

# Improving Cancer Pain Management by Homecare Nurses

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**Purpose/Objectives:** To demonstrate the effects of a program, directed at homecare nurses, of structured educational interventions on the management of pain and opioid-related side effects in homecare patients with cancer.

**Design:** A longitudinal multilevel, randomized, controlled clinical trial.

**Setting:** Midwestern region in the United States.

**Sample:** 202 nurses caring for patients with cancer recruited from homecare agencies.

**Methods:** The two-tiered educational program focused on basic and advanced pain management strategies, particularly in the area of pharmacologic options and assertive communication skills. Instruments used were the Nurses' Knowledge and Attitudes Survey Regarding Pain, the Barriers Questionnaire, Perception of Control Over Pain, and a demographic questionnaire.

**Main Research Variables:** Knowledge and attitudes about pain management, barriers to pain management, and perception of control over pain.

**Findings:** Nurses in the intervention group had a significant increase in their knowledge, a more positive attitude about pain management, fewer perceived barriers to pain management, and an increase in perceived control over pain compared to the nurses who did not receive the intervention.

**Conclusions:** The educational program Power Over Pain has beneficial effects for homecare nurses caring for patients with cancer pain.

**Implications for Nursing:** A need exists for homecare nurses to gain more insight into pain management strategies and enhance their advocacy skills to improve pain management for patients with cancer treated in the home.

Cancer-related pain often is undertreated despite the availability of effective interventions (Agency for Healthcare Research and Quality, 2002). Although educational programs have been presented regarding cancer pain management, mastery of this content and its use in practice by nurses has not been achieved (Elliott et al., 1997). Numerous factors have affected these results, including the contribution of analgesic side effects to poor analgesic outcomes, the need for individual performance feedback, and the limitation of a single, rather than longitudinal, measure of outcomes.

The purpose of this study was to determine the effects of the two-tiered education program, Power Over Pain (POP), that was targeted to homecare nurses who manage pain and opioid-related side effects in patients with cancer-related pain. In addition to formal instruction, a pain management specialist offered individual feedback to participants throughout their six months in the study. The intervention was based on the belief that for nurses to change practice in pain management, two main areas of expertise are required: (a) Nurses must be

## Key Points . . .

- ▶ Effective interventions for cancer-related pain exist, yet pain often is undertreated.
- ▶ Nurses, especially those in home care, must become experts in pain management and communication to advocate for their patients.
- ▶ Education interventions increase nurses' knowledge and attitudes regarding pain, decrease barriers to pain control, and can help nurses reduce their patients' perception of pain.

experts in pain management strategies, particularly in pharmacologic options, and (b) nurses must have the communication skills to present viable options in an acceptable manner to physicians, pharmacists, patients, or caregivers. This article reports on a two-year study of the effectiveness of this intervention from a larger, ongoing research study involving nurses, patients, and caregivers.

## Literature Review

### Impact of Cancer-Related Pain on Homecare Management

Family members are caring for patients at different stages of cancer in the home in increasing numbers (Pasacreta & Barg, 1998). Although the control and management of cancer are within the domain of healthcare professionals, the control and management of symptoms related to disease are shared by healthcare professionals, caregivers, and patients.

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Homecare nurses often act as mediators among physicians, patients, and caregivers in addition to providing education and guidance for patients and caregivers in the management of patient care (Taylor, 1993). Studies have shown that although homecare nurses are knowledgeable in the care of patients with many health problems, they need specific information regarding pain management and opioid-related side effects (Dalton et al., 1995; Ferrell, Borneman, & Juarez, 1998; Glajchen & Bookbinder, 2001; Samaroo, 1996). In a national survey of 1,236 homecare nurses regarding pain management, the nurses answered only 56% of the items correctly (Glajchen & Bookbinder). The results demonstrated a strong correlation between knowledge of pain management and the homecare nurses' subjective feelings of competence. However, 37% over- or underestimated what they knew. Glajchen and Bookbinder suggested that the need for skills in pain assessment and management could be addressed only if accurate information about current abilities was obtained.

