Problem Solving Through Simulation & Scripts

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How do we assist students to be good medical and nursing decision makers?

Clinicians vary a great deal in their diagnostic effectiveness. Competence is complex and not merely a set of skills or knowledge. Practitioners must have foundations of knowledge with broad clinical experiences related to problems which assist them in the determination of which information is pertinent, which clinical findings are significant and how these findings are to be integrated into appropriate hypotheses (Elstein, Shulman and Sprafka, 1978).

Clinicians have a distinctly limited capacity for simultaneously considering multiple hypotheses, regardless of the complexity of the problem. Usually clinicians have five to ten hypotheses that they work from in making clinical decisions. Hypotheses are usually generated early in the assessment process (Elstein, Shulman and Sprafka). In their studies Elstein, Shulman and Sprafka found that those clinicians who are able to consider multiple competing hypotheses early in their assessments were more effective problem solvers. Therefore in teaching clinicians, it becomes important to help students develop many complex competing hypotheses in order to be competent practicing clinicians.

Story telling and simulations have been effective in helping nursing students to develop good problem solving skills (Jeffries, 2007). Simulations and scenarios can assist students to develop hypotheses and problem solve in a lower stress environment. Students can then transfer these experiences into the higher stress, real life clinical settings. Most nursing students have difficulty acquiring complex experiences with many different types of patients in their clinical experiences. Students are usually not the ultimate decision makers in actual clinical settings. Therefore, they lack these important opportunities for clinical problem solving. We can help increase their ability to consider
multiple hypotheses and thus become better problem solvers by providing these experiences through simulations.

Bruner (1988) and Elstein et al (1978) both stress the importance of providing a good foundation for the basis of continued learning. In nursing the curriculum starts with Assessment and Fundamentals of Nursing in which students are taught the basic concepts of nursing. All knowledge and skills become more powerful for students when scripts, simulations and scenarios are added to the learning. Simulations varying in complexity and can be added during all parts of the curriculum to create a powerful memory for students to use later in their decision making processes with patients.

The following project will provide a powerful model about how learning is promoted within nursing curriculum. In addition the project will outline a case scenario and provide an actual simulation experience based on the scenario. This simulation will be implemented into the curriculum at the Indiana University School of Nursing in Bloomington.

According to Lesh and Lamon (1994), case studies can be used as model-eliciting activities to aid nursing students in understanding the world of nursing. The students use their foundation learning from past experiences, textbooks, lectures, internet information, etc.→ listen powerful experience based stories about past personal/clinical experiences→ engage in a simulations about stories/scripts→ practice skills in lab setting→ apply a variety of these knowledge bases to clinical settings. The model below illustrates the relationship between Foundations of Learning, Case Studies, Simulations and Clinical Application Activities. None of the activities described below occur alone, students are continuously moving from one type of learning environment to another and back and
forth. Using a variety of teaching methods helps faculty to reach many students with different learning styles.

NURSING LEARNING MODEL

The next part of the project will describe two scripts about Insulin Dependent Diabetic Patients taken from the personal experiences of a nursing instructor with a diabetic father-in-law and hospice patient. The scripts provide the student with a verbal memory of a powerful experience that the instructor had with a patient. Then, an actual simulation experience is presented about this script only in a different setting.
Note: The names in these case studies have been changed to protect the confidentiality of the patients.

CASE STUDY SCRIPTS

Initially the nursing instructor discusses with the students the normal fasting blood glucose levels (80-120). Lewis, Heitkemper & Dirksen (2004). The instructor further explains that blood glucose levels lower than 50 (hypoglycemia) can result in “a rapid onset of cold, clammy skin, numbness of fingers, toes, mouth, rapid heartbeat, emotional changes, headache, nervousness, tremors, faintness, dizziness, unsteady gait, slurred speech, hunger, changes in vision, seizures, and coma” (p. 1292 ). “There is usually a gradual onset of symptoms in hyperglycemia (high blood glucose, above 120) with clinical manifestations of increase in urination, increase in appetite followed by lack of appetite, weakness, fatigue, blurred vision, headache, glycosuria, nausea and vomiting, abdominal cramps, fruity odor to the breath, excessive urination (p. 1292). Several years ago, the instructors’ father-in-law, Edward was diagnosed with diabetes. He had difficulty understanding how to regulate his own blood sugars. At times, Edward’s blood sugars would be too low (less than 80); not understanding that if he was not eating normally portioned meals, he needed to assess his blood glucose and make adjustments in the amount antidiabetic medication that he took. One time several days after having hernia surgery, he was not eating well but was continuing to take his normal antidiabetic medication. The wife (Mary) telephoned the paramedics in distress as Edward was diaphoretic, lying in bed, mumbling unintelligently. Upon arrival at the home, the paramedics took Edward’s blood sugar, found it to be 30 (normal is 80-110) and proceeded to give Edward intravenous glucose to increase his blood sugar to a level
above 80. Once, Edward’s blood sugar went from 30 to past 80, he was alert and conversed normally with others. Amazingly, the intravenous glucose brought Edward around in a matter of fifteen minutes. His sweating also ceased. However, he had to be hospitalized several days to regulate his blood sugars as they continued to fluctuate.

