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KNOWLEDGE AND SKILLS ENHANCEMENT THROUGH PERIOPERATIVE NURSING SIMULATION LAB TRAINING

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ABSTRACT:

In Edmonton Zone, the attrition rate among new perioperative nursing staff is an issue of concern and many ORs are facing noticeable staffing challenges. In the Edmonton area there are approximately 79 surgical suites. A series of simulation labs were established in 2015 to provide perioperative nurses in order to increase their comfort on the job and to help build confidence levels. The expectations for this simulation are an overall improvement in perioperative nurses' competency, a reduction in OR orientation and training time, and a decrease in the attrition rates among OR nurses.

BACKGROUND:

Rich and contextual learning occurs for students and staff throughout the hospital setting. Some demands of nursing include patient needs, understanding a wide range of acuity levels of patients, and specific demands of the clinical setting.[1] The ability to provide safe environments that offer realistic situations for learning is enhanced through the use of various simulation settings. Simulation training is a widely accepted teaching method in health care educational systems. It mimics real patient experiences and work environments in order to allow learners to gain specialized knowledge and skills without exposing real patients to risks.[2,3] Simulation training has, historically, been utilized in other high risk areas such as aviation, military training, nuclear power generation, and the aerospace industry. Simulation can assist learners by allowing them to experience critical learning events, solve a wide range of potential problems, and determine the cause of, and ways to avoid, accidents or errors by recreating events in a safe environment followed by a proactive debriefing.[4]

Benner's theory explores five levels of nursing experience, that range from the novice to expert level, and the different ways in which nurses need to learn at each level.[5] The theory promotes the concept of nurses moving from competent, to proficient, to expert by shifting away from theoretical learning and toward practical experience. When learners have the ability to enhance their learning through errors, in a simulation setting, then crisis operating room (OR) situations can be explored, practiced and critically reflected on.[6]

The traditional surgical training model requires learners to apply various core skills, under the supervision of other surgical team members, in the complex operating room environment. Currently the low retention of OR nurses, after completing a traditional training model, is a worldwide problem. Research has shown a connection between the low retention rates and the competency and confidence of the trainees.[7-10] Despite the fact that RN numbers in Canada are increasing (234,031 in 2009 to 239,093 in 2013), the OR nursing workforce is decreasing (12,883 in 2009 to 12,529 in 2013).[11] Evidence demonstrates that simulation can effectively improve the competency and confidence of OR nurses. With the increasing complexity

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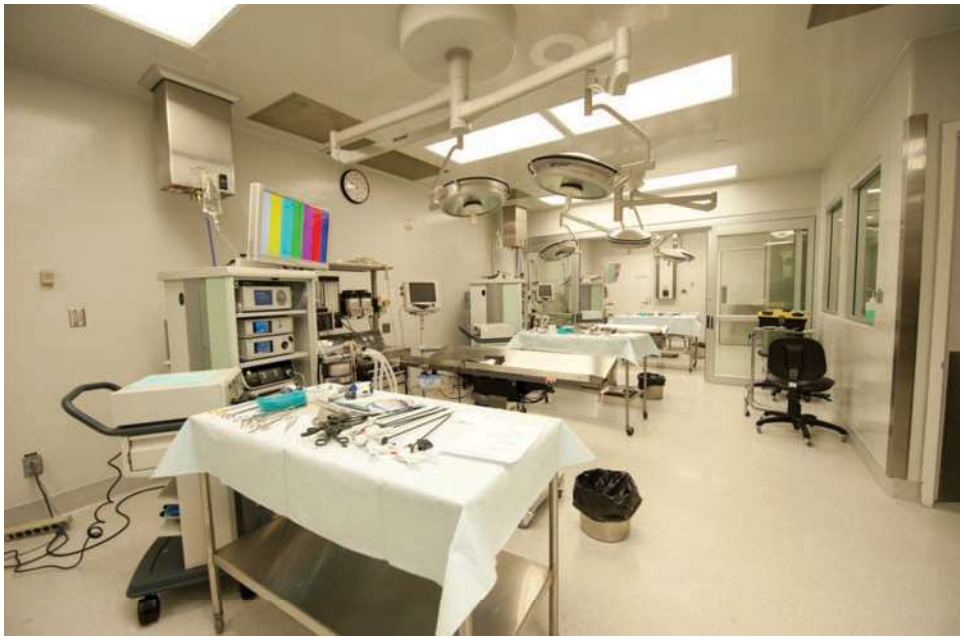

