

CANCER PAIN & PALLIATIVE CARE SECTION

Original Research Article

Cancer Pain Management Education Rectifies Patients' Misconceptions of Cancer Pain, Reduces Pain, and Improves Quality of Life

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Abstract

Objectives. More than half of the patients have reported improper management of breakthrough

cancer pain. Empirical evidence is lacking concerning the effectiveness of cancer pain education on breakthrough pain control. This study aimed to examine the effects of individual pain education on pain control, use of short-acting analgesics for breakthrough pain, quality of life outcomes, and rectification of patients' misconceptions regarding cancer pain.

Design. A quasi-experimental design was used. In total, 176 (102 inpatients and 74 outpatients) and 163 (93 inpatients and 70 outpatients) cancer patients completed questionnaires on pain intensity, quality of life, use of short-acting medication for breakthrough pain, and misconceptions about cancer pain and opioid use before and immediately and/or seven days after individual pain education.

Results. The mean age of the participants was 60.9 years (± 11.2), and 56.3% were male. The most common cancers were lung cancer (17.0%), colon cancer (15.9%), and breast cancer (12.5%). The subjects' reasons for attrition were conditional deterioration, death, or voluntary withdrawal ($N = 13$, 7.4%). Following the education, there was a significant reduction in overall pain intensity over 24 hours ($P < 0.001$). The outpatients showed more use of short-acting analgesics for breakthrough pain. Sleep quality change was most significantly associated with intervention; other quality of life aspects (e.g., general feelings and life enjoyment) also improved. Pain education also significantly reduced misconceptions regarding cancer pain management.

Conclusions. The present educational intervention was effective in encouraging short-acting analgesic use for breakthrough pain, improving quality of life outcomes, and rectifying patients' misconceptions about analgesic use.

Key Words. Breakthrough Cancer Pain; Educational Intervention; Pain Control

Introduction

Cancer ranks as the leading cause of death, accounting for 153.6 out of every 100,000 casualties in 2015 in Korea, and approximately one in three persons die of cancer [1,2]. Substantial progress has been made in national screening for major cancers and advanced therapeutic options that have prolonged cancer patient survival, but these are often accompanied by physical, psychological, and financial suffering [3–5]. Cancer pain is one of the major problems that escalate the sufferings of this population, leading to functional deterioration and poor quality of life [6–8]. Such pain varies in prevalence by the types and stages of cancer, with one-third or more of the patients with cancer reporting their pain at moderate to severe levels [9] and more than one in five patients reporting clinically significant breakthrough cancer pain [10]. In particular, the experience of breakthrough pain, characterized by spontaneous or incidental types or a combination of the two, often challenges and complicates pain management [10,11].

Cancer pain education has proven benefits, primarily for pain reduction [12–14] and other outcome improvements, such as psychological distress and quality of life (fatigue and insomnia) with an additional week of telemonitoring [12], barriers to pain management [13], or knowledge about pain control [14]. Despite some improvement in pain management, improper pain management has continued to be high, with approximately half of the cancer patients who were using analgesics reporting inadequacy [15,16]. Cancer pain management, particularly for breakthrough pain, is largely ineffective, with approximately one in four (23.5%) patients reporting no relief in breakthrough cancer pain [6].

Barriers to pain management, particularly pertaining to the use of opioid analgesics, arise from all stakeholders, including health care professionals, the patients themselves, and health care agencies [17,18]. The reported barriers associated with health care professionals are inadequate knowledge of opioid analgesics, misconceptions about patients' opioid use or pain reports, and passive attitudes toward opioid prescriptions [16,19,20]. Lack of diagnostic assessment or underestimation of pain severity was also noted, leading to the prescription of ineffective drugs or of insufficient doses for pain control [16,19,21,22,23]. Additional education and training for professionals are therefore important for eliminating these barriers and improving their cancer pain management competency [19–21]. Patient-related challenges to optimal pain management include underreporting of pain, cognitive and affective factors, poor patient-physician communication, and compliance issues [17,24,25]. Particularly, barriers to breakthrough cancer pain management are patients' negative attitudes and knowledge deficit of opioid analgesics, regarding the safety and efficacy of opioids, especially concerning addiction, tolerance, and side effects and their poor control of pain [18,22]. Additionally, institutional regulations concerning the issuing or administration of opioid

analgesic prescriptions may also prevent the effective implementation of pain management [17]. The lack of a system to ensure continuity of care with timely referrals also prevents optimal and consistent pain management across health care professions and health care settings [18,26]. Therefore, it is critical to identify the barriers to cancer pain treatment in order to solve pain relief issues and to improve the continuity of care for pain management.

