

Impact of an Educational Program on Pain Management in Patients With Cancer Living at Home

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Purpose/Objectives: To assess the effect of an educational homecare program on pain relief in patients with advanced cancer.

Design: Quasi-experimental (pretest–post-test, nonequivalent group).

Setting: Four community-based primary care centers providing social and healthcare services in the Quebec City region of Canada.

Sample: 80 homecare patients with advanced cancer who were free of cognitive impairment, who presented with pain or were taking analgesics to relieve pain, and who had a life expectancy of six weeks or longer.

Methods: The educational intervention included information regarding pain assessment and monitoring using a daily pain diary and the provision of specific recommendations in case of loss of pain control. Pain intensity data were collected prior to the intervention, and reassessments were made two and four weeks later. Data on beliefs were collected at baseline and two weeks. All data were collected by personal interviews.

Main Research Variables: Patients' beliefs about the use of opioids; average and maximum pain intensities.

Findings: Patients' beliefs regarding the use of opioids were modified successfully following the educational intervention. Average pain was unaffected in the control group and was reduced significantly in patients who received the educational program. The reduction remained after controlling for patients' initial beliefs. Maximum pain decreased significantly over time in both the experimental and control groups.

Conclusions: An educational intervention can be effective in improving the monitoring and relief of pain in patients with cancer living at home.

Implications for Nursing: Homecare nurses can be trained to effectively administer the educational program during their regular homecare visits.

Key Points . . .

- Although cancer pain can be relieved adequately in most cases, it is not always managed optimally.
- Educational interventions to modify patients' attitudes and misbeliefs about the use of opioid analgesics contribute to improved pain management in patients with cancer receiving care at home.
- A detailed daily pain assessment recorded by patients facilitates required adjustments in an analgesic regimen in a home setting.

Different studies have been designed to test interventions to improve cancer pain management. Unfortunately, many were observational and did not have appropriate control groups or lacked a formal assessment of patients' pain levels before and

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Digital Object Identifier: 10.1188/06.ONF.1183-1188

An increasing percentage of patients with advanced cancer want to stay at home as long as possible and want to die at home. Adequate pain management is essential in the homecare setting. Although cancer pain can be relieved in more than 90% of cases when basic analgesic guidelines are employed (Mercadante, 1999; Ventafridda, Tamburini, Caraceni, De Conno, & Naldi, 1987; Zech, Grond, Lynch, Hertel, & Lehmann, 1995), cancer pain often is poorly managed, with approximately 50% of patients with cancer experiencing moderate to severe pain (Cleeland et al., 1994; Green & Wheeler, 2003; Von Roenn, Cleeland, Gonin, Hatfield, & Pandya, 1993; Weiss, Emanuel, Fairclough, & Emanuel, 2001).

after program implementation (Allard, Maunsell, Labbe, & Dorval, 2001). Nevertheless, several strategies are recognized as helpful to improve cancer pain control.

A detailed pain assessment is essential to precisely adjust analgesic medications and provide optimal relief (Cleeland et al., 1994; Du Pen et al., 1999; Ferrell, 2000). Using a pain diary is an effective method for recording fluctuations in pain intensity (de Wit et al., 1999; Maunsell, Allard, Dorval, & Labbe, 2000; Schumacher et al., 2002) and provides patients with a sense of self-control to optimize pain relief (de Wit et al., 1999; Schumacher et al.).

Educational sessions for patients help to modify negative attitudes or beliefs toward opioids that can adversely affect pain management (Cleeland, 1987; Ferrell & Schneider, 1988). For instance, fear of addiction and adverse side effects of opioid analgesics (e.g., delirium, respiratory depression) may lead to underreporting of pain and compromise patient adherence to analgesic therapy (Dar, Beach, Barden, & Cleeland, 1992; Ferrell, Ferrell, Ahn, & Tran, 1994; Ferrell, Taylor, Sattler, Fowler, & Cheyney, 1993; Miaskowski et al., 2001; Ward & Gordon, 1994).

The researchers in the current study developed and implemented an educational program to optimize pain management in patients with advanced cancer who were being treated at home. The educational program, which was delivered by trained nurses, included three components: (a) a videotape on cancer pain and the role of opioid analgesics, (b) a daily pain diary to allow patients to record fluctuations in pain intensity, and (c) specific recommendations for patients to request a review of their analgesic regimens in case of uncontrolled pain. The purpose of the study was to evaluate how effective the program was in helping to reduce pain and dispel incorrect beliefs regarding the use of opioids.

