

Evaluation of a Cancer Pain Education Module

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Purpose/Objectives: To assess whether a case-based cancer pain education module would lead to acquisition and retention of knowledge and attitudes at the graduate nursing student level.

Design: Quasi-experimental pretest, post-test, and follow-up.

Setting: Three nursing schools in the New England area.

Sample: 92 graduate nursing students.

Methods: An oncology nurse specialist delivered seven two- to four-hour seminars integrated in existing pharmacology, primary care, or adult health courses. Participants' cancer pain knowledge was assessed at four time points with a paper-and-pencil test: before the seminar, immediately after, and approximately 6 and 24 months after the seminar.

Main Research Variable: Cancer pain knowledge.

Findings: The intervention was effective in improving students' knowledge of cancer pain management and assessment ($p = 0.0001$), and the effect was retained at 6 and 24 months ($p = 0.0001$ and $p = 0.0024$, respectively).

Conclusions: Policymakers, clinicians, and professional organizations have recommended providing cancer pain education during professional training to overcome the continuing problem of the undertreatment of cancer pain. The education module used was effective in changing students' knowledge of cancer pain management, and the results suggest that this knowledge is lasting.

Implications for Nursing: Early cancer pain education for nurses may play an important role in improving pain control for patients with cancer. Although this study did not evaluate the application of cancer pain knowledge to clinical practice, the results support the notion that advanced practice nurses can improve their cancer pain management knowledge and attitudes while in training. One implication is that this shift in attitudes and knowledge will translate to effective management of pain in varied healthcare settings.

A number of initiatives have been implemented to improve healthcare professionals' knowledge of and attitudes toward cancer pain management and assessment. Among these are the clinical practice guidelines developed by the World Health Organization (1990, 1996), the American Pain Society (1987), American Society of Anesthesiologists (Task Force on Pain Management, 1996), and the Agency for Health Care Policy and Research (Jacox, Carr, & Payne, 1994; Jacox et al., 1994). These guidelines offer comprehensive recommendations for physicians, nurses, and other medical personnel about the assessment and treatment of cancer-related pain. Little evidence exists, however, that these guidelines have been used in clinical practice or, if they are used, whether adherence to the guidelines produces significant changes in clinical outcomes (Carr, 2001; Sterman, Gauker, & Krieger, 2003; Worrall, Chaulk, & Freake, 1997).

Just as the literature reports an increasing number of cancer pain educational interventions, it also continues to report the undertreatment and inappropriate treatment and assessment of

Key Points . . .

- Appropriate pain assessment and management will be endured if education is provided during professional training.
- Cancer pain education should focus on appropriate medication for specific types of pain, equianalgesic dosing, and pain with addiction.
- Pain content can be integrated into existing courses during professional education.

cancer pain. Nurse and physician researchers have developed, implemented, and evaluated cancer pain education programs for practicing professionals (Weissman & Dahl, 1995; Weissman, Dahl, & Beasley, 1993). These programs have tried to improve pain management through institutional, quality-assurance, observership, case-based role-model workshop, community-based, multidisciplinary integrated, and CD-ROM multimedia approaches (Breitbart, Rosenfeld, & Passik, 1998; Elliott, Murray, Oken, et al., 1995; Miaskowski, 1994; Weissman & Dahl; Weissman et al.). Their focus has been on improving the knowledge and attitude deficits of experienced nurses, doctors, and pharmacists (Janjan et al., 1996; Thompson, Savidge, Fulper-Smith, & Strode, 1999). Lasch, Wilkes, Lee, and Blanchard (2000) reported that didactic workshops were as effective as hands-on experience in improving nurses' knowledge and attitudes concerning pain management across the care continuum—home, hospital, and hospice.