Given that only about half of the participants received adequate pain management [15,16], the proactive implementation of effective pain management interventions is critical to the improvement of continuity of care and quality of life among cancer patients. Educational interventions have proven efficacious in improving health outcomes [12–14,27,28], yet empirical evidence concerning the effectiveness of such educational programs on optimal pain management, particularly on the control of breakthrough cancer pain, is lacking. Therefore, the aim of this study was to determine whether individual education about cancer pain management (1) reduces the pain intensity experienced by cancer patients in both inpatient and ambulatory care settings, (2) increases use of short-acting analgesics for breakthrough pain experienced by both in- and outpatients, (3) improves patients' quality of life outcomes, and (4) rectifies patients' false knowledge of cancer pain.

Methods

Design and Procedure

We used a quasi-experimental design (a single group pre- and post-test design), and both inpatients and outpatients were invited to participate in this study. In order to evaluate the efficacy of an educational intervention for pain management, all the subjects completed surveys prior to and either immediately and/or seven days after the intervention. For those who were discharged before seven days had passed following the intervention, follow-up evaluations were performed either during outpatient visits or via the telephone. The institutional review boards of the National Evidence-Based Healthcare Collaborating Agency and the participating hospitals approved this study, and all the subjects consented to participate in this study, after being fully informed of the questionnaire survey, by signing written consent statements.

Subjects

The subjects were eligible if they fulfilled the following criteria: (1) being an in- or outpatient with a diagnosis of malignancy, (2) being age 18 years or older, (3) being aware of one's cancer diagnosis, (4) experiencing chronic pain from cancer or treatment-related pain with the prescription of an array of long-acting opioids for baseline pain and short-acting opioids, as needed, for pain control, and (5) being committed to participate in the pre-post-test evaluation. This study excluded

patients who did not consent to participate in the pre-post-test evaluation surveys concerning cancer education or those who were unable to participate in the survey due to deteriorations in their physical or mental conditions.

Cancer Pain Education

The educational program materials used for pain management were "The Cancer Pain Management Guidelines" for patients issued by the Ministry of Health and Family Welfare [29] and the National Cancer Center [30] and the educational booklets developed by the participating hospitals. The contents of the cancer pain education that the patients received involved general education and pharmacologic and nonpharmacologic therapy, among other information. Specifically, patients received the following information on general pain management: (1) causes of cancer pain, (2) estimation of pain intensity, (3) effective communication with physicians regarding pain experiences and/or reports, (4) effects of cancer pain, (5) concerns about cancer pain, (6) purpose and principles of pain control, and (7) breakthrough cancer pain.

The patients also received the following information about pharmacologic and nonpharmacologic therapies: (1) safe consumption of long- and short-acting opioids, (2) types of analgesics and their effects, particularly short-acting opioid regimens for breakthrough pain relief, such as oxycodone, morphine, hydromorphone, or fentanyl, (3) truths and misunderstandings regarding opioid analgesics, (4) side effects of opioid analgesics and symptom management, (5) coping strategies according to the types of cancer pain, and (6) effects of adjuvant analgesics and various nonpharmacological therapies for pain control, including, but not limited to, massage, psychological treatment, and heat or cold application. The cancer pain education also introduced other therapeutic options for cancer pain control such as pain monitoring through diaries and other treatment modalities such as radiation therapy or nerve block.

The clinical research nurses who offered this cancer pain educational intervention were trained to implement the program using a standardized manual that specified the detailed educational content and provided a coordinated approach to individual patient education. They educated individual patients for thirty minutes or more, on average, in separate rooms using the educational booklets developed by the investigators [31].

Questionnaire Surveys

The cancer patients were asked to complete questionnaires for the assessment of pain intensity, breakthrough pain experience, use of short-acting analgesics, and the effects of pain on quality of life aspects prior to and seven days after the educational intervention; they were also asked to complete questionnaires regarding their misconceptions, such as analgesic use prior to

and immediately following the intervention. Pain intensity was measured using a numeric rating scale (NRS; 0=no pain to 10=the strongest pain), which is part of the Brief Pain Inventory–Korean [32]. Based on the NRS scores, pain intensity was classified into the following three categories: severe, moderate, and mild. Satisfaction with pain management was also evaluated using a five-point Likert scale, with higher scores indicating higher satisfaction.