The evaluation of the program was based on Donabedian's (1980, 1985) conceptual framework. The classic model of quality-of-care assessment already has been adapted to the context of palliative care (Stewart, Teno, Patrick, & Lynn, 1999) and considers three different aspects in the analysis: (a) patients' personal and medical characteristics, including their baseline beliefs regarding cancer pain; (b) structural and process aspects, namely the use of the educational program; and (c) results obtained with the program.

Methods

Study Design and Patient Selection

This pretest–post-test, nonequivalent group study was conducted in four community-based Local Center of Healthcare and Social Services (CLSC) centers in the Quebec City region of Canada. The educational program was implemented in two of the CLSC centers (experimental group), and usual homecare services were provided in the other two centers (control group).

Recruited patients were enrolled in the palliative homecare program of the CLSC, which included only patients with an estimated life expectancy of three to six months, who presented with some frailty, and who had a score of two or higher on the Eastern Cooperative Oncology Group Performance Status scale (Oken et al., 1982). Patients were eligible if they spoke French and their medical files indicated that they suffered from cancer pain or were taking analgesics to relieve pain. Patients' homecare nurses also were asked to select patients with advanced cancer who had a life expectancy of six weeks or

longer and had no cognitive impairment on the basis of nurses' knowledge of patients' global condition.

Eligible patients were given information about the study by homecare nurses. Those who expressed a desire to participate were contacted by a member of the research team. Patients who agreed to participate signed an informed consent. Recruitment of participants was performed from February 2001–May 2002. Physicians were informed when any of their patients participated in the study. The study was approved by the Laval Hospital Research Ethics Committee.

Educational Program

CLSC homecare nurses in charge of recruiting patients assisted with a two-hour training session on the principles of cancer pain assessment and management, opioid-related beliefs, physician-nurse collaborative work, and current pharmacologic treatment guidelines (American Pain Society Quality-of-Care Committee, 1995). The session consisted of a structured slide presentation, a video, the introduction of a manual, and a brief discussion period.

A homecare nurse delivered the educational program to each participant during a regular homecare visit. The intervention included three components: (a) didactic material on pain management, (b) a pain diary, and (c) specific instructions about how to react to uncontrolled pain.

Didactic material: A 15-minute videotape, which was viewed in the presence of the homecare nurse, included information on myths surrounding the use of opioid analgesics to relieve cancer pain and on the general principles of cancer pain analgesia (Purdue Pharma, Inc., & Canadian Cancer Society, n.d.). The nurse answered any questions from patients or family members. The nurse also provided an information booklet summarizing the video information.

Pain diary: The nurse provided patients with a brief pain diary developed and used in French that has been validated previously among ambulatory patients with cancer receiving radiation therapy (completion rate = 86%, internal consistency [Cronbach's alpha] = 0.87–0.92, correlation with the European Organization for Research and Treatment pain subscale = 0.65) (Maunsell et al., 2000). Patients were asked to record the intensity of their pain on waking and retiring according to a scale ranging from 0 (no pain) to 5 (unbearable pain). Patients also assessed, on a weekly basis, the effects of pain on their sleep, family life, relationships with others, and daily activities.

Pain-monitoring recommendations: Patients and caregivers were instructed regarding pain-monitoring recommendations. Patients were told to notify their homecare nurse if the intensity of the pain registered in the diary was three or higher for two consecutive days or if three or more rescue opioid doses per day were used for two consecutive days. Subsequently, the nurse communicated with patients' physicians. If patients' analgesic regimens had not been readjusted by their physician within 24 hours, patients were instructed to call their physician directly. If they could not reach their physician, they were instructed to telephone the physician on call at a 24-hour service available to palliative homecare patients in the Quebec City region. Phone numbers of key healthcare professionals and healthcare services were printed on the back of the pain diary.

Instrument

Pain intensity assessments were obtained using the **Brief Pain Inventory (BPI)** (Cleeland & Ryan, 1994), a pain assessment

tool used in patients with cancer to measure pain intensity (sensory dimension) and pain interference (reactive dimension) in patients' life. The BPI consists of dichotomous (yes or no) response questions, open-ended questions, and 11-point Likert-type scales (range = 0–10). The BPI has been validated in several languages and obtained satisfactory test-retest reliability and internal consistencies (Cronbach's $\alpha = 0.78$ – 0.89). The scale was preferred to the 0–5 scale used in the pain diary because it is the most widely used in pain studies. A member of the research team was present when pain was assessed using the BPI; no difficulties arose as a result of the use of two different pain scales. Patients' beliefs related to the management of cancer pain were assessed using the Knowledge subscale of the **Family Pain Questionnaire (FPQ)**, a nine-item questionnaire developed by Ferrell, Rhiner, and Rivera (1993), that demonstrated satisfactory content validity, construct validity, concurrent validity ($p < 0.05$), and factor analysis and test-retest reliability ($r = 0.80$). The FPQ was completed by patients at entry into the study and two weeks after the intervention. Each item was scored on a 0–10 Likert scale, with higher scores indicating more appropriate beliefs about the role of opioids in cancer pain.

