Nonspecialty Nurse Education

Evaluation of the Oncology Intensives Initiative, an oncology curriculum to improve patient care

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BACKGROUND: A community hospital combined its medical and surgical patients with cancer on one unit, which resulted in nurses not trained in oncology caring for this patient population.

OBJECTIVES: The Oncology Intensives Initiative (ONCii) involved the (a) design and implementation of a daylong didactic boot camp class and a four-hour simulation session and (b) the examination of nurses’ worries, attitudes, self-efficacy, and perception of interdisciplinary teamwork.

METHODS: A two-group, pre-/post-test design was implemented. Group 1 consisted of nurses who attended the didactic boot camp classes alone, whereas group 2 was comprised of nurses who attended the didactic boot camp classes and the simulation sessions.

FINDINGS: Results of data analysis showed a decrease in worries and an increase in positive attitudes toward chemotherapy administration in both groups, as well as an increase in self-efficacy among members of group 2.

EXPERIENCING A GROWING NUMBER OF PATIENTS, clinical staff at Duke Raleigh Hospital (DRAH), a 180-bed hospital in North Carolina, must manage two patients per room to accommodate the increased volume of inpatients on the medical-surgical floors. Hospital administration determined that quality nursing care of patients with cancer was at risk because of the two-patient requirement in each room (e.g., neutropenic patients were exposed to an increased risk for infection). To address the needs of the hospital and of this specialized population, the patients with cancer were moved to private rooms on the surgical floor. This move also served to centralize oncologic care by placing medical and surgical patients with cancer in one unit. One of the medical-surgical unit’s strategic goals is to foster and develop the oncology expertise of nurses with no previous oncology education, training, or experience with the recognition and management of oncologic emergencies. In addition, the medical-surgical nurses previously caring for patients with cancer had limited training and education in caring for this patient population.

The primary aim of the Oncology Intensives Initiative (ONCii) was to design and implement a one-day boot camp and a four-hour simulation session for medical-surgical nurses caring for patients with cancer. Although the boot camp class was to consist of didactic content, the simulation session was intended to be made up of exercises leading nurses through chemotherapy administration and recognition of early and late signs of oncologic emergencies. The simulation would also incorporate the Situation, Background, Assessment, Recommendation (SBAR) technique for communicating key information to the care team, callout for providing status updates to the care team, and check-back for offering closed loop communication among team members, all from the Agency for Healthcare Research and Quality’s TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety). A secondary aim of ONCii was to examine nurses’ worries, attitudes, self-efficacy, and perception of teamwork across the interdisciplinary team while caring for patients with cancer, both before and after participation in the didactic boot camp classes and in the didactic boot camp classes and the simulation sessions.
“Studies suggest that simulation can be used effectively when designing clinical oncology care curricula.”

Methods
Before medical-surgical nurses at DRAH could begin an advanced oncology core curriculum, they first needed to complete an educational curriculum covering the essentials, which would ensure quality care of patients with cancer. To establish this basic curriculum, the oncology committee (consisting of DRAH administration, as well as hospital and cancer center clinical educators, providers, and nurses) relied on a literature review concerning the essentials of evidence-based practice related to didactic classes and simulations within nursing education. Thirty systematic reviews and meta-analyses discussed the benefits of simulation for knowledge acquisition, problem-solving competency, critical thinking, clinical judgment, communication skills, self-efficacy, and learner satisfaction. Five of these systematic reviews and meta-analyses noted that the strongest benefit is seen with a combination approach (didactic class for knowledge acquisition, followed by simulation for knowledge application) (Cant & Cooper, 2014; Härkänen, Voutilainen, Turunen, & Vehviläinen-Julkunen, 2016; McGaghie, Issenberg, Barsuk, & Wayne, 2014; Murdoch, Bottorff, & McCullough, 2014; Weaver, Dy, & Rosen, 2014).