Continuity of care between providers, particularly with respect to questions arising in the evening or on weekends, is a common problem cited in home care (Ferrell et al., 1998). Typically, on-call homecare nurses may be patients' only allies in pain management, which places nurses' knowledge of pain management options at an even greater level of importance. Furthermore, homecare nurses must be able to communicate this knowledge to physicians, pharmacists, patients, and family caregivers. Neal (1999) identified good communication and the ability to negotiate as important characteristics of homecare nurses. Nurses play a pivotal role in preparing patients and their families to cope with management of pain and opioid-related side effects. Nurses translate the implications of medications, anticipated side effects, and benefits and challenges of the medication regimen to patients and their families. Inadequate communication is associated with poor symptom control and patient dissatisfaction (Chan & Woodruff, 1997).

## Perceived Control Over Pain

In a study conducted by Vallerand and Ferrell (1995), homecare nurses described the struggle between the wishes of patients and families and their own knowledge of what should be done and identified themselves as moving on a continuum between helplessness and control. These nurses described their role as patient advocates as being placed between the needs of the patient and family and the prescriptions of the physician (Vallerand & Ferrell). Although perceived control or self-efficacy has been addressed in studies of patient outcomes, little attention has been given to examining professional perception of capability or control in relation to practice change, especially in pain management (Dalton & Blau, 1996).

In a study using the theory of planned action, Nash, Edwards, and Nebauer (1993) examined determinants of nurses' intention to conduct a pain assessment and found that perceived control was the only variable that made an independent contribution to intent to conduct an assessment. The investigators suggested that perceived control could influence not only nurses' intention to perform a behavior but also the actual performance of the behavior. They noted that unless nurses perceived deficits in their knowledge, skills, or resources, interventions aimed at improving these areas will have little impact (Nash et al.). Providing nurses with infor-

mation about their own knowledge of pain management, resources, and opportunities to improve their knowledge and decreasing barriers to implementation of that knowledge will increase nurses' perceived control over pain.

## Effecting Change in Homecare Nursing Practice

Although the specialty of pain management is growing, the majority of pain services continues to be provided by individuals who are not pain specialists (Dalton & Blau, 1996). Patients with cancer in the homecare setting may be under the care of physicians of various specialties, such as oncology, primary care, or family medicine. Therefore, homecare nurses must become experts in meeting the pain management needs of their patients. Benner (1982, 2001) described the nature of how nurses gain clinical wisdom and move from novice to expert clinicians through a combination of experience and education. According to Benner (1982, 2001), change in skill performance occurs through a series of proficiency levels. Nurses first must be educated about general principles related to the clinical process and then have the opportunity to apply this knowledge in the practice setting. Change occurs through an increased perception and understanding of the clinical situation as a whole. The educational intervention and design of this study allowed Benner to direct a change in practice and measure the outcomes of the change.

## Methods

### Participants and Setting

The current study was conducted over 24 months and focused on 11 home healthcare agencies assisting patients with cancer. Following approval of the study by the Wayne State University Human Investigation Committee, 14 home healthcare agencies in a large midwestern metropolitan area were contacted. Three of these agencies were not eligible to participate because they did not care for patients with cancer at the time. The 11 eligible agencies all agreed to participate. Nurses within each agency also had to consent to participate. The number of nurses recruited from each agency varied from 6–34.

### Design

A cluster randomized, experimental design was used. The 11 agencies that agreed to participate were randomly assigned to experimental and control conditions: five to the experimental condition and six to the control. The sampling and assignment process resulted in 100 nurses in the experimental condition and 102 in the control condition. In addition, four- to six-week longitudinal data were obtained to evaluate the persistence of the basic intervention. These longitudinal data were not collected on the advanced intervention component.