Joyce, from a rural Midwestern town, realized that her Hospice patient husband, Jack, who was sleeping in bed beside her, was mumbling incoherently, totally soaked with sweat, and was unable to be aroused. Joyce called the hospice nurse at three o’clock in the morning to get assistance. Groggedly, the nurse opened up her laptop computer and pulled up this patient’s chart. As she was reviewing Jack’s medical history, she was talking to Joyce, asking her if Jack was awake and alert on Christmas day which was the day prior to her call. “He was” she said, “in fact he ate Christmas dinner with us and had a snack before bed”. Upon opening Jack’s medication profile the nurse realized he was a diabetic and was on twice daily Insulin injections. (After thinking about the previous experience with her father-in-law) the nurse asked Joyce to take his blood sugar, in which she responded, “I didn’t even think of that, and here I am also a diabetic!” Then she took his blood sugar; it was extremely low at 30. The nurse discussed what the family had on hand to give him to increase his blood sugar. The only thing sweet that she had available was Coca Cola, therefore Joyce was encouraged to position her husband on his side and elevate his head with pillows while giving him sips of Coca Cola. Joyce in the meantime was able to contact their son, who arrived at their house to assist her and her husband.

After being on the phone with Joyce for 1 ½ hours, Jack could be heard asking for his coffee and a newspaper. They now had him sitting up in bed. The family was instructed to purchase some jelly and peanut butter and give this to the patient, in order to keep
Jack’s blood sugar above 80 until his blood sugar stabilized at this level or above. Joyce had realized she had given Jack an extra dose of Insulin the previous night which caused the onset of the low blood glucose and symptoms of hypoglycemia. The Hospice committee recognized that Joyce, elderly herself, was becoming overwhelmed by taking care of her elderly husband at home. Several days later, Jack was placed in a nursing home for respite care, so Joyce could have a break.

The following section is an illustration of a scenario/simulation of a similar hypoglycemic episode, but portrayed in a hospital setting. The actual simulation scenario was developed by the authors however the design template was created by Gail Kost and Pamela Jeffries from the Indiana University School of Nursing.
Orientation to the Simulation Experience: Diabetic Patient

Welcome to your simulation session. You will be caring for an Insulin Dependent Diabetic patient. This patient has been admitted with flu-like symptoms. In your group, you will have about 30 minutes to complete the simulation in collaboration with your peers. You will all be assigned roles to play during the simulation. Please portray this role the best way you can with the knowledge and skills you have. You will each have a different role to play. You will have prompt cards to help you with things to say to guide the scenario.

- Simulation patient
- Family member
- Primary Nurse
- Charge Nurse
- Observer

At the end of each simulation, you will then have 10 minutes to do reflective thinking on the simulation you have just experienced. You will then have 20 minutes to participate in a debriefing of the simulation.

Simulation Objectives:

The objective of this simulation is to assist students to actively participate in a scenario/simulation that utilizes the diabetic principles learned in B245. It encourages students to work together and to begin to think critically in a simulation setting.
Your session will last approximately 60 minutes and will be broken down as follows: 10 minutes for orientation, 20 minutes for simulation, 10 minutes for guided reflection, and 20 minutes for debriefing.

First 10 minutes: Roles are assigned. Students review their prompt cards that contain statements and prompts to assist in the progression of the scenario. The charge nurse and primary nurse listen to report; review the patient’s medication administration and graphic record.

20 minutes of simulation: The nurse and charge nurse are responsible for completing a patient assessment and performing priority interventions relevant to your assessment. You will have twenty minutes to complete these activities, keep this in mind as you prioritize your assessment and care. At the end of thirty minutes, the assessment and intervention portion of the simulation will be complete.

The observer role will simply observe. The observer will need to make mental notes about the assessment, interventions and interactions of the nurse, patient, and family. You will be taking part in the guided reflection and sharing your thoughts about the process and procedures.