Literature Review
Askew, Trotter, Vacciano, Garvey, and Overcash (2012) used simulation to identify knowledge gaps among surgical oncology nurses in failure-to-rescue scenarios. This method of education and evaluation (simulation) led to the creation of individualized educational plans for nursing staff in the Askew et al. (2012) study. Failure-to-rescue simulation in patients with cancer has also been used in the evaluation of advanced practice provider (APP) knowledge. Blackburn, Harkless, and Garvey (2014) used simulation to assess APP management of patients with cancer experiencing complications, which resulted in the design and implementation of a full-team oncology simulation to maintain and validate APPs’ competence annually. Horan (2009) explored the use of simulation to increase critical thinking skills among oncology nurses, finding that employing a focused, specific scenario that was commonly encountered allowed nurses the opportunity to hone these skills in a safe, nonthreatening environment. Kuhrik, Kuhrik, Rimkus, Tecu, and Woodhouse (2008) and Muehlbauer, Parr, and Perkins (2013) have investigated the role of simulation in increasing nursing knowledge and evaluating competence in the care of patients with cancer. These studies suggest that simulation can be used effectively when designing clinical oncology care curricula.

Planning Phase
The oncology committee met regularly during the planning phase (April to August 2016). During the initial planning meetings, the oncology committee decided that the didactic boot camp classes and the simulation sessions would take place on separate days. Participation in ONCii consisted of participation in either (a) only the didactic boot camp classes or (b) the didactic boot camp classes and the simulation sessions. Although the oncology committee appreciated the benefits of the simulation exercises, the didactic content remained the priority of the curriculum. Consequently, the simulation session, which focused on the oncologic emergencies seen most often in the hospital setting, was deemed to be optional for the nurse participants.

To establish the didactic content, the oncology committee distributed an informal nursing survey to the medical-surgical nurses to determine their deficits in oncology knowledge. In addition, the Core Curriculum for Oncology Nursing (Itano, 2016) was reviewed to prevent duplication of content in ONCii and to focus on the topics considered to be essential to providing safe care to patients with cancer. Topics selected for inclusion in the basic curriculum for ONCii were assessment of patients with cancer, toxicities, hazardous spills, extravasation, hypersensitivity reaction, sepsis and septic shock, and oncologic emergencies.

Curriculum Development
The oncology committee developed the curriculum that was to be taught during the didactic boot camp classes. The content for each of the chosen topics was either newly created or modified from existing content that had been developed by the DRAH Cancer Center educator or nurse practitioners or by the hospitalist (hospital medicine) oncology nurse practitioners. Dates for the didactic boot camp classes were determined, and nurses were enrolled. Institutional review board approval was obtained, with the project given exempt status as an evidence-based implementation project, and no participant consent was required.

The simulation content was designed and developed by DRAH’s hospitalist oncology nurse practitioners. All nurse participants voluntarily attended the simulations. The DRAH Cancer Center did not have an established simulation design; therefore, the authors identified a simulation for chemotherapy administration, extravasation, and hypersensitivity reaction developed
at the H. Lee Moffitt Cancer Center and Research Institute in Florida for new nurses with little or no experience in chemotherapy administration (Warnke & Ferrell, n.d.). Permission was obtained from the Moffitt Cancer Center to use the simulation as a template for the design of the simulation content used for ONCi. Doing so provided an opportunity to save time by using an established framework for simulation. The simulations ultimately developed for the DRAH nurses covered chemotherapy administration, extravasation, hypersensitivity reaction, febrile neutropenia and sepsis, superior vena cava syndrome, and cord compression.

**Curriculum Implementation**

An interprofessional team participated in the simulations, leading small groups of nurses through the scenarios. This team included providers, pharmacy members, and an infusion nurse; a DRAH hospitalist oncology nurse practitioner acted as lead facilitator. The didactic boot camp classes and the simulation sessions took place during a four-month period. A total of six didactic boot camp classes were offered from August to October 2016, whereas a total of four simulation sessions were offered from September to November 2016.