In this study, breakthrough pain was defined as a sudden increase in preexisting chronic pain from cancer [33]. The experience of breakthrough pain and use of short-acting analgesics for such pain relief were assessed using dichotomized response options (yes or no). Pain-related quality of life outcomes regarding daily activities, general feelings, walking, normal matters, personal relationships, functioning, sleeping, and enjoyment of life were assessed on a 10-point Likert scale (0=no limitation, 10=highly limited). Barriers to cancer pain management were assessed with a short form of the American Pain Society (APS) Patient Outcome Questionnaire, which was originally developed by Ward et al. [34]. In this study, the Pain Barriers Questionnaire–Taiwan version [35], which was derived from the original APS, was used to evaluate patients' misconceptions about cancer pain management using the following eight items: fatalism, addiction, be good, disease progression, side effects, tolerance, regular medication, and distract a physician. Each item had five-point response options, with higher scores indicating higher misconception regarding pain management.

Data Analysis

Descriptive statistics were computed for the subjects' characteristics, cancer types, and treatment methods. In order to examine the effects of cancer pain education on the reduction of pain intensity with reference to the clinical contexts of patient care, either inpatient or outpatient care (Aim 1), and improvement of false knowledge about cancer pain medication (Aim 4), paired *t* tests were used to examine the changes in the pre- and post-test scores. In order to examine the effects of cancer pain education on the reduction of pain intensity (Aim 1) and the pain-related quality of life outcome changes (Aim 3), multiple linear regression analyses were performed with age, education, history of psychiatric disorders, history of substance use (such as alcohol, anxiolytics, and/or other substance abuse), previous counseling experience for pain medication, and clinical contexts of patient care (either inpatient or outpatient) as covariates. Pearson's chi-square tests were also performed to examine the associations between cancer pain education with experience of breakthrough pain and the use of short-acting medication among inpatients and outpatients (Aim 2). All statistical analyses were computed using the Statistical Analysis System, version 9.1.3 [36]. The level of significance was set at 0.05.

Table 1 Baseline demographic and clinical characteristics of the sample

Demographic and Clinical Characteristics	Total sample (N = 176) No. (%)	Inpatients (N = 102) No. (%)	Outpatients (N = 74) No. (%)
Gender			
Male	99 (56.3)	56 (54.9)	43 (58.1)
Female	76 (43.2)	46 (45.1)	30 (40.5)
Age, mean±SD (range), y	60.9±11.2 (32–88)	59.4±11.4 (33–84)	62.9±10.7 (32–88)
<40	5 (2.8)	4 (3.9)	1 (1.4)
40–59	71 (40.3)	46 (45.1)	25 (33.8)
≥60	100 (56.8)	52 (51.0)	48 (64.9)
Education*			
No schooling	9 (5.1)	5 (4.9)	4 (5.4)
Elementary school	41 (23.3)	22 (21.6)	19 (25.7)
Junior high school	39 (22.2)	29 (28.4)	10 (13.5)
High school	62 (35.2)	34 (33.3)	28 (37.8)
College or higher	24 (13.6)	12 (11.8)	12 (16.3)
Diagnosed cancers†			
Gastric cancer	20 (11.4)	13 (12.7)	7 (9.5)
Liver cancer	8 (4.5)	6 (5.9)	2 (2.7)
Colon cancer	28 (15.9)	14 (13.7)	14 (18.9)
Lung cancer	30 (17.0)	13(12.7)	17 (23.0)
Breast cancer	22 (12.5)	18 (17.6)	4 (5.4)
Uterine cancer	4 (2.3)	4 (3.9)	0 (0.0)
Others	71 (40.3)	41 (40.2)	30 (40.5)
Treatment methods†			
Radiotherapy	64 (36.6)	32 (31.4)	32 (43.2)
Chemotherapy	158 (90.3)	91 (89.2)	67 (90.5)
Surgical therapy	92 (52.6)	46 (45.1)	46 (62.2)
Complementary/alternatives	7 (4.0)	2 (2.0)	5 (6.8)
Others	6 (3.4)	2 (2.0)	4 (5.4)
Missing	11 (6.3)	8 (7.8)	3 (4.1)
History of psychiatric disorders	13 (7.4)	7 (6.9)	6 (8.1)
Alcohol, anxiolytics, and/or substance abuse	13 (7.4)	10 (9.8)	3 (4.1)
Experience of analgesic medication counseling	14 (8.0)	9 (8.8)	5 (6.8)

*One missing value.

†Multiple responses.