### Instruments

Barriers to pain management were identified by the **Barriers Questionnaire (BQ)**, a 17-item self-report questionnaire designed to assess the extent to which patients have concerns with reporting pain and using analgesics (Ward et al., 1993; Wells, Johnson, & Wujcik, 1998). The original 27-item questionnaire, developed by Ward et al. (1993), has eight subscales measuring fear of opioid side effects, fear of addiction, the belief that increasing pain signifies disease progression, fear of injections, concern about drug tolerance, believing "good" patients do not complain about pain, the belief that reporting

pain may distract the physician from treating or curing the cancer, and fatalism (i.e., believing that pain is inevitable with cancer and that it cannot be relieved). Items on both versions of the BQ are rated based on the extent of agreement, from 0 (do not agree at all) to 5 (agree very much) (Ward et al., 1993). In a study of 270 patients with cancer, the internal consistency (alpha) of the total scale was 0.89 (Ward & Gatwood, 1994). Test-retest reliability was 0.90, and the alphas for the subscales ranged from 0.52–0.91 (Ward, Berry, & Misiewicz, 1996). In another study, the BQ was tested on 217 outpatients with cancer and found to have a Cronbach alpha of 0.84 (Wells et al.). For the nurses in the current study, a Cronbach alpha of 0.75 was determined. The BQ also has been used with caregivers of patients with cancer pain (Ward et al., 1996).

The **Nurses' Knowledge and Attitudes Survey Regarding Pain (KAS)** measures nurses' knowledge and attitudes about pain management (Ferrell & McCaffery, 1987; Ferrell, McGuire, & Donovan, 1993). This 39-item tool has been used extensively since 1987. Content validity was established by a group of pain experts. The content of the tool was derived from current standards of pain management developed by the American Pain Society and the World Health Organization. Construct validity has been established by comparing scores of nurses at varied levels of expertise (e.g., students, new graduates, oncology nurses, graduate nurses, senior pain experts). The tool was identified as discriminating among levels of expertise. Test-retest reliability was established ( $r > 0.80$ ) by repeat testing in a continuing education class of staff nurses ( $N = 60$ ). Internal consistency reliability was established ( $\alpha > 0.70$ ), with items reflecting both knowledge and attitude domains. Internal consistency for the nurses in the current study was a Cronbach alpha of 0.74.

**Perception of Control Over Pain (PC)** was determined by a single item, "I am in control of my patient's pain," that was measured with a seven-point scale (1 = agree to 7 = disagree). In addition, each participating nurse completed demographic questionnaires that were developed by the investigators.

## Procedure

Nurses in the intervention group attended two POP programs that were developed and presented by the principal investigator to improve the management of pain and side effects in patients with cancer. At the start of the first program, the study was explained and consent for participation was obtained from each nurse. Nurses then completed the demographic data questionnaire, PC, BQ, and KAS. The first program was a four-hour lecture and discussion covering misconceptions of analgesics (e.g., addiction, tolerance, dependence, respiratory depression), pharmacologic management of pain, and management of analgesic side effects. Also, the skills that are necessary to communicate with physicians regarding patients' pain management needs were reviewed as well as methods of discussing pain and pain management with patients and caregivers. According to Benner (1982), new nurses need guidelines to follow as they develop expertise in skill performance. In addition to the presentation, nurses received a packet of information containing national guidelines for pain management and resources for managing pain and opioid-related side effects. At the end of the program, participants completed post-test measures of the PC, BQ, and KAS.

During the next four to six weeks (dependent on scheduling availability), the nurses used the knowledge they gained from

the first program in caring for patients in their caseload. The nurses then returned for the advanced POP session and were asked to complete the PC, BQ, and KAS to determine any change in their scores from the post-test in session one.

Benner (1982) contended that as nurses develop skill expertise they are able to incorporate more complex clinical explanations. The two-part intervention allowed the homecare nurses to move from novice to expert as they applied their acquired knowledge in the homecare setting. The advanced session of the educational intervention was based on this assumption. It focused on the more complex concepts of dose titration while managing side effects and emphasized communication and advocacy skills used in pain management. This session incorporated role-playing and assertiveness training to enhance the nurses' role as patient advocates and improve their communication with physicians, patients, and caregivers. At the completion of the session, the nurses were asked to complete the PC, BQ, and KAS again. Content presented in the basic and advanced interventions was developed based on guidelines from the American Pain Society, Agency for Healthcare Policy and Research, American Geriatrics Society, and the experience of the principal investigator (American Academy of Pain Medicine, American Pain Society, & American Society of Addiction Medication, 2001; American Pain Society, 1999b; Ferrell et al., 2002; Jacox, Carr, Payne, et al., 1994). The principal investigator, an expert consultant, was available by pager to provide a way for the nurses to have their questions answered while in the field. The consultant also was available to provide guidance while nurses in the clinical setting developed care plans and to direct role-playing to prepare for situations requiring advocacy for more effective pain management (e.g., telephone calls to physicians requesting changes in analgesic orders). Although this resource was not frequently used, the nurses who did use it stated that it was very helpful for problem solving with patients with complex pain problems and increased their confidence when speaking with physicians.