Implementation strategies included sharing dates for the nurses to sign up for ONCi, communicating about the didactic boot camp classes and the simulation sessions during staff meetings, and obtaining full support of all stakeholders. Needed resources consisted of the following:

- Educational content (most of which was already available from the DRAH Cancer Center educator)
- Simulation content
- Space needed to conduct the didactic boot camp classes and the simulation sessions
- Simulation equipment (hospital bed, IV pole, IV pump, personal protective equipment, computer)
- Hard copies of policies and protocols
- Instructors (educators and clinicians, based on topics and schedules)

Group 1 was made up of those who participated in the didactic boot camp classes alone, whereas group 2 consisted of those who took part in the didactic boot camp classes and the simulation sessions.

**Instruments**

Program participants were each asked to complete a 125-item questionnaire that combined one nonvalidated questionnaire and three validated tools. Overall, the questionnaire measured nurses’ worries, attitudes, current oncology education, and teamwork across the interdisciplinary team. Quality of the simulation experience was measured by those who participated in the simulation sessions. Each nurse participating in ONCi was assigned a number; an envelope labeled with this number and containing the questionnaire was distributed to each nurse at the beginning and end of the didactic boot camp class (the post-class questionnaire included an additional section to evaluate the didactic boot camp class). Nurses who also completed the simulation session were given a questionnaire (with an additional section to evaluate the simulation session) at its end. The nonvalidated questionnaire was a modified version of the Chemotherapy: Education, Worries, and Attitudes Questionnaire (Verity, Wiseman, Ream, Teasdale, & Richardson, 2008); permission to use and modify the questionnaire was obtained. For instance, the demographic data were modified to focus on nursing degrees offered in the United States.

**TABLE 1.**

SAMPLE CHARACTERISTICS BY GROUP

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>GROUP 1 (N = 41)</th>
<th>GROUP 2 (N = 16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education*</td>
<td></td>
<td></td>
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<tr>
<td>BSN</td>
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<td>9</td>
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<tr>
<td>ASN</td>
<td>19</td>
<td>7</td>
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<tr>
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<td>–</td>
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<td>16</td>
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<td>–</td>
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<tr>
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<td>3</td>
</tr>
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<td>3</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
<td>Pacific Islander/Alaskan</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>–</td>
</tr>
</tbody>
</table>

*Participants could select more than one response.

ASN—Associate of Science in Nursing; BA—Bachelor of Arts; BS—Bachelor of Science

**Note.** Group 1 completed the didactic boot camp classes only, whereas group 2 completed the didactic boot camp classes and the simulation sessions.
States, to include more ethnicities, and to add years of experience in the care of patients with cancer and in the care of medical-surgical patients without cancer. In addition, the spelling was changed from British English to American English. All three validated tools are in the public domain: the New General Self-Efficacy Scale (Chen, Gully, & Eden, 2001); TeamSTEPPS Teamwork Perceptions Questionnaire (Keebler et al., 2014); and Satisfaction With Simulation Experience Scale (Williams & Dousek, 2012).

Evaluation and Statistical Analysis

The Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework (Gaglio, Shoup, & Glasgow, 2013) was chosen to evaluate ONCii. Data analysis using IBM SPSS Statistics, version 23.0, was conducted to evaluate change in five domains: worries, positive attitudes toward chemotherapy administration, negative attitudes toward chemotherapy administration, self-efficacy, and interdisciplinary teamwork.

Missing data on the questionnaire (items left blank) were analyzed to determine if data were missing at random using Little’s (1988) missing completely at random (MCAR) test. For all domains, the significance level was greater than 0.05, indicating that missing data were random. A median imputation method was used to create a complete data set. Because of Shapiro–Wilk tests indicating departures from normality and because of the small sample sizes, Wilcoxon signed-rank tests for paired data were conducted on all outcomes for group 1 and group 2 with one exception: The negative attitudes dimension for group 2 met normality assumptions for all three time points; consequently, two separate paired t-tests were used. Reliability statistics were done on all five domains measured by the questionnaire. The Cronbach alpha was greater than 0.9 for the worries, self-efficacy, and interdisciplinary teamwork dimensions, showing good internal consistency. For positive and negative attitudes toward chemotherapy, the Cronbach alpha was 0.64 (questionable) and 0.72 (acceptable), respectively. None of the domains were considered to have poor or unacceptable internal consistency.