These results confirm a clear link between educational exposure to pain management principles and improved knowl-

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edge and attitudes. Yet, despite these laudable efforts and their dissemination in the literature, study after study continues to report the undertreatment of pain in patients with cancer (Swenson, 2002). Bernabei et al. (1998), in a large, multistate, cross-sectional, retrospective study of elderly and minority patients with cancer in nursing homes, found that 25%–40% of these patients experienced daily pain and that this pain often was untreated. A review of studies of cancer pain control interventions published from 1962–1999 found that, although educational interventions improve professionals' attitudes and knowledge, they had little impact on patients' pain (Allard, Maunsell, Labbe, & Dorval, 2001). Drayer, Henderson, and Reidenberg (1999) found that hospital doctors and nurses tended to assess pain intensity at a lower level than patients did and that, when patients requested more pain medicine, the medication was denied to them.

The inadequate management of cancer pain generally is acknowledged to be the result, in part, of insufficient knowledge about cancer pain care and healthcare professionals' attitudinal barriers toward the use of opioids (Portenoy & Lesage, 1999; Weinstein et al., 2000; Wells et al., 2001). Negative attitudes toward the use of opioids and inaccurate information about cancer pain care in a clinical setting appear early in the training of medical practitioners (Lasch et al., 2002). These attitudes tend to harden if practitioners are not exposed to appropriate pain management education (Weissman & Dahl, 1990).

Many studies have reported that cancer pain management is not adequately represented in nursing and medical school curricula (Bonomi, Ajax, Shikier, & Halpern, 1999; Elliott, Murray, Elliott, et al., 1995; Pargeon & Hailey, 1999). Furthermore, some of the didactic aids adopted by teachers may not cover pain management topics exhaustively (Portenoy, 1992). In a study by Wallace, Reed, Pasero, and Olsson (1995) a random sample of nurses from 24 hospitals selected from four states in the United States rated the preparation in the use of analgesics that nursing programs presented in their nursing textbooks as only partially adequate. Ferrell, Virani, Grant, Vallerand, and McCaffery (2000) reported in their content analysis of 50 nursing textbooks that coverage of pain management is almost nonexistent (0.5% of total text content) and what does exist often is inaccurate.

Thus, despite efforts by individuals and organizations, barriers to effective pain management still exist. Recent pain education efforts have been introduced in medical and nursing school curricula, often in specialized rather than integrative ways. For example, Sloan, Montgomery, and Musick (1998) reported that, after completing a compulsory short course on pain management, 86 final-year medical students had a better understanding of cancer pain management techniques. Owens (2000) reported that second-, third-, and fourth-semester nursing students scored significantly higher on a pain knowledge and attitudes survey than first-semester students, although no significant differences existed among groups of advanced students. However, determining exactly what happened during the first semester, if anything, to improve nursing students' knowledge and attitudes is difficult. In addition, the assessments were based on a cross-section of students rather than repeated measures of the same students, which allows for the possibility that second-, third-, and fourth-semester students may differ from first-semester students in ways other than exposure to pain education.

In summary, the literature dating from the early 1990s clearly suggests that educational efforts can change the cancer pain knowledge and attitudes of practicing clinicians. During the course of the 1990s, educators and policymakers recognized the need to include pain control as part of the curriculum in professional training. As a result, reports of evaluations of initiatives presented in the course of nursing and medical professional education started appearing in the literature. These strategies, however, have not been integrated in existing curricula in nursing or medical schools. Results of the evaluations of these programs have limited generalizability and other methodologic problems. None has followed students into advanced practice to see whether this shift in knowledge and attitudes has been maintained.

From 1995–2001, the National Cancer Institute (NCI) funded an intervention model, the Cancer Education Module for the Management of Pain (CEMMP). CEMMP was a five-year project that developed, implemented, evaluated, and refined transferable modules of cancer pain control education for medical and nursing students. The long-term objectives of the CEMMP project were to facilitate the transfer of knowledge into practice by systematically integrating state-of-the-art cancer pain management and assessment education into existing curricula. This article presents results from the evaluation of the effect of CEMMP on the knowledge of cancer pain assessment and management for 92 graduate nursing students from three nursing schools. The authors hypothesized that educational interventions such as CEMMP would be effective in changing graduate nursing students' level of knowledge of cancer pain management and that the benefits of early and reinforced exposure of such pain education would be maintained over time.