The control participants received an explanation of the study and were offered the intervention at the completion of their six months in the trial. Nurses in the control group provided measurements at baseline and one-month post baseline. Although this article reports only on pre- and post-test measures, nurses in both groups also will complete measures at three and six months to determine maintenance of changes.

## Results

### Sample

A total of 202 nurses agreed to participate. Nurses ranged in age from 24–71 years, with a mean age of 44.4 years ( $SD = 8.29$ ). Four percent ( $n = 8$ ) were educated in a practical or vocational setting, 46% ( $n = 91$ ) had a diploma or an associate's degree, 44% ( $n = 88$ ) had a bachelor of science in nursing degree, and 6% ( $n = 12$ ) were master's prepared (see Table 1). This was an experienced sample of nurses, with 39% reporting more than 20 years of nursing experience. The majority was female (97%), Caucasian (87%), and married (66%).

### Methodologic Results

**Retention:** Of the 202 nurses who participated at baseline, 157 returned for the one-month follow-up. Follow-up participation did not differ by intervention group: 75% ( $n = 75$ ) for

**Table 1. Number of Participants in Each Group by Education Level**

Education	Intervention (N = 100)		Control (N = 102)	
	n	%	n	%
Vocational or practical	3	3	5	5
Diploma or associate's degree	41	42	50	49
Bachelor's degree	44	45	44	43
Master's degree	9	9	3	3
Missing	3	–	–	–

Note. Because of rounding, not all percentages total 100.

the experimental group and 80% (n = 82) for the control group,  $\kappa^2(1, N = 202) = 0.84, p = 0.357$ . Nurses failed to return for two primary reasons: either they experienced a change in employment or they were in the field and not available for the second intervention.

**Random assignment:** Because agencies were randomly assigned, this study's researchers expected that experimental and control participants would not differ on background variables or baseline outcome measures. No differences existed between experimental and control groups on age, years in nursing, or BQ (see Table 2). Educational level also did not differ by condition. However, small differences were discovered in knowledge, attitudes, and perceived control. Nurses in the intervention condition scored higher in knowledge and attitudes, whereas nurses in the control condition scored higher on perceived control. This could be a result of nurses with a higher commitment choosing to participate in an intervention they perceived as relevant to practice, but this difference should not affect the evaluation of the intervention because participants' baseline measures were used to control initial individual differences.

**Sampling:** Agencies, rather than nurses, were randomly assigned to a condition; as a result, the usual assumption for independence of observations might not hold. Therefore, independence of observations was determined by computing the

**Table 2. Sociodemographic and Baseline Outcomes for Intervention and Control Groups**

Variable	Intervention (N = 100)		Control (N = 102)	
	$\bar{x}$	SD	$\bar{x}$	SD
Age	45.21	8.31	43.62	8.23
Years in nursing	3.77	1.31	3.49	1.41
Nurses' Knowledge and Attitudes Survey Regarding Pain*	29.54	4.74	26.42	4.22
Barriers Questionnaire				
Total	20.55	9.05	19.09	8.30
Cluster 1	0.51	0.53	0.53	0.51
Cluster 2: disease progression	1.32	1.32	1.11	1.18
Cluster 3: side effects	2.39	0.97	2.37	0.84
Perception of Control Over Pain*	5.36	1.54	4.42	1.73

\*  $p = 0.001$

Note. The total possible score for the Nurses' Knowledge and Attitudes Survey Regarding Pain ranged from 0–39, the Barriers Questionnaire ranged from 0–85, and the Perception of Control Over Pain ranged from 1–7.

intraclass correlations for knowledge, attitudes, barriers, and perceived control scales. Intraclass correlations also were computed for the pretest to post-test change in these measures. The intraclass correlations for these measures were of moderate size and significant. However, the analysis was planned for the change scores, so these scores are the most relevant. All intraclass correlations for the change scores were small (0.001–0.031) and insignificant ( $p > 0.05$ ). Thus, observations were treated as independent in the analysis.