Reach was assessed by comparing the number of medical-surgical nurses who participated in ONCii to the number of medical-surgical nurses caring for patients with cancer overall. Effectiveness was determined by analyzing outcome data (e.g., worries, attitudes, interdisciplinary teamwork) and participant feedback. Implementation was evaluated by looking at the steps leading to the development and provision of the didactic boot camp classes and the simulation sessions, along with attendance rates. Adoption was assessed by reviewing key stakeholders’ support of ONCii. Maintenance was evaluated by determining if any components of the program would continue; for those that would not, the barriers in place were examined.

Results

Participant Demographics

The average age of participants in group 1 was 39.69 years (SD = 11), as compared to 34.94 years (SD = 11) in group 2. Nurses in group 1 had spent an average of 10.48 years (SD = 11) as an RN, as compared to 9.31 years (SD = 12) for nurses in group 2. For group 1, the average length of time of chemotherapy administration experience was 1.15 years (SD = 2.7); for group 2, it was less than...
one year ($X = 0.63$ years, $SD = 2$). Table 1 shows additional characteristics of each group, and Table 2 displays the results of analyses involving groups 1 and 2. Statistically significant improvements were noted in two of the five domains for groups 1 and 2: From pre- to postimplementation, worries decreased, and positive attitudes toward chemotherapy administration increased. In addition, for group 2, a statistically significant improvement was noted in self-efficacy scores from pre- to postimplementation of the simulation.

**Evaluation**

Figure 1 shows the detailed RE-AIM framework evaluation for all five domains of reach, effectiveness, adoption, implementation, and maintenance of ONCii. The participating nurses provided feedback at the conclusion of the didactic boot camp classes and the simulation sessions, which helped to shape changes made to the boot camp classes (see Figure 2).

**Discussion**

The current authors found evidence that the oncology education provided in the didactic boot camp classes alone (group 1), and also in the combination of the didactic boot camp classes and the guided hands-on application of the oncology education in the simulation sessions (group 2), decreased worry and increased positive attitudes toward chemotherapy administration among medical-surgical nurses providing care to patients with cancer ($p < 0.05$). The combination of didactic boot camp classes and simulation sessions also yielded an increase in confidence among the medical-surgical nurses who participated. The use of four different instruments resulted in lengthy questionnaires and created the possibility that all four of the tools may not be valid and reliable when used in combination (three of the four have been shown to be reliable and valid when used individually). However, when used together, these instruments assist in the evaluation of the desired outcomes; in addition, these findings provide a strong foundation for future research.

The impact of ONCii was evaluated in all five domains of the RE-AIM framework. Of 88 total possible participants, 16 took part in the didactic boot camp classes and the simulation sessions, as compared to 41 who participated in the didactic boot camp classes only; this is directly linked to difficulties with implementation, which are as follows:

- Nurse anxiety at the thought of simulation exercises
- Resource-intensive nature of simulation exercises
- Limited date offerings because of limited resources and location availability
- Conflicts with nursing schedules that could not be changed because of the optional status of the simulation session

Participation in ONCii varied across units. Among members of the medical-surgical floor who traditionally cared for medical patients with cancer, 23 of 42 participated, whereas 44 of 46 nurses on the medical-surgical floor, now tasked with caring for medical and surgical patients with cancer, participated. On both floors, significantly more nurses took part in group 1 than in group 2.