Results

A total of 176 cancer patients (102 inpatients and 74 outpatients) were enrolled and participated in this study at baseline; 163 patients (93 inpatients and 70 outpatients) completed the follow-up surveys after the cancer pain education. Thirteen patients (nine inpatients and four outpatients) were excluded from the sample seven days following the education because of death, severe illness, or withdrawal of consent. The average age of the subjects was 60.9 years, and 56.3% of them were male (Table 1). The subjects suffered from lung cancer (17.0%), colorectal cancer (15.9%), and breast cancer (12.5%). In the past, 90.3% and 52.6% of the subjects received chemotherapy and surgery, respectively. Few (7.4%) of them had a history of treatment for psychological problems such as depression, neurosis, or other mental illnesses; 7.4% of them had misused alcohol,

anti-anxiety drugs, or narcotics; and 8.0% of them had received counseling on adequate analgesic medication.

The pre- and postreductions in pain intensity for all three categories were significant among outpatients ($P < 0.001$), while inpatients showed significantly reduced pain intensity in terms of severe ($P = 0.002$) and moderate pain ($P < 0.001$). Prior to the cancer pain education, outpatients showed higher scores for all three categories of severe, moderate, and mild pain (NRS pain reduction scores were 2.51, 2.16, and 0.96, respectively), as compared with the inpatients. In addition, pain education appeared to be most effective for reducing severe pain, with NRS score decreases of 0.93 for inpatients and 2.51 for outpatients (Table 2). After controlling for age, education, history of psychiatric disorders, a history of substance abuse, previous counseling experience for pain medication, and patient hospital

Table 2 Changes in cancer pain before and after cancer pain education according to the clinical context of patient care

Pain Experience by Patient Status	Before Education, Mean \pm SD	7 d After Education, Mean \pm SD	Change in Pain	P Value*
Inpatient care	N = 102	N = 93	N = 93	
Severe pain	5.58 \pm 2.70	4.69 \pm 2.46	0.93	0.002
Moderate pain	3.75 \pm 2.06	2.91 \pm 2.01	0.84	<0.001
Mild pain	1.77 \pm 1.93	1.40 \pm 1.76	0.32	0.135
Outpatient care	N = 74	N = 70	N = 70	
Severe pain	7.20 \pm 2.12	4.64 \pm 2.87	2.51	<0.001
Moderate pain	4.75 \pm 1.99	2.64 \pm 2.02	2.16	<0.001
Mild pain	2.20 \pm 2.31	1.16 \pm 1.58	0.96	<0.001

High scores indicate more severe pain.

*Paired *t* tests.

Table 3 The effect of pain education on patient pain experience (N = 175*)

Outcomes	Before Education, Mean \pm SD	7 d After Education, Mean \pm SD	B [†]	P Value
Pain intensity				
Severe pain	6.27 \pm 2.60	4.67 \pm 2.64	0.45	<0.001
Moderate pain	4.17 \pm 2.09	2.80 \pm 2.02	0.38	<0.001
Mild pain	1.93 \pm 2.10	1.31 \pm 1.69	0.35	<0.001
Satisfaction with pain management	3.75 \pm 1.26	4.77 \pm 1.01	-0.06	0.39

High scores indicate more severe pain.

*One missing value.

[†]Unstandardized coefficients for pain education were computed from the multiple linear regression analyses with age, education, history of psychiatric, history of substance uses (such as alcohol, anxiolytics, and/or other substance abuse), past counseling experience for pain medication, and patient hospital status (either inpatient or outpatient) as covariates.

status, cancer pain education was a significant predictor of reduced pain in all three categories of pain intensity (B = 0.35–0.45, $P < 0.001$), but not significant for satisfaction with such pain management (Table 3).

After this intervention, outpatients' breakthrough pain experience significantly decreased from 68.9% to 48.6%, and the administration of short-acting analgesics increased from 25.5% to 73.5%, while inpatients did not improve significantly in terms of decreased numbers of breakthrough cancer pain experiences and short-acting analgesic use (Table 4). Individual pain education also significantly improved all pain-related quality of life aspects, with significant changes across all seven aspects of life quality associated with cancer pain education, independent of age, education, history of psychiatric disorders, history of substance abuse, previous counseling experience for pain medication, and patient hospital status (B = 0.30–0.52, $P < 0.001$). Sleep exhibited the most significant change, and aspects of quality

of life improved in terms of general feelings and life enjoyment (Table 5).