Methods

Description of the Program

CEMMP was designed to implement and evaluate a cancer pain education program integrated into existing nursing and medical school curricula. Its overall objective was not only to ascertain whether students could learn the material but also to identify the optimal contexts, formats, and timing of this learning for the most facile transfer of knowledge to practice. In addition, its goal for the five years of funding was to reinforce knowledge and attitude acquisition by repeated exposure to cancer pain management and assessment at several time points during training. The integration of material was to ensure the continued introduction of pain content into the curricula.

The schools were selected through a negotiation process with the deans of three nursing schools who agreed to integrate a cancer pain module into their curricula. The deans recommended faculty members who were willing to integrate the module into particular existing courses. The three schools, referred to hereafter as Schools A, B, and C, were similar in that all provided clinical experience. However, they varied in terms of the students that they attracted, curriculum, and educational philosophy. School A was a much older program than the others, having opened its doors for the training of nurses in the early 1900s. Its curriculum was rooted in the liberal arts. Its focus was on the professionalization of the nurse and the development of clinical judgment. School B focused on community-based primary care and partners with community

health centers as an element of an internship program. Students were mentored by faculty members who were certified nurse practitioners and became adult or family nurse practitioners. School C offered master of science and doctor of philosophy degrees, as well as an undergraduate degree in nursing. School C's graduate nursing program in primary health care concentrated on scholarship, practice, and research in specialized areas of nursing, such as women's and gerontologic health. School C fostered a goal-oriented approach to promote health and prevent illness by developing purposeful relationships between nurses and clients. Schools A and B had approximately 50 matriculating graduate students per year, and School C had 30.

Initially, faculty members had concerns about some students' readiness for clinical content and the time available in the curriculum. Through collaboration and negotiation with various deans and faculty members, the timing, content, and format of modules were selected and implemented. The CEMMP curriculum, which included the pathophysiology of cancer pain, pharmacologic and nonpharmacologic management, collaborative care, cultural diversity in pain expression and receptivity to treatment, and pain management under managed care, was integrated into the curricula of the medical and nursing schools in various ways.

For nursing students at the graduate level, a hybrid format of inquiry- and case-based learning was chosen as the best method, given time constraints, to use to approach graduate nursing students. Inquiry-based learning evolved in the 1990s as a viable teaching method for nursing education (Albanese & Mitchell, 1993; Ellwood, 1988; Feletti, 1993). Although CEMMP did not have the opportunity to rigorously apply inquiry-based learning methods such as small group tutorials with multiple sessions, it was able to modify and use a problem-based learning case of a Haitian patient with breast cancer. This case was used originally at a two-day workshop dedicated to developing problem-based learning cases for one of the participating medical schools. The CEMMP team members who participated in the development of this case included a dean for one of the nursing schools, an oncology nurse specialist, an anesthesiologist, a medical sociologist, an oncologist, and a nurse. This case incorporated all of the elements of the CEMMP curriculum.

From 1996–1997, a site principal investigator for the CEMMP program (an oncology nurse specialist) delivered seven similar two- to four-hour seminars to graduate school nursing students from the three schools. She delivered this material in a case-based interactive format in pharmacology, adult health, primary care, or anesthesia courses, all of which are required courses in all three schools. She presented this material in a standardized format that included the same handouts, slides, and case study to reduce variability in terms of presentation. The presentation was identical at each site except for possible differences in the questions students asked, which seemed to depend on the work experience of the students. In one class, for example, one student asked about the challenges involved with caring for a patient with terminal cancer on a hydromorphone drip. In other classes, where none of the nurses had cared for a patient with cancer, this issue did not surface.

The students who participated were enrolled in similar courses at each school. The presenter briefly described the CEMMP program at the beginning of the class and asked the

students to take a pretest and post-test as well as 6- and 24-month follow-up tests. She presented the material to 120–130 graduate students from the three schools. The response rate for the pretest ranged from 71%–77%. The authors originally had calculated a power analysis using pre- versus post-test results from Weissman and Dahl's (1990) items with Cohen's (1988) power tables. Basing the calculations assuming a one-tailed t test ($\alpha = 0.05$) and an effect size of 0.5 standard deviations, the power ranged from adequate to very good. Some loss was expected at the 6- and 24-month follow-ups, given that the tests were mailed and students may have moved or graduated.

