discuss the appropriate actions to be taken in a real clinical situation. In addition, the facilitator engages the group in discussing the main issues by questioning and reviewing the video recording for significant events. The group discussion allows the students to re-evaluate their experiences with the facilitator and peers. The use of group discussion engages students in reflective learning as it enables the group members to consider a situation from multiple perspectives and consider other alternatives (Mezirow, 1981).

Through weekly laboratory sessions in the contemporary nursing module, students would have acquired a set of clinical skills. For example, after the contemporary nursing module, students are expected to have learnt a set of clinical skills related to respiratory procedures (e.g. application of pulse oximetry, administering oxygen therapy, performing lung auscultation and suctioning). The case scenario of a patient with breathlessness is used during the simulation to allow the students to review and practise their clinical skills as a whole. This integration of clinical skills enables the students to perceive the relationship between various nursing skills in patient care.

Besides bringing all the clinical skills together, simulation enables the students to apply their theoretical knowledge across different nursing modules. During the simulation, students are required to apply their clinical reasoning skills in assessing a patient’s condition, and make clinical decisions to plan, implement and evaluate the nursing actions to manage his/her problem. The simulation scenario enables students to think critically, develops their decision making skills and provides them with opportunities to apply the theoretical knowledge which they have gained from various sources to patient management.

Facilitating the Transition from Classroom to Clinical Practice

Although clinical skills laboratory are incorporated into the contemporary nursing modules to help students acquire psychomotor skills, it remains a challenge for nursing students to transfer these skills to real clinical practice. It may be possible that students lack retention of what they have learnt. Though clinical skills laboratory lessons are conducted on campus, it may be months after the session before a student nurse has a chance to apply it during his/her clinical placement. Moreover, a single skills training episode is unlikely to provide adequate preparation for skills performance (Kneebone, Scott, Darzi & Horrocks, 2004).

The simulation facilitates laboratory skills practice in a ‘real’ clinical setting. The opportunity to participate in a simulation after clinical skills laboratory allows students to engage in repetitive practice. Repetitive practice is crucial for clinical skill acquisition as it makes skills demonstration effortless and automatic (Issenberg, McGaghie, Petrusa, Lee & Scalese, 2005). Kneebone et al (2004) highlight the importance of placing simulation alongside clinical practice and the use of regular simulation to consolidate skills.

The transition from classroom to clinical practice is often associated with anxiety and uncertainty among nursing students, particularly in their first clinical posting. White (2003) reports that the lack of confidence to perform a nursing skill can cause the student to be anxious about making mistakes. The implementation of simulation through laboratory sessions, simulation-based learning, which is implemented at the end of the module, helps students integrate the skills and knowledge that they have learnt together, thus bridging the gap between theory and practice.
before a clinical practicum provides opportunities for nursing students to practice their clinical skills in a non-threatening environment. Students’ anxiety levels would be reduced as the simulated ward environment removes the learners’ fear of harming a real patient. This will promote meaningful learning as the threats to self will be lower compared to the real clinical setting (Murray, Grant, Howard & Leigh, 2008).

Another challenge students face involves the transition from the relatively calm clinical laboratory to the fast-paced clinical setting (Olesinski, Brickell & Pray, 1998). Nurses need to know how to respond quickly to provide the patients with appropriate care in the clinical setting (Nolan, 1998). Clinical practice demands a highly complex combination of knowledge, skills and professional judgment which cannot be adequately acquired through laboratory teaching alone. The simulation, which incorporates clinical scenario, provides a complex clinical situation that helps students to develop cognitive, psychomotor and affective competencies.