Several items regarding misconception about cancer pain and opioid use improved significantly, with pain education demonstrating efficacy in rectifying misconceptions pertaining to narcotic analgesic use in pain medicine efficacy for pain control in addition to the pain medication, pain complaint, meaning of pain experience, and timing of pain medication taking (B = 0.12–0.30, $P < 0.05$), independent of age, education, history of psychiatric disorders, history of substance abuse, previous counseling experience for pain medication, and patient hospital status. The largest significant change was found for the item "Pain medicine should be given only when pain is severe" (a score change of 2.38), followed by "Pain medicine should be 'saved' in case the pain gets worse" (a score change of 2.01) and "People get addicted to pain medicine easily" (a score change of 1.95) (Table 6).

Table 4 Breakthrough pain experience and short-acting oral analgesic medication

	Inpatients			Outpatients		
	Before Education (N = 102), No. (%)	7 d After Education (N = 93), No. (%)	P Value*	Before Education (N = 74), No. (%)	7 d After Education (N = 70), No. (%)	P Value*
Breakthrough pain experience						
Yes	50 (49.0)	41 (44.1)	0.490	51 (68.9)	34 (48.6)	0.013
No	52 (51.0)	52 (55.9)		23 (31.1)	36 (51.4)	
Use of short-acting oral analgesics						
Yes	37 (74.0)	32 (78.0)	0.654	13 (25.5)	25 (73.5)	<0.001
No	13 (26.0)	9 (22.0)		37 (72.5)	9 (26.5)	

*Pearson χ^2 tests.**Table 5** The effect of pain education on quality of life outcomes

Quality of Life Aspects	Mean \pm SD* Before Education	Mean \pm SD* 7 d After Education	B [†]	P Value
Daily activities	4.82 \pm 3.46	3.51 \pm 3.28	0.52	<0.001
General feelings	5.67 \pm 2.96	3.32 \pm 3.07	0.50	<0.001
Walking ability	4.34 \pm 3.64	2.65 \pm 3.26	0.41	<0.001
Normal matters	5.23 \pm 3.62	3.36 \pm 3.31	0.41	<0.001
Personal relationships	4.84 \pm 3.69	3.00 \pm 3.25	0.44	<0.001
Sleep	4.62 \pm 3.68	1.85 \pm 2.68	0.30	<0.001
Enjoyment of life	6.00 \pm 3.25	3.79 \pm 3.31	0.48	<0.001

*A higher number denotes poorer quality of life.

†Unstandardized coefficients for pain education were computed from the multiple linear regression analyses with age, education, history of psychiatric disorders, history of substance use (such as alcohol, anxiolytics, and/or other substance abuse), past counseling experience for pain medication, and patient hospital status (either inpatient or outpatient) as covariates.

Discussion

The highlight of this study is that individual pain education proved beneficial in terms of the short-term effects on cancer pain management, particularly for short-acting analgesic use for breakthrough pain control. There were significant reductions in overall pain intensity after the intervention. Severe cancer pain most greatly decreased among both in- and outpatients, and greater pain change was shown among the outpatients. When breakthrough pain occurred, pain management education was particularly noted among the outpatients whose control over severe pain significantly improved by taking short-acting analgesics.

Cancer pain management interventions proved efficacious in reducing pain, particularly breakthrough cancer pain, and in improving psychological functioning and quality of life [27,28]. Pharmacological therapy with the selection and administration of appropriate analgesics as recommended, following the three-stage analgesic ladder, is also critical for managing pain among cancer

patients [29]. In particular, breakthrough cancer pain can be effectively controlled with additional pharmacologic agents like immediate-release oral opioids (morphine, oxycodone) or buccal or intranasal preparations of fentanyl, which are readily available for proactive prescription and administration [29,37]. Despite these therapeutic pharmacological or nonpharmacological approaches currently available, cancer pain management, particularly for breakthrough pain, is largely ineffective, possibly associated with barriers [16,19,21,22,33]. Such barriers, for example, patients' misunderstanding of cancer pain management, can be improved by physician-patient communication, in which physicians assist patients by informing them and helping them understand opioid therapy in terms of its benefits or adverse effects [17]. While a recent study showed that pain education alone did not properly control pain, it was effective when accompanied by counseling, regarding pain control strategies, pharmacologic and non-pharmacologic approaches, knowledge of pharmacologic treatment, assessment and evaluation of pain, and communication of pain [29,38]. Our study

Table 6 The effect of pain education on the improvement of misconceptions about cancer pain and opioid use