Surgical Medical Research Institute (SMRI) Equipment

of the perioperative nursing work environment the need for such simulation training has significantly increased.[2,12-15]

Benner's theory provides methods of support for training everyone from a new graduate to an experienced nurse who has moved to a new position or department. Through the application of Benner's levels of nursing expertise simulation training offers nurses the opportunity to explore higher competencies and identify new potential problems more quickly. Scripted simulations, designed for specific areas of expertise, can help a novice nurse grow in to an expert role through practice and the opportunity to receive cues from the rest of the OR team in an environment where there is no risk to the patient.

Local Facts:

In the Edmonton Zone of Alberta Health Services (AHS), Perioperative Nursing is considered a specialty practice that requires months of training. Registered Nurses (RNs) and Licensed Practical Nurses (LPNs) typically complete this additional training through structured learning methodology and curriculum (e.g. classroom, lecture style content). Edmonton Zone is currently facing perioperative nursing attrition rates that are higher than anticipated. There have been noted challenges in the completion of the didactic part of the traditional course. According to unit manager feedback, as provided to management at the Zone level, high attrition rates are extremely detrimental to this health care system and are believed to have resulted in:

- A shortage of operating room (OR) nurses;
- Overworking of OR nurses which could increase rates of attrition as well as fatigue related injuries at work;
- Concerns regarding availability of senior OR nurses to provide supervision and orientation time for newer OR nurses; and
- Higher costs to the health care system for the recruitment and training of new perioperative staff.

A major factor in the high attrition rate is believed, by the AHS management, to be the high stress environment of the operating room theatres. The traditional training methodology may not be providing enough support for the novice nurse entering this highly specialized area.

Perioperative Nursing Simulation Labs (PNSL):

In the Edmonton Zone, a new Perioperative Nursing Simulation Lab Training series, organized by The Centre for the Advancement of Minimally Invasive Surgery (CAMIS), has supplemented the clinical portion of the perioperative nurse training. CAMIS is dedicated to surgical research and training. CAMIS has had over 200 trainees, since the program launch in 2015, participate in seminars, workshops, didactic lecture, hands-on

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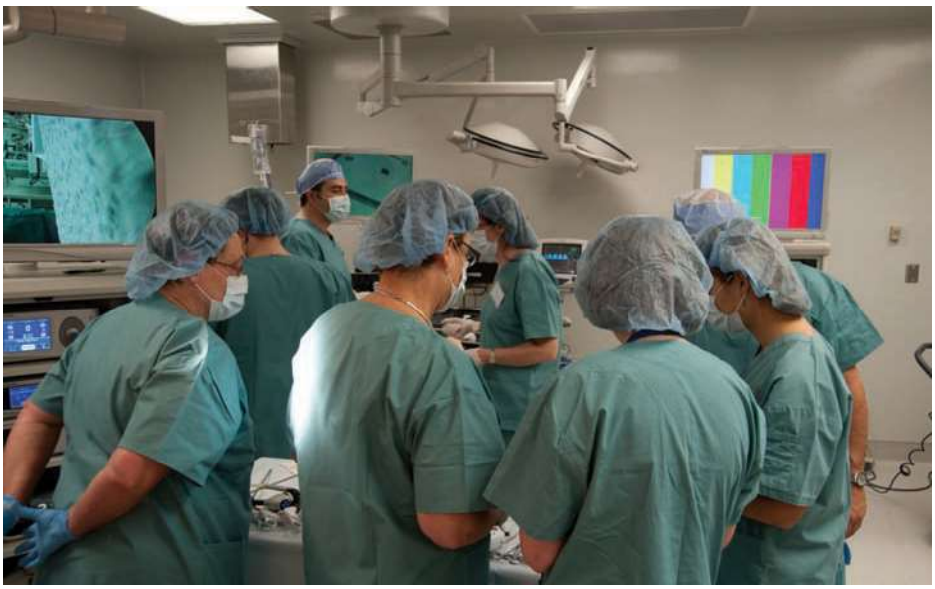


Surgical Medical Research Institute (SMRI) Wet Lab OR

SIMULATION LAB TRAINING (cont.)