Promoting Patient Safety in Acute Care

An ageing population and advanced medical care have made training in acute care and patient safety a priority for nursing education. Studies have shown that the majority of cardiac and respiratory arrests are preceded by observable warning signs that indicate the deterioration of the patient’s condition (Goldhill, White & Summer, 1998). However, these warning signs and symptoms, frequently undetected, worsen morbidity and mortality (Goldhill & McNarry, 2004). Gibson (1997) states that the ward nurses, often the first ones to encounter a patient’s clinical deterioration, are in the best position to provide early recognition and intervention. Thus, the emphasis should be on training the nurses to identify those who are deteriorating, and to utilise their knowledge to evaluate the assessment data and notify the doctor promptly (McArthur-Rouse, 2001). Hospitals in Singapore are implementing crisis courses such as pre-code programme and crisis team management to train ward nurses and doctors to identify and manage acutely ill patients. To enhance current efforts to improve patient safety in acute care, such educational needs are also addressed in the pre-registration nursing curriculum.

Although the clinical laboratory and clinical practicum in the pre-registration nursing curriculum provide invaluable learning experiences for nursing students, exposure to clinical crises cannot be guaranteed during clinical practice. The human patient simulator can capture a variety of patient conditions and create opportunities for learners to manage emergency situations in a planned and prescribed way. One of the major strengths of such high-fidelity simulation is that it places the learners in a realistic situation and provides them with opportunities to apply their skills and knowledge for problem solving in a controlled environment without putting patients or others at risk (Medley & Horne, 2005; Beyea & Kobokovich, 2004). This teaching strategy enhances learning, skills and knowledge retention, and subsequently improved advanced cardiac life support outcomes (Scherer, Bruce, Graves & Erdley, 2003).

Simulation is used to develop students’ clinical competency for providing safe, competent, timely and appropriate patient care during crises. A variety of case scenarios progressing from simple to more complex situations are used to expose the students to various clinical crises. In the first year of the nursing course, simulations are implemented using simple case scenarios, such as respiratory distress and acute chest pain, with the aim of consolidating students’ clinical skills relating to caring for patients with respiratory and cardiovascular disorders. In the second year, simulations are used to expose the students to common medical and surgical crises which include post-operative complications, different types of shock and metabolic conditions.

While the simulation-based learning in the first and second years of the nursing course focuses on applying clinical nursing skills to manage acute patient care, in the final year, simulation aims to develop the students’ clinical decision making and teamwork skills in crisis management. To achieve this, we incorporate acute care simulation programme into the module on clinical decision making skills to consolidate the final-year nursing students’ critical care skills as well as to develop their clinical decision-making skills in assessing and managing patient with acute medical emergencies, including cardiopulmonary arrest. A series of complex case scenario presenting common deterioration conditions (e.g. airway obstruction, breathlessness, hypotension, oliguria and altered conscious level) are used in the simulation programme. The module’s learning objectives are to help nursing students acquire assessment skills in detecting signs of deterioration, apply their knowledge to interpret the assessment findings, initiate immediate life-saving action and communicate the patient’s situation to the doctor effectively.

Inter-professional collaboration is identified as an essential means of ensuring safe and effective patient care. The training of inter-professional education through simulation has shown a great deal of promise to prepare future healthcare professionals (Baker et al, 2008). A 3-hour inter-professional simulation course is implemented for the fifth year medical students and third year nursing students. The programme is designed to introduce and improve teamwork skills among medical and nursing students on patient care during crisis. During the training, students participate in a series of simulated crisis scenarios with high-fidelity patient simulator. Debriefs are conducted after each simulation by having team members view the video recording and reflect on the team’s behaviours and skills. The TeamSTEPPS (Strategies and Tools to Enhance Performance and Patient Safety) evidence-based teamwork programme is incorporated into the simulation course to develop students’ teamwork, communication and leadership skills.

Patient Safety) evidence-based teamwork programme is incorporated into the
Conclusion

Simulation-based learning has been integrated across the undergraduate nursing course at NUS. It aims to deepen students’ learning, enable them to integrate what they have learnt and apply their knowledge to patient care. The simulator’s ability to capture a variety of patient conditions has also created opportunities for students to learn how to manage unexpected emergencies and collaborate with other healthcare teams with the ultimate goal of promoting better patient outcomes.

References