**Figure 1.** APPLICATION OF RE-AIM FRAMEWORK TO THE ONCOLOGY INTENSIVES INITIATIVE PROJECT

- **Reach**
  - Medical-surgical nurses providing care to patients with cancer ($n = 88$)
  - Refused to participate ($n = 20$)
  - Missing data ($n = 11$)

- **Adoption**
  - Duke Raleigh Hospital administration (e.g., assistant chief nursing officer, nursing management, hospital clinical education, cancer center education, and cancer center infusion nursing) supported the program.

- **Implementation**
  - Group 1: Didactic boot camp classes only ($n = 41$)
  - Group 2: Didactic boot camp classes and simulation sessions ($n = 16$)

- **Effectiveness**
  - Group 1: Worries decreased ($p = 0.01$); positive attitudes toward chemotherapy administration increased ($p = 0.01$)
  - Group 2: Worries decreased ($p = 0.02$); positive attitudes toward chemotherapy administration increased ($p = 0.01$); self-efficacy increased ($p = 0.01$)

- **Maintenance**
  - The didactic boot camp class will continue to be offered three times each year, with new nurse hires on the medical-surgical oncology floor required to attend.
  - The resource-intensive nature of the simulation sessions (e.g., people, supplies) makes them less feasible to maintain. Educators have decided to modify didactic boot camp class content to include more experiential learning opportunities.

**Note.** Based on information from Van Acker et al., 2011.
Nurses were given the option to transfer units two months prior to the combining of the medical and surgical patients with cancer into one unit; some nurses who had registered for ONCII canceled their registration once they chose not to transfer to the surgical floor that would now be caring for all patients with cancer.

Qualitative data were obtained from participants via post-implementation questionnaires; those in group 1 provided data after the didactic boot camp classes, whereas those in group 2 provided data after the didactic boot camp classes and after the simulation sessions. Feedback on the didactic boot camp classes revealed that these classes alone were often overwhelming to nurses with little or no oncology experience. Also, based on these qualitative data, nurses who originally felt that caring for patients with cancer was the same as caring for other patients gained a greater appreciation for the complexity of this patient population. Feedback on the simulation sessions revealed that participating nurses found a strong perceived benefit to the use of hands-on application related to the oncology content. Taking part in commonly encountered scenarios increased their comfort level in caring for patients with cancer experiencing an oncologic emergency. All participating nurses agreed with the following statements:

- “The simulation helped me.”
- “The simulation helped me apply what I learned from the boot camp.”
- “The simulation developed my clinical decision-making skills.”
- “The simulation developed my clinical reasoning skills.”
- “I received feedback from the debriefing that helped me learn.”
- “Reflecting on and discussing the simulation enhanced my learning.”

Lessons Learned

With the care delivery change that occurred as a result of combining the medical and surgical populations of patients with cancer into one unit, a quick and effective system change was crucial in addressing this need and improving care for these patients. Many key stakeholders came together to design and implement an effective oncology education program (ONCII), and they made crucial decisions regarding its design and content.

When numerous individuals are involved in making decisions, the decision-making process can be as important as the decision itself. A decision-making analysis was conducted at the conclusion of ONCII implementation, revealing decision traps that affected the success of ONCII (Russo & Schoemaker, 1990). The first decision trap identified was overconfidence in judgment. Given nurses’ need for oncology education, the stakeholders anticipated that nurses would fully support participation in simulation exercises to increase their level of comfort in caring for patients with cancer. Instead, the nurses verbalized high anxiety about the simulation exercises, which is reflected in their low participation rate. The second decision trap was groupthink. Although the comprehensive literature review showed a clear benefit to the use of simulation in nursing education, nursing management verbalized a desire to make the simulation sessions optional because of nurses’ anxiety; the oncology committee, made up of stakeholders, agreed to this without discussion. The third decision trap trap

**FIGURE 2. NURSE FEEDBACK POST-ONCOLOGY INTENSIVES INITIATIVE PROJECT**

**DIDACTIC BOOT CAMP CLASS CONTENT**

- “It was a great educational class. I would say mentioning more nursing care points to emphasize [would be helpful]—for example, tumor lysis labs (K, uric acid)—and think about what should be done to increase critical thinking.”
- “[It] would also be helpful to have [a] section on required calculations and practice problems regarding different [chemotherapy] medications, hospital policy for [chemotherapy] administration, spill clean-up.”
- “Class needs to be broken down more on process of giving [chemotherapy] infusions and should be spread out over more than one day.”
- “A lot of good [information], just in a minimal amount of time.”
- “More [information] on inpatient policy and procedure.”