skills training, and simulation training. A variety of trainees benefit from CAMIS seminars including medical students, surgical residents, minimally invasive surgery (MIS) fellows, Registered Nurses (RNs), licensed practical nurses (LPNs), and nursing students. Funding for the PNSLs has been provided by AHS and industry grants. Through the PNSLs learners have access to:

- Experienced OR staff, Medical Device and Reprocessing staff, biomedical staff, simulation consultants, fellows, surgeons, residents, and industry representatives;

- CAMIS skills labs for simulation exercises and activities using Fundamentals of Laparoscopic Surgery (FLS) trainers, Minimally Invasive Training System T3 Classic Endo trainers, TASKit Portable Laparoscopic Simulators, Simbionix Lap Mentors, and Simbionix GI Mentors; and

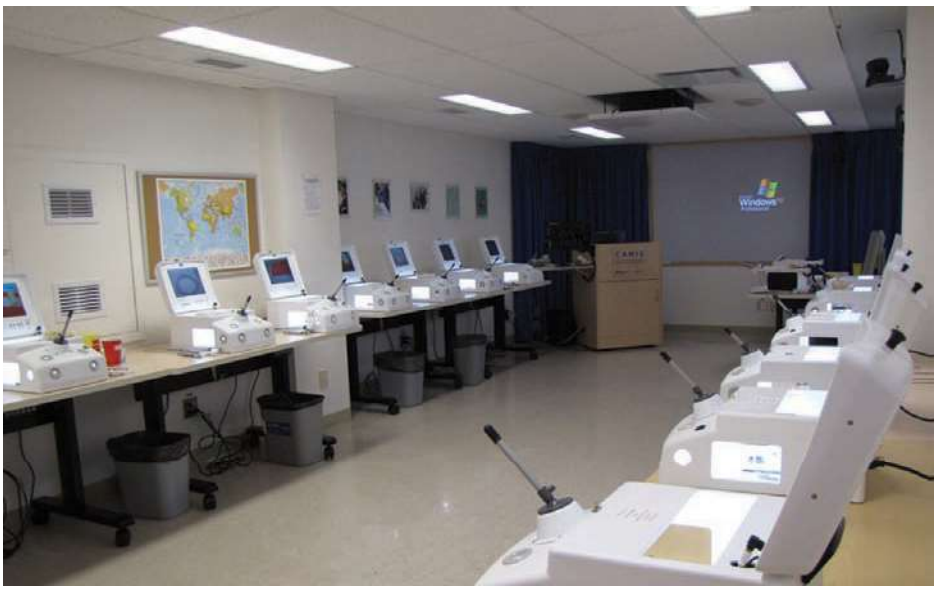
- Surgical Medical Research Institute (SMRI) wet lab for animal model training and cadaver lab training.

A working group has been established, within Edmonton Zone, that comprises surgeons, clinical fellows, clinical nursing educators, unit managers, and experienced OR nurses. The working group is responsible for recommending the lab topics, informing stakeholders who work in the various ORs, reviewing the feedback from the learners and preceptors and making recommendations for future learning opportunities.

An OR nursing readiness survey, of 45 questions (see appendix I), was developed based on the Readiness to Practice document developed as part of the AHS Health Professions Strategy and Practice, Specialty Orientation initiative. The survey was created by a cross- zone working group of expert OR Clinical Nurse Educators and the ORNAC standards and the Canadian Nurses Association (CNA) Perioperative Certification blueprint were both used in the development of the content. This document was sent out to all stakeholders, including the working group, potential instructors, and students, in order to identify training needs and training schedule requirements.

Based on the survey results a structured curriculum, applying Benner's theory concepts of novice to expert nurses has been designed for the perioperative nurses with approximately 80 hours of simulation lab training. The program was launched in January of 2015 and at the time of this writing 3 cohorts, comprising a total of 27 RNs and LPNs, had completed the simulation training. The labs focus on principles of asepsis, patient assessment, infection control, patient preparation, surgical instrument, anesthesia, crisis management, and environment safety. Each lab takes 6 to 8 hours depending on the topic.