Pain Knowledge and Application Measures

The participants' cancer pain knowledge was assessed at four time points with a paper-and-pencil test developed and refined by the CEMMP multidisciplinary team. The pretest was administered before the seminar, post-test immediately after the class, and the follow-up tests at approximately 6 and 24 months after the seminar, which means that some of the students had graduated by the two-year follow-up. The test included 13 pain knowledge and application questions. All questions were multiple choice. Standardized scores for pain knowledge and application measures were created by adding all correct answers from the 13 items for a given individual, dividing by the total number of items, and multiplying by 100. Items that were left blank were considered incorrect.

The instrument was pilot tested with students ($N = 27$) in one of the school's courses where a presentation was given by the principal investigator on cultural factors in the assessment and management of pain for ease of administration, quality of items through item analysis, and reliability. The course director administered the test on the day of the presentation and then when the class met again two days later. The test-retest and internal consistency reliability of the test instrument were assessed using the kappa statistic and Cronbach's alpha. The test instrument has a substantial agreement between test and retest with a kappa statistic of 0.76 (0.69–0.83 of 95% confidence interval). The internal consistency reliability of the instrument was 66% (Cronbach's alpha). A Cronbach's alpha of 0.70 or higher is considered fair to good reliability. However, when data have a multidimensional structure such as the measures in the current study's instrument, Cronbach's alpha usually will be lower.

Originally, the authors used the test that was given in the Boston Cancer Pain Education Program, a prior NCI-funded study, as a template (Lasch, Wilkes, Montuori, et al., 2000). The test was reviewed and edited by the core members of the CEMMP program study team composed of two oncology nurse specialists, a medical school educator, an oncologist who specialized in symptom management, a research nurse, a sociologist, a problem-based learning specialist, and a biostatistician. The authors further ensured content validity by having the core team and other participants (e.g., course directors) review any changes.

Data Analysis

An item analysis was conducted first to determine response choice frequencies and item difficulty as well as the effect of the program (improvement) for each item in the test. The immediate effect (change between participants' pre- and

post-tests), as well as the retention effect (change between participants' pre- and follow-up tests), was examined using paired t tests. Data also were aggregated by student subgroups, such as students' age group, year in school (dichotomized into beginning [first year] and advanced year [second, third, and fourth year]), and course. The data formed a hierarchical structure with more than one level, where students are nested within seminars and seminars are nested within schools. The student-level data also were designed to explore longitudinal effects (test-retest on individuals). To reflect the relatively complex nature of the sample design, multilevel mixed-effects models (Kreft & De Leeuw, 1999) were applied using SAS® PROC MIXED (SAS Institute Inc., Cary, NC). Multilevel modeling allowed for the testing and estimation of the main effect (program effect) and covariate effects (course and years in graduate school) and, simultaneously, for unexplained random variation at the level of the individual student (test-retest), the seminar level, and the school level.

Results

Sample Description

Table 1 presents the sociodemographic characteristics of the study population of 92 graduate nurses who returned pretests. The majority of the program participants were female (98%). Fifty-nine percent were at the beginning year of the graduate program, and 41% were in their second or third year or had completed the program by the 24-month follow-up. Sixty-three percent of the participants were in clinical pharmacology, 21% in pharmacotherapy and advanced nursing practice, 8% in public health practice, and 9% in the anesthesia courses. Seventy percent of the participants were older than 30, and 30% were 20–30 years old. The majority was white (90%) with the remaining (10%) participants including other ethnic groups such as African Americans, Asians, and Hispanics.

Table 1. Sample Characteristics

Variable	n	%
Gender		
Female	90	98
Male	2	2
Course		
Pharmacology related	85	92
Public health practice	7	8
Age (years)		
≤ 30	28	30
≥ 30	64	70
Ethnic group		
White	82	90
Other	10	10
Year		
First year	54	59
Advanced	38	41
School		
A	19	21
B	16	17
C	57	62

N = 92

Item Analysis

Table 2 presents the results of item analysis for the 13 knowledge questions at pretest, post-test, and follow-up tests. At baseline (pretest), participants answered 25%–96% of the questions correctly. All items showed varying degrees of improvement at the post-test and follow-up tests, with the percentage of items answered correctly ranging from 48%–100%.