There will be a family member role assigned to one of the students. Please portray the family member as a real member. The family member needs to direct her conversation to the simulator patient and the nurse as she would if she were actually talking to the patient or the nurse.

The last 30 minutes: After your simulation experience, your student group will move to a small room where guided reflection will take place with your instructor. During this time, you will discuss the simulation and reflect on your experiences. You will also debrief the entire simulation.
Guidelines: Please remember to communicate verbally with your colleagues, patient, and family member throughout the session. We want you to make this experience as realistic as possible.
Simulation Design Template

Date: 11/09/08  
File Name: B245 ADA 1

Discipline: Nursing  
Student Level: Fundamentals
Expected Simulation Run Time: 30 min.  
Guided Reflection Time: 30 minutes
Location: IUSON Nursing Lab  
Location for Reflection: same
Simulation Learning Objectives

1. Demonstrate principles of RIGHT patient selection

2. Demonstrate principles of Standardized Precautions

3. Demonstrate correct procedure for glucose monitoring

4. Demonstrate correct technique for taking TPR & B/P & O2 Sat

5. Demonstrate attributes of caring

6. Demonstrate application of teaching principles as it relates to patient/family care

7. Demonstrate therapeutic communication skills with patient and family

8. Functions as a member of the health care team
Fidelity  (choose all that apply to this simulation)

Setting/Environment
- ER
- Med-Surg
- Peds
- ICU
- OR / PACU
- Women’s Center
- Behavioral Health
- Home Health
- Pre-Hospital
- Other _________________

Simulator Manikin/s Needed:

Props: Hat and jacket for sister

Equipment attached to manikin:
- IV tubing with primary line __________ fluids running at _________ cc/hr
- Secondary IV line __ running at _ cc/hr
- IV pump
- Foley catheter _______cc output
- PCA pump running
- IVPB with ___running at ___ cc/hr
- 02 _______
- Monitor attached
- ID band _______
- Other____________________

Equipment available in room
- Bedpan/Urinal
- Foley kit
- Straight Catheter Kit
- Incentive Spirometer
- Fluids
- IV start kit
- IV tubing
- IVPB Tubing
- IV Pump
- Feeding Pump
- Pressure Bag

Medications and Fluids
- IV Fluids:
- Oral Meds:
- IVPB:
- IV Push:
- IM or SC:

Diagnostics Available
- Labs
- X-rays (Images)
- 12-Lead EKG
- Other____________________

Documentation Forms
- Physician Orders
- Admit Orders
- Flow sheet
- Medication Administration Record
- Kardex
- Graphic Record
- Shift Assessment
- Triage Forms
- Code Record
- Anesthesia / PACU Record
- Standing (Protocol) Orders
- Transfer Orders
- Other____________________

Recommended Mode for Simulation  (i.e. manual, programmed, etc.)
Vitalsim simulation with 4 person model. Each individual has a role to play in “acting” out the simulation
<table>
<thead>
<tr>
<th>o 02 delivery device (type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Crash cart with airway devices and emergency medications</td>
</tr>
<tr>
<td>o Defibrillator/Pacer</td>
</tr>
<tr>
<td>o Suction</td>
</tr>
<tr>
<td>• Patient gown</td>
</tr>
<tr>
<td>• Medication chart</td>
</tr>
<tr>
<td>• Graphic chart</td>
</tr>
<tr>
<td>• B/P cuff &amp; Pulse Oximeter</td>
</tr>
<tr>
<td>• Thermometer and Stethoscope</td>
</tr>
<tr>
<td>• Glucometer</td>
</tr>
<tr>
<td>• Wash cloth and Towels</td>
</tr>
<tr>
<td>• Emesis basin</td>
</tr>
<tr>
<td>• Items above, RN (student nurse) should demonstrate critical thinking skills by bringing these items into the patient’s room.</td>
</tr>
</tbody>
</table>
Important Information Related to roles:

The Observer role: played by one student will simply observe. Will be taking part of the guided reflection and sharing your thoughts about the process and procedures.

The Nervous Sister Role: Patient’s sister is worried about patient’s unreliable blood sugar status. She “speaks up” and tells the nurse: I am worried that my sister will have a seizure and become comatose.

The RN Role: The RN is to properly wash her hands, assess for the right patient, introduce self to patient and family, assess for vital

Report Students Will Receive Before Simulation: Oral report from the faculty member.