By Lyn Michelin



Centre for the Advancement of Minimally Invasive Surgery (CAMIS) Skills Lab

Evaluation:

After each lab CAMIS distributes an online lab evaluation survey (see appendix II), to all attendees in order to gather information about their experience, level of satisfaction, and any comments or other feedback. After each cohort has completed all eight simulation labs the original OR nursing readiness survey (see appendix I) is once again sent to all students in order to provide a comparison with the pre-lab responses. Information gained from these surveys informs the working group's understanding of the skills acquisition benefits of the program. This information will also offer further guidance for the planning of future simulation training of novice perioperative nurses. By providing a comparison of the simulation trainees' pre- and post-lab confidence and competency levels this survey allows CAMIS to adjust and amend the curriculum to further improve future trainees' readiness, understanding, and critical thinking as it relates to their perioperative practice.

CONCLUSION:

It is the expectation of CAMIS that a simulation-based training program will reduce orientation time, result in an overall improvement in surgical trainee competency, reduce attrition, and improve patient safety and outcomes within the Edmonton Zone's perioperative environment. Future research into this topic could also include an analysis of the effectiveness and satisfaction of the PNSL program.

Appendix I

OR Nursing Readiness Survey Questions:

1. Principles of Asepsis - Knowledge of principles of asepsis (i.e., creating, maintaining and monitoring sterile fields)/Ability to demonstrate corrective action for breaks in technique
2. Patient Assessment - Confirms patient identification as per institutional policy/Ensures complete preoperative preparation of patient (i.e., valid consent, surgical site verification, history, NPO status, blood products, allergies, prosthesis, body piercing/tattoos, consults)/Assesses communication, sensory and physical levels/Interprets and communicates data to all members of the multidisciplinary team
3. Infection Control - Isolation Precautions - Knowledge and understanding of Standard Precautions/ Contact Precautions /Droplet Precautions /Airborne Precautions/Creutzfeldt-Jakob Disease Precautions
4. Patient Preparation - Safe surgery checklist
5. Patient Preparation - Surgical Skin Preparation - Knowledge and understanding of the principles of skin preparation in relation to: Patient specific factors (i.e., skin condition & allergies) /Selection of antimicrobial agents / Preparation of patient / Appropriate method of application/sequence/Required personnel
6. Patient Preparation - Draping - Demonstrates the principles of draping and the use of appropriate draping materials.
7. Patient Preparation - Positioning -Transfers patient safely to and from OR ensuring adequate personnel and resources/Applies safety devices (i.e. safety strap and arm restraints)/Understands the principles of positioning and associated risks for specific positions:
   • Supine • Prone • Lithotomy • Lateral
8. Patient Preparation - Specimens - Knowledge in care and handling of surgical specimens, including medico legal specimens
9. Patient Preparation - Catheter
10. Patient Preparation - Miscellaneous -Knowledge and understanding in relation to application of dressings, and use of drains and irrigations. Implements protective measures to

prevent skin and/or tissue injury due to chemical, electrical, or thermal sources

11. Surgical Instrumentation - Knowledge and understanding of the principles of safe care and handling of surgical instruments in relation to:
• Decontamination • Sterilization • Disinfection • Storage & packaging

12. Surgical Instrumentation - Knowledge of reprocessing methods ensuring safe utilization of sterilization equipment (i.e., steam, flash & chemical).

13. Surgical Instrumentation - Inspects and ensures equipment and instruments are in proper working order.

14. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Mechanical equipment (e.g. operating room table and attachments)

15. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Electrosurgery

16. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Smoke Evacuator

17. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Staplers

18. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Pneumatic tourniquet

19. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Laser

20. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Minimally invasive equipment

21. Surgical Instrumentation - Knowledge and understanding of the safe utilization of
• Flexible endoscopes

22. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Thermal device (e.g. cryo, ablation systems)

23. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
• Powered equipment (e.g., electrical, battery & compressed gas)

24. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
    • Thermoregulatory equipment (e.g.., warm air device, fluid warmers)

25. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
    • Diagnostic imaging equipment (e.g., Mini C-arm)

26. Surgical Instrumentation - Knowledge and understanding of the safe utilization of:
    • Service specific equipment

27. Surgical Instrumentation - Is familiar with the preventative maintenance program of equipment

28. Surgical Instrumentation - Is familiar with health care facility policy for process of "recalls" or "risk alerts"

29. Surgical Instrumentation - Is familiar with procedure related to the reporting of intraoperative equipment failure

30. Surgical Instrumentation -Count - Conducts surgical count according to institutional policy/Knowledge and understanding of managing incorrect counts