The majority of participants answered items concerning the requirements of optimal management, the importance of prognosis when assessing cancer pain, that cancer pain is normal and to be endured, and adjuvant pain treatment (items 3, 8, 9, and 10 in Table 2) correctly (95%, 91%, 95%, and 96%, respectively), and no significant difference existed between first-year and advanced-year students. The format and content of these questions may have resulted in ceiling effects because the correct answer almost can be chosen through common sense and process of elimination.

Items 4, 11, and 13, the most difficult items to answer at baseline (25%, 34%, and 29% answered correctly), improved to 64%, 69%, and 63%, respectively, at the post-test and were retained at similar levels at the follow-up tests. These items test knowledge concerning the appropriate medication for a given type of pain and equianalgesic dosing. Again, no significant differences existed between first-year and advanced-year students for the degree of difficulty of these items.

Items 1 and 6 on Table 2, which concern the prevalence of addiction in patients receiving opioids and the maximum tolerated daily dose of IV morphine, were among the items that improved the most at the post-test (from 45% to 94% and 57% to 95%, respectively). These improvements also were retained at the follow-up tests. First-year students had more difficulty ($p = 0.01$) than advanced students with the prevalence of addiction item at baseline. These differences, however, no longer existed at the post-test and follow-up tests.

The Effect of the Cancer Pain Management Education Program

Pain knowledge changes from the pretest, post-test, and follow-up tests were used to assess the effect of the program for each participant. Table 3 provides the descriptive statistics of the standardized score at four time points for all participants and students stratified by school year. The significance levels were based on paired t tests. The authors did not initially anticipate much loss to follow-up at the post-test (less than 2%). However, 53% of the participants did not return the 6-month test and 77% did not return the 24-month follow-up test. The authors tested for significant differences between subgroups of those who completed follow-up tests and those who did not by school, age group, gender, ethnicity, course, year in graduate school, and initial baseline scores and found none.

The overall average pain knowledge score at baseline was significantly lower (64 ± 16) than at the post-test (86 ± 10), 6-month test (82 ± 13), and 24-month test (82 ± 11). The participants improved their knowledge of cancer pain management ($p = 0.0001$ for post- versus pretest) and also retained this knowledge at the follow-up tests ($p = 0.0001$ and $p = 0.0024$ for 6- and 24-month tests, respectively). When stratified by school year, first-year and advanced-level students both showed improvement and retention of pain knowledge.

Table 2. Percentage of Respondents Answering Knowledge Questions Correctly

Item	Time Point			
	Baseline	Post	6 Months	24 Months
1. Estimate prevalence of addiction in patients receiving opioid analgesics for acute pain.	45	94	75	85
2. Fear of respiratory depression, inadequate assessment, and poor pharmacologic knowledge are barriers.	74	86	83	95
3. Optimal management requires communication, cultural sensitivity, and dosing schedule.	95	97	100	100
4. Neuropathic pain, caused by nerve injury, may be best relieved by tricyclic antidepressants. ^a	25	64	62	71
5. Therapeutic touch, application of heat or cold, guided imagery, and massage may promote patient control and relieve caregiver helplessness and are less costly.	68	76	84	76
6. No ceiling dose of IV morphine for pain control exists in adult patients with cancer.	57	95	96	95
7. A patient with advanced prostate cancer who complains of new onset back pain, paresthesias of both legs, and inability to void for 24 hours and move bowels for 48 hours requires a complete neurologic examination.	49	59	66	52
8. Patient prognosis is a less important factor when assessing unrelieved cancer pain.	91	97	98	100
9. Uncontrolled cancer pain is not normal and should not be endured.	95	98	98	95
10. Consider analgesic adjuvant or oral opioid for a newly diagnosed patient with cancer, on ibuprofen, who continues daily activities but with much difficulty.	96	97	98	100
11. A patient with breast cancer and documented bone metastases experiences a constant, well-localized, achy rib pain, previously managed with nonsteroidal anti-inflammatory drugs and opioid analgesics. What type of pain is the patient most likely experiencing?	34	69	62	61
12. Cancer pain in 90% of patients can be relieved by appropriate treatment.	59	86	88	90
13. Demonstrate ability to use equianalgesic chart when presented with vignette.	29	63	48	50

^a Today, the first-line therapy for neuropathic pain is gabapentin (Neurontin®, Pfizer Inc., New York, NY), but this answer was not an option when the test was designed in the mid 1990s.