Misconception	Before Education, Mean \pm SD*	Immediately After Education, Mean \pm SD*	Average Change	P Value [†]
1. Pain medicine cannot really control pain.	2.31 \pm 1.52	1.59 \pm 1.18	0.72	<0.001
2. People get addicted to pain medicine easily.	3.39 \pm 1.43	1.44 \pm 0.93	1.95	<0.001
3. Good patients avoid talking about pain.	2.56 \pm 1.58	1.35 \pm 0.79	1.21	<0.001
4. The experience of pain is a sign that the illness has gotten worse.	4.12 \pm 1.28	2.41 \pm 1.42	1.71	<0.001
5. It is easier to put up with pain than with the side effects that come from pain medicine.	2.40 \pm 1.51	1.28 \pm 0.75	1.12	<0.001
6. Pain medicine should be "saved" in case the pain gets worse.	3.35 \pm 1.67	1.34 \pm 0.87	2.01	<0.001
7. Pain medicine should be given only when pain is severe.	3.91 \pm 1.47	1.53 \pm 1.15	2.38	<0.001
8. Complaining about pain could distract a doctor from curing the resident's problem.	2.09 \pm 1.37	1.35 \pm 0.79	0.74	<0.001

*A higher score indicates more misconception.

[†]Paired *t* tests.

further supported the finding that a comprehensive approach to pain education improves such known barriers to cancer pain management. Particularly, outpatients' understanding was increased by our pain management education, and their breakthrough cancer pain was successfully managed with short-acting oral analgesics. This education appears to be beneficial to facilitating patients' active engagement in pain control by reducing their fear of analgesic medication.

The present study differed from prior studies in that the inclusion of comprehensive content, as well as the use of a standardized and systematic approach to cancer pain control in terms of individual education and counseling, showed beneficial short-term effects in both in- and outpatient settings. According to a cross-sectional study with a sample of 428 oncology outpatients, 39% of the patients suffered from pain, with the administration of analgesic medication lacking in more than half of these sufferers (62%) [8]. The breakthrough cancer pain experience is particularly concerning, given its high incidence within outpatient settings. The lack of proper pain control among outpatients seems to be associated with timely access to medical professionals, which is more limited for this group as compared with that of inpatients. The findings of our study also showed that pain was not controlled properly among outpatients as compared with inpatients. Our individual pain education proved efficacious, particularly for outpatients, in reducing breakthrough pain experiences and in increasing the use of short-acting opioid analgesics for such pain control. This pain education also greatly improved the patients' understanding of addiction, tolerance, and regular medication. This corrected patients' faulty

understanding of pain and the negative misunderstanding and prejudices against analgesics, thus making it possible for patients to reduce their pain without prescribing additional medication. Therefore, their quality of life improved in terms of sleep, feelings, and life enjoyment following the cancer pain education. Their Barriers Questionnaire scores also reduced significantly for all items, demonstrating an improvement in their understanding of cancer pain.

However, this study had a couple of limitations. First, the design of this study did not allow for the employment of controls. This limited the efficacy of the individual educational intervention as well as the generalization of the study findings. Second, we were unable to determine how long the educational efficacy lasts for pain control and quality of life outcomes so as to accurately ensure the timely delivery of the next education session. Additional research is warranted to investigate the intervention's long-term effects, which may contribute to more effective pain management by assisting cancer patients in avoiding unnecessary pain experience in their daily living. Third, the efficacy of this educational intervention, particularly for breakthrough pain management, was determined by a simple query, a yes or no question about whether patients were having breakthrough pain; perhaps a future study might tighten up this definition by defining breakthrough pain more specifically (i.e., an increase of pain intensity to severe pain in patients who receive an effective treatment with opioids, presumably at least 60 mg of oral morphine equivalents to acceptable analgesia for a mild background pain [39]). Further, it is beyond the scope of the present investigation to assess breakthrough pain monitoring and its change

following short-acting opioid use. While that a part of the education was on how to record breakthrough pain using a diary, patients' compliance with breakthrough pain monitoring behavior remains undetermined. Future research is warranted to develop multimodal intervention for cancer pain control and management, including both education and monitoring, while meticulously designing and testing the efficacy while controlling covariates such as prior experience of pain education or duration of opioid use.

Conclusion

This individual education was effective in improving overall pain control, particularly breakthrough pain control with short-acting analgesic use in ambulatory settings. This education also improved some quality of life aspects and rectified the false perceptions of opioid pain medication.