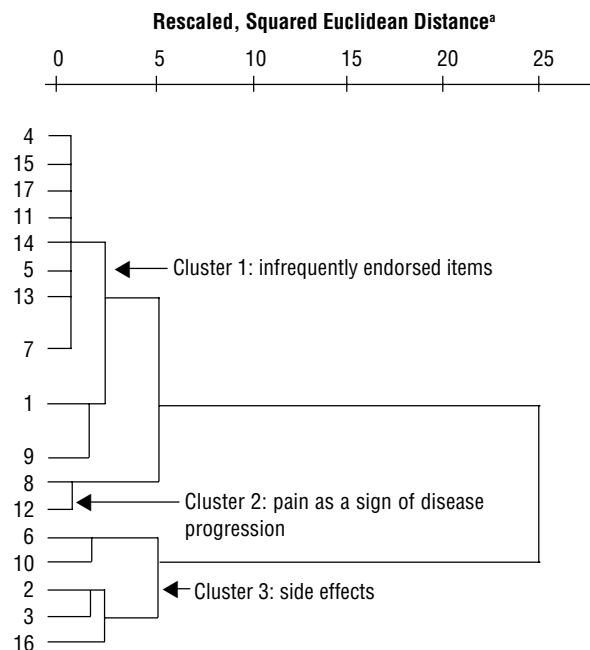
### Descriptive Statistics for Baseline Variables

The mean baseline levels of BQ, KAS, and PC are shown in Tables 3 and 4. Mean baseline for KAS was relatively high, 29.54 for the intervention group and 26.70 for the control group. This may reflect the high level of experience of the study nurses or perhaps an agency-specific emphasis on effective pain management as a result of randomization at the agency level. Although the means are high, the potential range of the instrument (0–39) still allowed for demonstration of improvements in knowledge and attitudes regarding pain management. Similarly with the PC, a mean of 2.61 in the experimental condition and 3.40 in the control condition, with a range of 1–7 on the scale (higher scores indicate a lower perception of control), allowed for demonstration of improvement in perceived control. The BQ subscales, on the other hand, with a possible range of 0–5, were already low. Little room existed to further reduce these types of perceived barriers.

### Exploratory Analysis of the Barriers Questionnaire

The BQ originally was developed to measure perceived barriers to effective pain control in patients with cancer (Ward et al., 1993). The use of the BQ with nurses in this study was an exploratory effort to determine whether nurses held the same barriers that were identified by patients and caregivers and whether education might decrease those barriers. In the shortened 17-item version, Wells et al. (1998) identified two underlying dimensions: communication about pain and use of analgesics. In the current study, the 17-item instrument was used to measure nurses' perceived barriers to cancer pain management. To examine the underlying dimensionality of the BQ, a cluster analysis of variables was performed on the baseline barriers data. Factor analysis often is used for this purpose when the items are assumed to have a normal distribution. Preliminary examination showed that the BQ item distributions varied considerably and were highly skewed. Therefore, a hierarchical cluster analysis using Ward's (1963) minimum variance method was used as an alternative. The results are described in a dendrogram (see Figure 1) that shows which items were combined at each stage. For example, items 4, 15, 17, 11, 14, 5, 13, and 7 were combined into a single cluster at stage 1. Selecting the number of clusters to retain is made by examining the dendrogram and considering the content of the items making up the clusters. Based on these criteria, this study's researchers determined that three clusters of items underlie the BQ for nurses. The first cluster consisted of 10 items that were endorsed infrequently by the nurses. The mean ratings for these items ranged from 0.23–1.03 on a 0–5 scale, indicating that these kinds of issues (i.e., fear of addiction, efficacy of pain medication, or physician attitude or cooperation) are not perceived as barriers to pain management by nurses. The second cluster, which had a mean rating of 1.21–1.22, consisted of two items, both related to the idea that increased