Table 4 summarizes the effects of the program on post-, 6-month, and 24-month follow-up tests after controlling for individual-level covariates (i.e., age group, school year, and course) while employing random effects models to account for residual variation between and within subjects. The model included a dummy variable for test (pretest = 0, post-test = 1; 6-month test = 1; 24-month test = 1) as well as the person-level covariates, age group ($\leq 30 = 0$, $> 30 = 1$), year in school (first year = 0, advanced year = 1), and course (pharmacology related = 0, primary care = 1). Because the majority of the participants were female and white, gender and ethnicity were not included in the model.

Results demonstrated that participants' cancer pain knowledge increased substantially immediately after the CEMMP

program ($p = 0.0001$) as well as at the 6-month ($p = 0.0001$) and 24-month follow-up tests ($p = 0.0001$). The participants who were older (age 30+) and taking courses that related to pharmacology scored higher than younger subjects ($p = 0.02$) or those in primary care classes ($p = 0.04$). However, the first-year graduate students scored as well as the students in advanced years, with no significant difference among the groups.

Discussion

Results suggest that the CEMMP initiative was effective in changing graduate nursing students' level of knowledge of cancer pain assessment and management. In addition, the benefits

Table 3. Pain Knowledge Changes Stratified by School Year

Test	N ^a	\bar{X}	SD	Minimum	Maximum	p
All participants						
Pre	92	64	16	15	92	—
Post	90	86	10	54	100	0.0001
6 months	43	82	13	31	100	0.0001
24 months	21	82	11	69	100	0.0024
First year						
Pre	54	62	15	15	92	—
Post	53	87	10	62	100	0.0001
6 months	24	85	14	31	100	0.0006
24 months	12	83	12	69	100	0.0160
Advanced						
Pre	38	67	17	23	92	—
Post	36	84	11	54	100	0.0001
6 months	18	79	11	62	100	0.0119
24 months	9	81	11	69	100	0.0701

^a Differences in N result from missing data.

Table 4. Program Effects

Variable	Estimate	Standard Error	t	Pr > t
Intercept				
	62.00	2.66	23.29	< 0.0001
Test				
Baseline ^a	—	—	—	—
Post	21.82	1.93	11.28	< 0.0001
6-month follow-up	17.60	2.43	7.25	< 0.0001
24-month follow-up	17.86	3.18	5.62	< 0.0001
Age group				
$\leq 30^a$	—	—	—	—
≥ 30	4.41	1.94	2.27	0.0200
School year				
First ^a	—	—	—	—
Advanced	1.29	1.85	0.70	0.4900
Course				
Pharmacology related ^a	—	—	—	—
Public health practice	-11.81	5.62	-2.10	0.0400

^a Reference group

of early exposure to such pain education were, at least for those who returned tests, maintained for two years.

The results of item analyses suggest that, at baseline, students have the most difficulty with (a) giving appropriate medication for specific types of pain, (b) symptoms of cancer pain, (c) equianalgesic dosing, (d) prevalence of addiction in patients receiving opioids, and (e) maximum tolerated daily dose of IV morphine. These findings are supported by previous studies (Lasch et al., 2002; Weissman & Dahl, 1990) that reported negative attitudes and inaccurate information toward the use of opioids and inappropriate pain management education in the training of medical practitioners.