**HANDS-ON APPLICATION**

- “Boot camp gave a good overview, but I definitely need more info and hands-on experience to feel confident in providing [chemotherapy] to [patients].”
- “Hands-on activities provides for more interesting lesson.”
- “I need hands-on training.”
- “Time with practical application will ensure/reinforce information given.”

**SIMULATION SESSIONS**

- “This is far better than sitting in a classroom, going through content all day. It’s so much better going through the scenarios and thinking about what’s going on with the [patient].”
- “The simulations really helped me understand what I might see and how I can help my patient.”
- “I have a much better idea now of my resources. I will go to my charge nurse, pharmacy. This was great.”
- “There is still so much to learn, but I feel better about taking care of the oncology patients now.”

**KNOWLEDGE DEFICIT**

- “I feel like there’s more I don’t know than I realized before this class. I feel more worried about it than I was before!”
- “I still need more education and certification to administer [chemotherapy], but this class is helpful, and I should have received it sooner working on the [unit] this long. I hope every new hire receives this class much sooner, as it will help and alleviate a lot of stress working with oncology patients.”

**ONCOLOGY NURSING**

- “I think oncology is not for everyone, but for those who have a desire or curiosity, it is wonderful.”
was short-sighted shortcuts. Existing course content was updated for the didactic boot camp classes in an attempt to save time on content creation. This method was helpful; however, the majority of the content had an outpatient focus, which contrasted with the target population of nurses caring for patients with cancer in the hospital. Nurse feedback mentioned the need for a greater inpatient focus.

Once a date had been determined for moving medical patients with cancer to the surgical unit, the surgical nurses were expected to complete extensive requirements with a short time frame (two months). They were required to attend the didactic boot camp classes, complete a rotation in the infusion room at the cancer center (to gain hands-on experience with infusing chemotherapy to patients with cancer), and complete their chemotherapy competency examination (test of knowledge that nurses must prepare for and pass prior to being allowed to administer chemotherapy in the hospital). In addition, these nurses attempted to determine a time to participate in the optional simulation sessions. Nurse feedback revealed that many struggled to finish this comprehensive education and noted that the time frame was too short for what was being asked of them. Overall, the nurses would have benefited from a longer time frame to complete this education and training.

**Implications for Practice**

ONCi has affected the medical-surgical nurses who care for patients with cancer at DRAH by decreasing their worries about providing this care and increasing their positive attitudes toward chemotherapy administration. Competencies were not measured.

The didactic boot camp class is now offered three times per year, timed with the orientation of new nurse hires. Simulation sessions are not being offered because of their resource-intensive nature. However, in recognition of the benefits seen with the simulations, the didactic boot camp class content has been modified to include more hands-on learning opportunities. The class is also being adjusted to have more of an inpatient focus.

**Conclusion**

Combining medical and surgical patients with cancer on one unit is an effective way to centralize oncology care within a community hospital. However, doing so creates learning needs for medical-surgical nurses with limited or no prior experience in the care of patients with cancer. ONCi was successfully implemented to offer the basic information needed by nurses to provide safe care to patients with cancer. Incorporating the hands-on application of knowledge acquired in the classroom allows nurses to learn and use what has been gained via real-life scenarios.

Addressing the educational needs of nonspecialty nurses can lead to fewer worries and greater confidence in the nursing care provided to this specialized patient population, as well as potentially inspire medical-surgical nurses to specialize in oncology nursing.

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