Procedures

The relative change in pain intensity scores from the first week to the third week was computed separately for the maximum and average pain intensities. Baseline pain intensity data were collected from every study participant before the program was implemented (T_0). Subsequent pain intensity reassessments were obtained at two weeks (T_1) and four weeks (T_2). At the end of the study, a discussion group was held with nurses from the two CLSC centers at which the program was implemented to collect their comments regarding the suitability of the educational intervention for their clinical setting as well as patients' use of the pain diary.

Data Analysis

All statistical analyses were performed using SAS® software (SAS Institute Inc., Cary, NC). Characteristics of patients in the control and experimental groups were compared using appropriate statistics. A multivariate analysis of variance for repeated measures was conducted using the SAS mixed procedure to determine whether both groups differed in their ratings of pain intensity from T_0 – T_2 while controlling for their respective baseline pain intensity. The study had an 80% power to detect a difference in the pain intensity scores of two over 10 (type I error = 5%).

The variable of baseline beliefs (measured at T_0) was introduced as a covariable into the analysis model to control for differences in beliefs between the experimental and control groups and to determine whether it had an effect on the variation in pain levels from T_0 – T_1 (no data were collected on patients' beliefs at T_2). The average pain levels at T_1 and T_2 were adjusted using the SAS mixed procedure to take sample loss into account. The threshold of statistical significance was set at 0.05.

Results

Sample

Of the 80 study patients with advanced cancer, 53 were in the experimental group and 27 were in the control group. The smaller number of patients in the control group was

related to the withdrawal of one study site during the study for reasons unrelated to the study. The characteristics of the patients in the control and experimental groups were not significantly different at entry into the study program, but a nonsignificant trend was seen for control group patients to have been treated for pain for a longer time period ($p = 0.08$) and to have used strong opioids ($p = 0.06$) and nonsteroidal anti-inflammatory drugs (NSAIDs) ($p = 0.07$) more frequently (see Table 1).

The number of participants decreased from 80 to 58 participants by T_1 and to 41 participants by T_2 (see Table 2) as the result of patient deaths (32% in the control group, 30% in the experimental group) or hospitalization (11% in the control group, 10% in the experimental group) or because patients did not want to continue with the study or did not feel pain anymore (0% in the control group, 8% in the experimental group). From T_0 – T_1 , attrition rates were 34% in the experimental group and 15% in the control group. From T_0 – T_2 , the rates reached 53% in the experimental group and 33% in the control group. The differences in attrition rates between the experimental and control groups were not statistically significant from T_0 – T_1 ($p = 0.30$) or from T_1 – T_2 ($p = 0.56$).

Pain

The mean score on the FPQ increased significantly in the experimental group following the intervention, from 58.9 (T_0) to 68.4 (T_1) ($p < 0.0001$). However, the score decreased slightly in the control group, from 65.5–62.6 ($p = 0.19$).

Six weeks following the start of the intervention, the average pain intensity had decreased significantly in the intervention group ($p = 0.02$) but not in the control group ($p = 0.80$) (see Table 3). The difference in the level of average pain over time between the control and experimental groups (time-group interaction) was statistically significant ($p = 0.01$) (see Figure 1), and it remained significant even after controlling for patients' beliefs at baseline ($p = 0.02$).

During the same time period, maximum pain intensity also decreased significantly, to a larger extent in the intervention group ($p = 0.04$) than in the control group ($p = 0.10$). However, maximum pain levels among patients in the experimental group did not decrease more than among patients in the control group (time-group interaction) ($p = 0.23$).