This study indicates that the benefits of CEMMP for first-year graduate students were as good as the benefits for students in advanced school years, suggesting that pain management material can be introduced as effectively in the first year of graduate training as later in the curriculum. One strength of this study is that all students were educated by the same person so the results were not confounded by teacher effects. Further, the lecturer had experience in cancer care and cancer pain education efforts. To the best extent possible, all students were offered the same module, including slides, handouts, and case studies, to attenuate any module effects on the results. Methodologic weakness in the evaluation deriving from this, however, was that the authors could not compare different formats for graduate student nurses. Students of the educational process would argue that, given time and other constraints, the authors chose a format likely to produce learning that included role modeling, active participation, and feedback, albeit in a somewhat contained fashion (Wilkerson, 2002).

Another strength of the study is that the authors used one format (case-based) and an interactive approach for all students. Qualitative data analysis for the CEMMP project, which will be presented more fully elsewhere, corroborates the value of active participation and the use of case-based methods. For example, one graduate nursing faculty member describing acute care nurses in the course related how stunned the complacent acute care nurses appeared, thinking "Yeah, yeah, yeah, we've heard that before," when the lecturer asked them to convert somebody from one type of pain medication to another. She said asking the students to convert an analgesic during the lecture made them appreciate that they will be making these decisions. This student went on to say,

And you sure as heck better know how to transfer it because if that poor woman is up at two in the morning crying because she's in pain, because you've miscalculated and underdosed, or if, conversely, if she's intubated in the emergency room, both of those responsibilities will now be yours.

Limitations

This study and its results, however, suffer from limitations that may bias the positive findings. Most students who were in class on the day the presentation was given returned pre- and post-tests. The response rates at the 6- and 24-month follow-ups were low. The results may be biased in that only students who were more knowledgeable and had more favorable attitudes toward optimal pain control responded. In addition, responders may have been more likely to be working in the oncology field where pain control may be more salient.

The poor follow-up response rate may result from the fact that mailed tests were administered rather than in-person tests.

Other reasons may include a changed or incorrect address, lack of interest by advanced care nurses who had graduated at the 24-month follow-up and were in primary care, or no time to complete and send back the test for new advanced practice nurses coping with professional and personal demands. Given the data available, assessing the cause and extent of this bias was not possible. However, the authors did examine socioeconomic and other differences in responders and nonresponders and found no significant differences.

The appropriate assessment and management of pain has become more important since the Joint Commission on Accreditation of Healthcare Organizations issued standards for pain assessment and treatment that are to be used in the evaluation process (Miaskowski, 2000). The legitimacy that this gives pain control, as well as the continuing problem of inadequate pain management, makes the implementation of effective and efficient educational intervention models for its assessment and treatment all the more imperative. The study reported here suggests that starting early in the academic careers of professional nurses is effective. More importantly, this material may be maintained even two years after the presentation of pain information.

The generalizability of the program may be limited by the characteristics of the schools, faculty, or students included in the study. However, when the authors analyzed for school or faculty (course) effect, no differences were found. In addition, the inadequate response rate for the follow-ups limits the ability to generalize the idea that changes in knowledge and attitudes were maintained as nurses began to practice. One important sequel to this study would be to examine the students who were educated and their patients in their current practice settings relative to similar nurses who did not receive this education.

Implications for Nursing

This evaluation of the CEMMP program, when delivered to nursing students at the graduate level, suggested several key points for educators of future advanced practice nurses.

- Education initiatives for practicing clinicians are not enough to ensure adequate management of cancer pain.
- Pain management and assessment education should be a part of professional training.
- Cancer pain education improves knowledge of cancer pain management and assessment in graduate nursing students.
- Cancer pain education appears as effective for first-year students as for more advanced students.
- A case-based, interactive format with handouts is an effective educational approach for students at the graduate level.
- Education for patients with cancer needs to focus on appropriate medication for specific types of pain, symptom management, equianalgesic dosing, pain with addiction, and the maximum tolerated daily dose of IV morphine for patients with cancer.

The CEMMP program has developed a Web site (www.caper.tufts.edu) in which many of its educational tools, including this nursing school presentation, can be found. The CEMMP program invites nursing educators to provide this training in their curriculum in the hopes that nurses finally may relieve the suffering that uncontrolled cancer pain causes to patients, families, and professional caregivers.

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