- BQ4: Pain medicine cannot really control pain.
- BQ15: Medicine cannot relieve cancer pain.
- BQ17: Complaints of pain could distract the doctor from curing the cancer.
- BQ11: Good patients avoid talking about pain.
- BQ14: Pain medicine should be “saved” in case the pain gets worse.
- BQ5: People get addicted to pain medicine easily.
- BQ13: It is easier to put up with pain than with the side effects that come from pain medicine.
- BQ7: It is more important for the doctor to focus on curing illness than to put time in to control pain.
- BQ1: It doesn’t do any good to talk about pain because the doctor will not do anything about it anyway.
- BQ9: Pain medicine often makes you say or do embarrassing things.
- BQ8: Having pain means that the illness is worse.
- BQ12: The experience of pain is a sign that the illness has gotten worse.
- BQ6: Nausea from pain medication is really distressing.
- BQ10: Constipation from pain medication is really upsetting.
- BQ2: Drowsiness from pain medicine is really a bother.
- BQ3: Confusion from pain medication is really a bother.
- BQ16: Doctors might find it annoying to be told about pain.



**Figure 1. Cluster Analysis Dendrogram of Barrier Items and Rescaled Squared Euclidean Distance Between Steps**

<sup>a</sup> This is the distance between the clusters combined at each stage and scaled to range from 0–25.  
BQ—Barriers Questionnaire

pain is a sign of disease progression. The third cluster, which had a mean rating of 2.00–3.29, consisted of five items, four of which were side effects of pain medication. The three scales had a low to moderate correlation ( $r = 0.29–0.39$ ), indicating that these sets of items represent separate dimensions.

### Results of the Intervention

To examine the immediate effects of the intervention, paired t tests were computed for each of the outcomes for the basic and advanced intervention. As shown in Table 3, the basic intervention significantly improved each of the outcomes as expected ( $p < 0.05$ ). The advanced intervention resulted in improvement only in the barriers side-effect cluster. To exam-

ine longer-term effects of the basic intervention, a separate 2 x 2 (group [experimental versus control] x time [pretest versus four-week post-test]) mixed-design analysis of variance was performed for each outcome measure. The improvements were retained at four weeks for one BQ cluster (disease progression) and for KAS. The effects were diminished for the other measurements (see Table 4). The intervention group had a significantly greater improvement in knowledge and attitudes than the control group ( $p < 0.02$ ), and the scores in the disease progression barriers increased in the intervention group ( $p = 0.01$ ).

**Effect size analysis:** Significance levels are largely a function of sample size. Effect sizes, on the other hand, allow for comparison across groups that vary in size and

**Table 3. Basic and Advanced Study Outcomes by Intervention**

Outcome <sup>a</sup>	Basic Intervention (N = 100)					Advanced Intervention (N = 75)				
	Pretest		Post-Test		p	Pretest		Post-Test		p
	$\bar{X}$	SD	$\bar{X}$	SD		$\bar{X}$	SD	$\bar{X}$	SD	
Barriers Questionnaire										
Total	20.55	9.05	19.54	8.77	0.01	20.63	8.87	20.13	9.31	0.11
Cluster 1: fear, lack of knowledge, and hopelessness	0.51	0.53	0.40	0.51	0.01	0.49	0.50	0.48	0.52	0.42
Cluster 2: disease progression	1.33	1.32	1.81	1.54	0.01	1.59	1.33	1.73	1.41	0.11
Cluster 3: side effects	2.39	0.97	2.13	0.51	0.02	2.23	0.85	2.10	1.00	0.02
Nurses’ Knowledge and Attitudes Survey Regarding Pain	29.54	4.74	34.34	3.27	0.01	33.44	3.38	33.73	3.10	0.16
Perception of Control Over Pain	2.61	1.54	2.25	1.62	0.02	2.43	1.54	2.37	1.49	0.35