Discussion

The educational intervention in the current study was followed by a significant decrease in pain intensity, suggesting that it provoked an improvement in pain management. In the past, many interventions to relieve pain in patients with cancer consisted exclusively of a pain education program in the form of a videotape or audiocassette, counseling sessions, individualized coaching, and printed material. Such interventions sometimes resulted in a pain intensity reduction (Lai et al., 2004; Oliver, Kravitz, Kaplan, & Meyers, 2000), but, in many instances, provision of information about cancer pain management to patients was insufficient to improve pain control (Chang, Chang, Chiou, Tsou, & Lin, 2002; Rimer et al., 1987; Wells, Hepworth, Murphy, Wujcik, & Johnson, 2003; Yates et al., 2004). The researchers are aware of only two other studies that tested the effect of a patient education program combined with the use of a pain diary. De Wit et al. (1997) observed a decrease in

Table 1. Patient Characteristics

Characteristic	Control (N = 27)		Experimental (N = 53)		p
	n	%	n	%	
Gender					0.58
Female	10	37	23	43	—
Male	17	63	30	56	—
Cancer					0.33
Lung	17	63	24	45	—
Breast	4	12	5	9	—
Otorhinolaryngeal	—	—	2	4	—
Digestive	5	19	13	25	—
Genital-urinary	1	4	3	6	—
Other	—	—	6	11	—
Medication for pain					
Strong opioids (e.g., morphine)	26	96	43	81	0.06
Weak opioids (e.g., codeine)	2	7	8	15	0.48
Nonsteroidal anti-inflammatory drugs and acetaminophen	19	70	26	49	0.07
Adjuvant analgesics	4	14	12	23	0.41
Number of breakthrough doses of opioids	21	78	38	72	0.56
Characteristic	\bar{X}	SD	\bar{X}	SD	p
Age (years)	64.1	11.3	65.0	11.7	0.76
Education (years)	10.3	3.9	11.5	4.7	0.24
Number of months knowing diagnosis	19.4	19.1	15.7	22.5	0.47
Number of months treating pain	10.8	12.6	6.1	10.4	0.08
Score for average pain ^a	2.4	2.3	3.0	2.2	0.33
Score for beliefs ^b	5.5	13.8	58.9	13.6	0.06
Score for maximum pain	5.1	2.6	4.6	2.7	0.43

^a Higher scores indicate stronger pain (range = 0–10).
^b Higher scores indicate more appropriate beliefs about the role of opioids (range = 0–90).
Note. Because of rounding, percentages may not total 100.

pain intensity among patients discharged from the hospital following the implementation of an education program combined with use of a pain diary and instructions on how to contact healthcare providers. The same research group implemented a similar intervention for homecare patients, but they observed no effect of the program on pain intensity (de Wit & van Dam, 2001).

To date, pain education programs designed for patients living at home have had limited success. Chang et al. (2002) reported a reduction in pain intensity following their intervention for homecare patients, but the reduction was the same in the control and experimental groups. In addition, Wells et al. (2003) did not observe any reduction in pain intensity, relief, or analgesic use in homecare patients following an educational intervention involving a 15-minute videotape and individualized consultations.

Numerous factors may explain why the reduction in pain intensity was greater for maximum than for average pain in the

current study. The significant reduction in maximum pain intensity may have resulted from regression to the mean, because the same trend was observed in the control and experimental groups.

The intervention markedly reduced patients' misbeliefs about opioids. Misbeliefs about the use of opioid analgesics have been shown to negatively affect pain management (Cleeland, 1987; Ferrell et al., 1994; Ferrell & Schneider, 1988). Other studies consistently have showed that educational interventions provided by nurses can improve patients' pain knowledge (Kim et al., 2004; Lai et al., 2004; Yates et al., 2004).

The present study was hindered by a high attrition rate that was directly related to the high mortality rate of patients during the study. The high mortality reflected the precarious condition of study patients at time of referral to the homecare team.

Despite the original design, the current study did not succeed in recruiting the same number of patients into the intervention and control groups. Although inherent loss of power occurred, the present study revealed a reduction in patients' misbeliefs and pain intensity.

In addition, although the difference was not significant, control group subjects in the current study tended to have been treated for their pain for a longer period of time than experimental group subjects (11 months versus 6 months, respectively). Also, the researchers found a trend toward a larger proportion of control group subjects than experimen-

Table 2. Sample Size Attrition Over Time

Group	Baseline	Two Weeks	Four Weeks
Experimental	53	35	25
Control	27	23	16
Total	80	58	41

Table 3. Pain Intensity Scores Over Time

Pain Intensity	Baseline		Two Weeks		Four Weeks	
	\bar{X}	95% CI	\bar{X}	95% CI	\bar{X}	95% CI
Mean average pain intensity						
Control group	2.4	2.0–2.8	3.3	2.9–3.7	2.4	1.9–2.9
Experimental group	3.0	2.7–3.3	2.1	1.8–2.4	1.7	1.3–2.1
Mean maximum pain intensity						
Control group	5.1	4.7–5.5	5.3	4.9–5.7	4.0	3.5–4.5
Experimental group	4.6	4.3–4.9	3.4	3.1–3.7	2.6	2.4–3.2

CI—confidence interval

tal subjects who had used strong opioids (96% versus 81%, respectively) and NSAIDs (70% versus 49%, respectively). Together, the factors could reflect the natural progression of pain management over time and, in part, explain the moderate effect of the intervention program on pain intensity in experimental group patients.