Important clinical implications emerged from our study results. The educational effect of the program implemented in the present study was significant, particularly for breakthrough cancer pain control among outpatients, who required active pain education. Nonetheless, it was difficult for outpatients to receive efficient education due to time and space limits and a shortage of health care professionals. In a European survey, nurses had difficulty defining and assessing breakthrough cancer pain, and more than one-third (38.4%) of them reported a lack of awareness of breakthrough cancer pain treatment [40]. Therefore, it is necessary to recruit and develop a professional labor force that can successfully conduct cancer pain education. Additionally, separate rooms should be provided to allow outpatients to receive more effective individualized education. A systematic approach to pain management and timely referrals to palliative/supportive care are also warranted as part of the routine care of cancer patients within clinical practice, which incorporates the general definitions of types of pain, particularly breakthrough pain, assessment, and management, accordingly [7,23]. Effective pain management, particularly for breakthrough pain in outpatients, also requires the identification of patient, professional, or institutional barriers to pain management, as well as successful methods of reducing these barriers to plan cancer pain management [18].

References

- 1 National Cancer Information Center. The 2015 major cancer deaths by sex. 2016. Available at: http://www.cancer.gov/kor/mbs/cancer/subview.jsp?id=cancer_040202000000 (accessed November 2016).
- 2 Korean Statistical Information Service. The 2015 death statistics. 2016. Available at: http://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1B34E07&vw_cd=MT_ZTITLE&list_id=D11&seqNo=&lang_mode=ko&language=kor&obj_var_id=&itm_id=&conn_path=E1 (accessed November 2016).
- 3 National Cancer Institute. Cancer statistics. 2016. Available at: <https://www.cancer.gov/about-cancer/understanding/statistics> (accessed November 2016).
- 4 Ramsey SD. How should we value lives lost to cancer? *J Natl Cancer Inst* 2008;100(24):1742-3.
- 5 Burton AW, Fanciullo GJ, Beasley RD, Fisch MJ. Chronic pain in the cancer survivor: A new frontier. *Pain Med* 2007;8(2):189-98.
- 6 Davies A, Buchanan A, Zeppetella G. Breakthrough cancer pain: An observational study of 1000 European oncology patients. *J Pain Symptom Manage* 2013;46(5):619-28.
- 7 Twomey F, O'Brien T, O'Reilly M, Bogan C, Fleming J. An observational research study to evaluate the impact of breakthrough cancer pain on the daily lives and functional status of patients. *Ir Med J* 2015;108(6):174-6.
- 8 Te Bovelde N, Vernooij-Dassen M, Burger N, et al. Pain and its interference with daily activities in medical oncology outpatients. *Pain Physician* 2013;16(4):379-89.
- 9 van den Beuken-van Everdingen MH, de Rijke JM, Kessels AG, et al. Prevalence of pain in patients with cancer: A systematic review of the past 40 years. *Ann Oncol* 2007;18(9):1437-49.
- 10 Raj SX, Thronaes M, Brunelli C, et al. A cross-sectional study on prevalence of pain and breakthrough pain among an unselected group of outpatients in a tertiary cancer clinic. *Support Care Cancer* 2014;22(7):1965-71.
- 11 Mishra S, Bhatnagar S, Chaudhary P, Rana SP. Breakthrough cancer pain: Review of prevalence, characteristics and management. *Indian J Palliat Care* 2009;15(1):14-8.
- 12 Kim HS, Shin SJ, Kim SC, et al. Randomized controlled trial of standardized education and telemonitoring for pain in outpatients with advanced solid tumors. *Support Care Cancer* 2013;21(6):1751-9.
- 13 Lovell MR, Forder PM, Stockler MR, et al. A randomized controlled trial of a standardized educational intervention for patients with cancer pain. *J Pain Symptom Manage* 2010;40(1):49-59.
- 14 Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. Results of a randomized controlled pilot study of a self-management intervention for cancer pain. *Eur J Oncol Nurs* 2013;17(3):284-91.