<sup>a</sup> Outcome variables: Barriers Questionnaire cluster 1 and cluster 2: disease progression; Nurses’ Knowledge and Attitudes Survey Regarding Pain; and Perception of Control Over Pain

**Table 4. Basic Intervention Versus Control by Time Interaction for Each Study Outcome**

Outcome	Baseline Pretest		Four-Week Post-Test		p <sup>a</sup>
	$\bar{x}$	SD	$\bar{x}$	SD	
<b>Basic Intervention Experimental Group (N = 75)</b>					
Barriers Questionnaire					
Total	19.58	8.85	19.93	8.51	0.21
Cluster 1: fear, lack of knowledge, and hopelessness	0.48	0.49	0.49	0.50	0.09
Cluster 2: disease progression	1.17	1.29	1.59	1.33	0.02
Cluster 3: side effects	2.33	0.95	2.23	0.85	0.10
Nurses' Knowledge and Attitudes Survey Regarding Pain	29.29	4.74	33.44	3.38	0.01
Perception of Control Over Pain	2.67	1.65	2.43	1.54	0.07
<b>Basic Intervention Control Group (N = 82)</b>					
Barriers Questionnaire					
Total	19.90	8.30	21.25	9.08	–
Cluster 1: fear, lack of knowledge, and hopelessness	0.48	0.49	0.58	0.47	–
Cluster 2: disease progression	1.14	1.20	1.14	1.09	–
Cluster 3: side effects	2.34	0.85	2.39	0.94	–
Nurses' Knowledge and Attitudes Survey Regarding Pain	26.70	4.22	28.06	3.95	–
Perception of Control Over Pain	3.40	1.65	3.55	1.57	–

<sup>a</sup> P values from the 2 x 2 interaction in the mixed-design analysis of variance

across different studies. Effect sizes were computed for changes in the five main outcomes for the basic and advanced intervention. As shown in Table 5, the effect sizes, with the exception of KAS, were small. In comparing the basic to the advanced intervention for each outcome, the effect size is smaller for the advanced intervention. A small effect size is 0.2 and accounts for only 1% of the outcome variance (Cohen, 1988).

**Preliminary patient data:** Preliminary data were available on the effects of the nursing intervention on self-reported pain of 30 patients with cancer cared for by 19 nurses during and after the educational intervention. Patient data were aggregated to the nurse level for the analysis. Sixteen nurses were in the intervention condition, and 14 were in the control group. Self-reported worst-pain scores from 30 patients were recorded for four successive weeks. The initial enrollment and data collection for patients began after the basic intervention was presented to the nurses and continued as patients were enrolled during the six months that the agencies participated in the study. The self-reported worst-pain scores for patients of nurses in the intervention condition decreased from 7.8 to 6.5 (on a 0–10 scale) over the four weeks whereas

patients of control group nurses increased slightly from 6.3 to 6.8 ( $F[1,26] = 3.267, p = 0.04$ ).

## Discussion

The POP intervention improved homecare nurses' knowledge and attitudes, decreased barriers to pain management, and improved their perception of control over pain. With respect to specific components of the intervention, the basic intervention resulted in immediate and sustained effects (four to six weeks) and the advanced intervention resulted in continued improvements in nurses' understanding of side effects related to pharmacologic pain intervention. The POP basic educational program was found to have beneficial effects for homecare nurses caring for patients with cancer pain. The most significant change was in the area of knowledge and attitudes. Homecare nurses are required to care for patients with all types of special considerations. Although pain may not affect all patients, the prevalence of chronic pain has been estimated at 25%–50% of the community-dwelling elderly (Ferrell et al., 2002). In addition, approximately 9% of adults suffer from severe chronic pain (American Pain Society, 1999a). In patients with cancer, 60%–90% experience pain sometime during the course of their illness (Cleeland et al., 1994; Elliott et al., 1997). Advances in pain treatments can provide control of cancer pain in approximately 90% of patients with cancer by relatively simple means (Jacox et al., 1994). However, in home care, patients with cancer often are under the treatment of primary care physicians or oncologists who may not be aware of advances in pain treatment. Homecare nurses must be knowledgeable regarding treatment options and able to communicate with physicians to advocate for better pain control.