Program Feasibility

In contrast to several other studies (de Wit & van Dam, 2001; Kim et al., 2004; Lai et al., 2004; Yates et al., 2004), the educational intervention was not tailored to the needs of individual patients. Nevertheless, the intervention was effective in improving pain relief and decreasing patients' misbeliefs about the use of opioids.

The nurses involved with patients in the experimental group stated their belief that the video was useful to counter false beliefs about opioids, especially among patients who were

reluctant to use them. A literature review of cancer-related patient education concluded that pain education programs, including video presentations, generally lead to an increase in knowledge and a decrease in pain intensity for participants (Chelf et al., 2001). The routine use of a video, however, is seriously constrained in patients receiving homecare because it lengthens the home visit duration and the video may not be necessary for all patients. Given the heavy workload of homecare nurses, the use of a video may be restricted to patients who are reluctant to take opioids.

The pain diary used in the study merits further refinement. The assessment of pain intensity on waking and at bedtime represents only a portion of the pain intensity experienced by a patient on a given day. An interesting alternative would be to record the intensity of the strongest and weakest pain experienced during the course of the same day along with the timing at which it occurred. The nurses observed that the daily pain diary was not always appropriate for frail patients because they were unable to make the diary entries.

The concerted action plan to be used by patients when their pain could not be relieved should be discussed earlier with attending physicians to reach an agreement about the maximum number of rescue doses to be taken during a given period. The discussion would enable physicians and nurses to agree on recommendations for patients, thereby avoiding any conflicting messages on the procedure with respect to analgesic medication. Of note is that the written action plan to help patients react quickly when their pain became impossible to manage rarely was used. The usefulness of a specific action plan to be initiated by patients was minimal in the context of frequent visits by nurses who could apply the instructions in the action plan.

Conclusion

The intervention had a moderately positive effect on pain relief through the empowerment of patients, but other requirements also are critical for optimal pain management. The intervention focused on pain assessment by providing training to homecare nurses and through patient use of a diary, and it addressed patients' misbeliefs regarding the use of opioids, but it did not target knowledge and skills of attending physicians concerning the use of analgesic medication. Despite the availability of cancer pain relief guidelines, the appropriateness of prescribed analgesic medication is highly variable among physicians (Von Roenn et al., 1993). Pain management possibly could be improved even more if attending physicians had worked systematically with

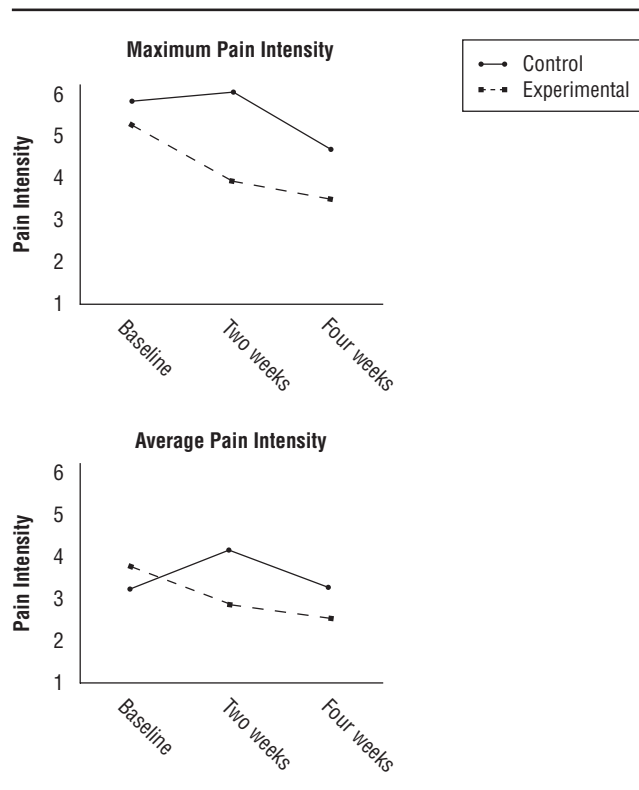


Figure 1. Maximum and Average Pain Intensity Over Time

patients' pain diaries and if they had been trained regarding cancer pain control principles. In addition, an intervention targeting patients' family members to improve their knowledge and behavior might contribute to reinforcing patients' responses to pain. Interventions targeting patients, families, and attending physicians need further development to sig-

nificantly improve pain management in ambulatory patients with cancer.

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