Time: evening shift report

Your patient, Janice Jones, is a 35 year old woman who was admitted yesterday with flu-like symptoms. She has had Insulin Dependent Diabetes for the past 3 years. Last night at hour of sleep (hs) she gave herself Lantus 30 Units and Novolog 3 Units subcutaneously and ate her snack at 2100. Her blood glucose was 140 at that time (2100). She has had nausea and vomiting (N & V) since 2400. It is now 0400 and she puts on her call light to report feeling dizzy and she is diaphoretic. Her sister is at her bedside frantic that the patient will seize and become comatose.
sign and blood sugar concerns.

The Charge Nurse Role: played by another student nurse who will assume assisting the RN as needed.

Significant Lab Values:
Hemoglobin A1C = 9
Blood Glucose (Noon) = 140

Physician Orders

- Vital Signs every 4 hours
- O2 Sat every 4 hours
- Blood glucose monitoring before every meal and hour of sleep (ac & hs)
- Blood glucose monitoring when necessary (prn) for symptoms
- 1200 Calorie Diabetic Diet
- Sliding Scale insulin dosing (insulin dose based on blood sugar)
## Scenario Progression Outline

<table>
<thead>
<tr>
<th>Timing (approximate)</th>
<th>Actions</th>
<th>Expected Interventions</th>
<th>May Use the Following Cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 minute</td>
<td>Primary nurse and charge nurse wash hands. Primary nurse checks ID band.</td>
<td></td>
<td>Sister:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cue: Thank you for washing your hands.</td>
</tr>
<tr>
<td>1 minute</td>
<td>Primary nurse makes eye contact and looks at patient and sister with concern.</td>
<td></td>
<td>Primary Nurse:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cue: How are you feeling?</td>
</tr>
<tr>
<td>8 minutes</td>
<td>Primary nurse tells the patient what she plans to do and asks Charge nurse to assist by getting any items she needs.</td>
<td>Primary nurse assesses the vital signs, O2 Sat and blood glucose of the patient.</td>
<td>Patient Actor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cue: I am really dizzy and sweaty and I can't seem to keep anything down. Please help me.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sister: I am worried that my sister will have a seizure and become comatose.</td>
</tr>
<tr>
<td>Time</td>
<td>Action 1</td>
<td>Action 2</td>
<td>Action 3</td>
</tr>
<tr>
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</tr>
<tr>
<td>3 minutes</td>
<td>Primary nurse tells the patient that her blood sugar is 50. She asks the Charge nurse to get 8 ounces of orange juice (could be anything really sweet)</td>
<td>Primary nurse gives patient an emesis basin and wash cloth.</td>
<td>Patient Actor: Cue: Makes a wretching noise and then inquires, what is my blood sugar?</td>
</tr>
<tr>
<td>2 minutes</td>
<td>Primary nurse reassures the patient and sister that she will stay with them until she feels better.</td>
<td>Charge nurse or primary nurse gives patient the orange juice.</td>
<td>Patient Actor: Cue: I’m scared, could you stay with me for awhile?</td>
</tr>
<tr>
<td>5 minutes</td>
<td>Primary nurse instructs the patient and sister about the signs of hypoglycemia and what she needs to do at home when she feels dizzy and diaphoretic.</td>
<td>Primary nurse retakes blood glucose and vital signs if abnormal.</td>
<td>Patient Actor: Cure: I’m feeling a little better. I’m not dizzy anymore. Sister: Thank you for helping my sister. She struggles to keep her blood sugars normal.</td>
</tr>
</tbody>
</table>
Debriefing/Guided Reflection Question for the Simulation:

1. How did you feel throughout the simulation experience?
2. Describe the objectives you were able to achieve?
3. Which ones were you unable to achieve (if any)?
4. Did you have the knowledge and skills to meet objectives?
5. Were you satisfied with your ability to work through simulation?
6. To Observer: Could the nurses have handled any aspects of the simulation differently?
7. If you were able to do this again, how could you have handled the situation differently?
8. What did the group do well?
9. What did the team feel was the primary nursing diagnosis?
10. What were the key assessments and interventions?
11. Is there anything else you would like to discuss?

(Jeffries, 2007, p. 58)
There are many teaching strategies that help students to understand content and use it in the practice of nursing. Any one strategy when used alone is not as powerful as when it is combined with others. Many of the strategies that were utilized ten years ago are no longer valid in today’s technical world. Students need to be able to use computers and high tech equipment in order to save lives. However, nursing students are often not allowed in clinical settings to make important life and death decisions that they need to be able to experience in order to make good clinical decisions in their practice. Adding the clinical simulation experience to clinical practice helps students gain these valuable critical thinking, hands on experiences.
References