The BQ, which was developed for and previously used with patients with cancer, measured barriers to effective pain control in this study. By using the same instrument to measure the nurses' barriers, the investigators were able to determine

**Table 5. Effect Sizes for Basic and Advanced Interventions**

Variable	Intervention	
	Basic	Advanced
Barriers Questionnaire		
Cluster 1: fear, lack of knowledge, and hopelessness	0.28	0.02
Cluster 2: disease progression	0.28	0.14
Cluster 3: side effects	0.27	0.25
Nurses' Knowledge and Attitudes Survey Regarding Pain	1.23	0.11
Perception of Control Over Pain	0.26	0.04

similarities between patients and nurses. The three clusters identified during analysis helped to determine barriers that are unique to nurses. The nurses' failure to acknowledge fatalism, addiction, and talking about pain as barriers reflects the nurses' belief that pain is manageable. The second cluster concerning pain as a sign of disease progression reflects the recognition that pain must be assessed, especially in patients with cancer. This response is opposite to that of patients. Patients interpreting pain as a sign of disease progression was considered a barrier because of their hesitancy to report pain for fear of this finding (Donovan et al., 2000; Gunnarsdottir, Donovan, Serlin, Voge, & Ward, 2002; Heidrich et al., 2003; Murphy-Ende et al., 2000). Nurses need to be aware of the possibility that increased or new pain is potentially a sign of disease progression and requires a complete workup. Therefore, the increase in this barrier's cluster for the intervention group was not expected. The third cluster, opioid-related side effects, suggests that this is the area that most challenges homecare nurses. As a result, a major focus of the basic and advanced interventions addressed the prevention and management of opioid-related side effects, and significant decreases in those barriers were found following both interventions.

Perception of control over pain is an abstract concept. The single item, "I can control my patient's pain," was used as an overall measure of the concept. A more detailed instrument may be required to capture the intervention effects on perception of control. However, while working with the nurses in the intervention group, the increase in perception of control was apparent as they consulted with physicians, advocated for better pain care, and became delighted at their ability to effect changes that decreased their patients' pain.

Although this article focuses on the effects of the intervention on the nurses, the most critical finding in relation to the intervention was the significant decrease in patients' worst pain scores during the four weekly measurements in patients whose nurses received the intervention. Although the data are preliminary (patient accrual is ongoing), they demonstrate that the intervention provides homecare nurses with the knowledge necessary to improve their patients' level of comfort and thus effect change in their practice. According to Benner (1982), changes in practice are difficult to measure and patient outcomes provide the best objective measurement of this change.

## Limitations

The small effect sizes seen in the measures following the advanced intervention reflect the lack of direct measures for the advanced intervention content. The instruments used in this study primarily measured basic concepts. The advanced intervention focused on complex concepts such as titration of doses with long-acting opioids, further information on the management of opioid-related side effects, and assertiveness in advocating for effective pain management. Instruments that measure these complex concepts likely would have provided more information about the effects of the advanced intervention.

## Implications for Nursing

Findings from this study have important implications for nursing. The POP intervention produced an increase in knowledge, decreased barriers to pain control, and improved perception of control over pain. Homecare nurses have a great need for pain management education. They often are their patients' only advocates and sources of information. They must be experts in pain management options and be able to advocate for the use of these options with physicians, pharmacists, patients, and caregivers. Interventions such as POP address the current modalities of pain management and provide nurses with the tools necessary to improve pain care for patients with cancer and others with pain. Although this study was limited to patients with cancer-related pain, the researchers believe that the education the nurses received can be applied to all patients and will lead to improved pain management for all patients receiving home care.

Data from this study will aid in the further development of the constructs and knowledge domains needed to devise and select appropriate instruments for use in future studies with the aim of improving patient outcomes. Many studies in the literature have reported interventions that educate nurses or patients. This study is unique in the perspective of measuring the effects of the nursing intervention on patient outcomes, such as pain. Outcomes directed at the endpoint of the effects on patients are an important direction in clinical research.

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