- 15 Deandrea S, Montanari M, Moja L, Apolone G. Prevalence of undertreatment in cancer pain. A review of published literature. *Ann Oncol* 2008; 19(12):1985–91.
- 16 Hong SH, Roh SY, Kim SY, et al. Change in cancer pain management in Korea between 2001 and 2006: Results of two nationwide surveys. *J Pain Symptom Manage* 2011;41(1):93–103.
- 17 Jacobsen R, Moldrup C, Christrup L, Sjogren P. Patient-related barriers to cancer pain management: A systematic exploratory review. *Scand J Caring Sci* 2009;23(1):190–208.
- 18 Sun VC, Borneman T, Ferrell B, et al. Overcoming barriers to cancer pain management: An institutional change model. *J Pain Symptom Manage* 2007;34(4):359–69.
- 19 Kim MH, Park H, Park EC, Park K. Attitude and knowledge of physicians about cancer pain management: Young doctors of South Korea in their early career. *Jpn J Clin Oncol* 2011;41(6):783–91.
- 20 Jho HJ, Kim Y, Kong KA, et al. Knowledge, practices, and perceived barriers regarding cancer pain management among physicians and nurses in Korea: A nationwide multicenter survey. *PLoS One* 2014;9(8):e105900.
- 21 Kim HJ, Park I, Kang KJ. Knowledge and awareness of nurses and doctors regarding cancer pain management in a tertiary hospital. *Asian Oncol Nurs* 2012;12(2):147–55.
- 22 Vellucci R, Fanelli G, Cortesi PA, et al. Reply-letter to the editor: What to do, and what not to do, when diagnosing and treating breakthrough cancer pain (BTcP): Expert opinion. *Drugs* 2016;76(10):1063–5.
- 23 Caraceni A, Bertetto O, Labianca R, et al. Episodic (breakthrough) pain prevalence in a population of cancer pain patients. Comparison of clinical diagnoses with the QUDEI-Italian questionnaire for intense episodic pain. *J Pain Symptom Manage* 2012; 43(5):833–41.
- 24 Al Qadire M. Patient-related barriers to cancer pain management in Jordan. *J Pediatr Hematol Oncol* 2012;34:S28–31.
- 25 Bağcıvan G, Tosun N, Kõmürçü S, Akbayrak N, Ozet A. Analysis of patient-related barriers in cancer pain management in Turkish patients. *J Pain Symptom Manage* 2009;38(5):727–37.
- 26 Redmond K. Organizational barriers in opioid use. *Support Care Cancer* 1997;5(6):451–6.
- 27 Adam R, Bond C, Murchie P. Educational interventions for cancer pain. A systematic review of systematic reviews with nested narrative review of randomized controlled trials. *Patient Educ Couns* 2015;98(3):269–82.
- 28 Jho HJ, Myung SK, Chang YJ, Kim DH, Ko DH. Efficacy of pain education in cancer patients: A meta-analysis of randomized controlled trials. *Support Care Cancer* 2013;21(7):1963–71.
- 29 Koh SJ, Kwon I, Kim DY, et al. Cancer Pain Management Guideline, 4th edition. Sejong: Ministry of Health and Family Welfare Cancer Control Policy Division, Healthcare Policy Division: Ministry of Health and Family Welfare/National Cancer Center; 2010.
- 30 National Cancer Information Center. Cancer Pain, No Longer Take, Time to Talk. Goyang, Republic of Korea: Hospice & Palliative Care: Ministry of Health and Family Welfare/National Cancer Center; 2010.
- 31 National Evidence-Based Healthcare Collaborating Agency. Cancer Pain Management: Current Practice and Directions for Improvement. Seoul, Republic of Korea: National Evidence-Based Healthcare Collaborating Agency; 2012.
- 32 Yun YH, Mendoza TR, Heo DS, et al. Development of a cancer pain assessment tool in Korea: A validation study of a Korean version of the brief pain inventory. *Oncology* 2004;66(6):439–44.
- 33 The National Cancer Institute Dictionary of Cancer Terms. Available at: <https://www.cancer.gov/publications/dictionaries/cancer-terms?cdrid=45612>. Accessed October 9, 2017.
- 34 Ward SE, Goldberg N, Miller-McCauley V, et al. Patient-related barriers to management of cancer pain. *Pain* 1993;52(3):319–24.
- 35 Lin CC, Ward SE. Patient-related barriers to cancer pain management in Taiwan. *Cancer Nurs* 1995;18(1):16–22.
- 36 SAS System for Windows [computer program]. Version 9.1.3. Cary, NC: SAS Institute, Inc; 2017.
- 37 Caraceni A, Hanks G, Kaasa S, et al. Use of opioid analgesics in the treatment of cancer pain: Evidence-based recommendations from the EAPC. *Lancet Oncol* 2012;13(2):e58–68.
- 38 Oldenmenger WH, Sillevius Smitt PA, van Montfort CA, de Raaf PJ, van der Rijt CC. A combined pain consultation and pain education program decreases average and current pain and decreases

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- interference in daily life by pain in oncology outpatients: A randomized controlled trial. *Pain* 2011; 152(11):2632–9.
- 39 Vellucci R, Mediatl RD, Gasperoni S, et al. Assessment and treatment of breakthrough cancer pain: From theory to clinical practice. *J Pain Res* 2017;10:2147–55.
- 40 Rustoen T, Geerling JI, Pappa T, et al. A European survey of oncology nurse breakthrough cancer pain practices. *Eur J Oncol Nurs* 2013;17(1):95–100.

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