31. Anaesthesia - Confirms theatre preparation and availability of anaesthetic supplies and equipment.

32. Anaesthesia - Recognizes the significance of normal and abnormal diagnostic data including blood pressure, basic ECG rhythms, pulse oximetry, and capnography

33. Anaesthesia - Knowledge and understanding of commonly used anaesthetic agents and medications.

34. Anaesthesia - Assists the anaesthesiologist with invasive and non-invasive monitoring

35. Anaesthesia - Knowledge of and assists with general anaesthesia phases:
    • Induction (i.e., preoxygenation, intubation, cricoid pressure, rapid sequence induction, assistive devices) • Maintenance (i.e., position change, intaoperative event) • Emergence (i.e., extubation)

36. Crisis Management - Knowledge and understanding of the following life-threatening situations:
    • Airway management (i.e., obstruction, laryngospasm/ broncho-spasm, aspiration, difficult/failed airway, respiratory arrest • Allergies (i.e., latex, medication, food, other) • Anaphylaxis • Cardiac event • Deep vein thrombosis/ pulmonary embolism• Hypothermia • Malignant hyperthermia • Seizure• Shock• Toxicity

37. Crisis Management - Prepares for potential life –threatening situations

38. Crisis Management - Assists the anaesthesiologist with obtaining and administering blood and blood products

39. Crisis Management - Knowledge of institutional policies regarding care of the deceased

40. Crisis Management -Documents and communicates unusual occurrences, near misses and sentinel events and follows -up appropriately (critical incident debriefing)

41. Environmental Safety - Knowledge and understanding of appropriate use of personnel protective equipment. Understands risk factors related to:
    • Sharps • Radiation • Laser substances • Pharmaceutical and chemical substances • Medical waste

42. Post-Operative - Patient Evaluation - Evaluates patient skin integrity/Documents accurately and completely/Communicates information essential to the patient's postoperative care to the receiving unit prior to transfer (i.e., ventilator needed, communicable disease, etc)/Transfers accountability of the nursing care to appropriate healthcare professional using a concise verbal or written report.

43. Post-Operative - Environmental Cleaning -Demonstrates safe handling and care of supplies and contaminated equipment, and appropriate cleaning/sanitation practices (i.e., room changeover, contaminated procedural waste).

44. Environmental Safety - Demonstrates knowledge and procedures related to latex sensitivity/allergy

45. Environmental Safety - Practices and facilitates compliance with Workplace Hazard Materials Information System (WHMIS) regulations, safety policies and procedures

46. Do you have any additional feedback about training or education that you would like to share?

Options:

1: Little or no exposure to the skill/attribute. Little/no understanding of principles
2: Between 1 and 3
3: Explains principles, recognizes examples; Applies knowledge to performance; needs support from references to achieve expected performance
4: Between 3 and 5
5: Able to achieved expected level of performance independently; applies knowledge to performance with little/no support from references

Appendix 2

Student's Evaluation of the attended Lab

1. Overall, are you satisfied with your experience at this lab, neither satisfied nor dissatisfied with it, or dissatisfied with it?
2. Are you satisfied with the overall quality of instruction at this lab, neither satisfied nor dissatisfied with it, or dissatisfied with it?
3. Are you satisfied with the overall quality of the facilities, neither satisfied nor dissatisfied with it, or dissatisfied with it?
4. Are you satisfied with the overall quality of the instrumentation and equipment, neither satisfied nor dissatisfied with it, or dissatisfied with it?
5. How useful was this lab in helping you prepare for working in an operating room environment?
6. Do you have any suggestions for improving this lab?

Options:

- Extremely satisfied
- Moderately satisfied
- Slightly satisfied
- Neither satisfied nor dissatisfied
- Slightly dissatisfied
- Moderately dissatisfied
- Extremely dissatisfied

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ORNAC Standards pertaining to this article can be found in the Operating Room Nurses Association of Canada (ORNAC) (October 2015) *Standards, Guidelines, and Position Statements for Perioperative Registered Nursing Practice* (12th edition), Section 1, p.40, standard 1.2.10; p.68, standard 1.1.4; p.58, standard 1.1.15.