A randomized controlled trial of a nurse-administered educational intervention for improving cancer pain management in ambulatory settings

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Patsy Yates, , a,
Helen Edwards a,
Robyn Nash a,
Sanchia Aranda b,
David Purdie c,
Jake Najman d,
Helen Skerman a and
Anne Walsh a

a Center for Health Research, Queensland University of Technology, Kelvin Grove Campus, Victoria Park Road, Kelvin Grove, Brisbane 4059, Australia
b Peter MacCallum Cancer Institute, Locked Bag 1, A'Beckett St. 8006, Vic., Australia
c Queensland Institute of Medical Research, Herston Road, Herston 4029, Qld, Australia
d University of Queensland, St. Lucia 4067, Qld, Australia

Abstract
The persistence of negative attitudes towards cancer pain and its treatment suggests there is scope for identifying more effective pain education strategies. This randomized controlled trial involving 189 ambulatory cancer patients evaluated an educational intervention that aimed to optimize patients' ability to manage pain. One week post-intervention, patients receiving the pain management intervention (PMI) had a significantly greater increase in self-reported pain knowledge, perceived control over pain, and number of pain treatments recommended. Intervention group patients also demonstrated a greater reduction in willingness to tolerate pain, concerns about addiction and side effects, being a "good" patient, and tolerance to pain relieving medication. The results suggest that targeted educational interventions that utilize individualized instructional techniques may alter cancer patient attitudes, which can potentially act as barriers to effective pain management.

Author Keywords: Cancer pain; Pain management; Barriers; Communication; Patient education

1. Introduction

Despite some remarkable achievements in cancer pain management, studies continue to demonstrate that many people with cancer are reluctant to report pain and do not adhere to prescribed pain therapy. Weiss et al. found that while more than one half of their sample of terminally ill patients experienced moderate or severe pain, only a third sought more drug

therapy, and one in ten wanted to stop or reduce their pain medication [1]. Similarly, a study by Zhukovsky et al. reported that 44% of cancer patients experienced moderate to greater than moderate pain, but only 41% of those patients were dissatisfied with their pain management [2].

Numerous reasons have been proposed for this paradox, including health care provider and patient beliefs, fears and concerns. Studies consistently identify patient concerns about addiction, side effects, and developing tolerance to analgesics, and a fear that increases in pain signify disease progression. These studies also report patients often want to be "good" and not distract their physician from the disease by reporting their pain [1, 3, 4, 5 and 6].

The persistence of these widely held views about cancer pain and its treatment suggest there is scope for identifying more effective patient and family education strategies to achieve optimal pain control. The purpose of this study is to evaluate the effectiveness of an educational intervention in overcoming attitudinal barriers and improving ambulatory cancer patients' ability to more effectively prevent and manage pain.

2. Literature review

Surprisingly few studies have systematically evaluated different approaches to improving pain management through patient education. An early study by Rimer et al. [7] demonstrated that 1 month after participating in an individualized patient education intervention consisting of nurse counseling and printed materials, patients in the experimental group were more likely than controls to have taken the correct schedule and dose of pain medication. In addition, the experimental group was significantly less worried about tolerance and addiction to medication, and reported lower pain levels at post-test. Wilkie et al.'s [8] trial of a Patient Coaching Protocol found that improvement in percentage agreement between patients' and nurses' pain ratings occurred more often in the coached group compared to the non-coached group. Other recent studies using randomized experimental designs have reported similar beneficial effects of individualized coaching interventions for a range of pain outcomes, including pain severity [9, 10 and 11].

While most published studies report significant improvements in patients' knowledge and attitudes as a result of educational interventions, not all studies demonstrate that such improvements translate to behavioral change or reductions in pain. A recent randomized trial of an informational intervention with 43 women with gynecological cancers reported no main effect for lower barriers (attitudes) scores, using more adequate analgesic medication, or lower pain intensity or pain interference scores [12]. The researchers acknowledge that their non-significant findings may be due to lack of statistical power, or an insufficient "dose" of the intervention.

The discrepancies in published research suggest that certain types of intervention strategies may be more beneficial than others in achieving the behavioral change necessary for more effective pain management. That is, the few available studies that have demonstrated a beneficial effect for patient attitudes, behavior, and pain experiences are those which have utilized individualized, structured instructional techniques and/or cognitive behavioral strategies [7]. A recent review of methods of information giving in cancer supports the view that targeting of information is a more effective way of reducing the amount of information and ensuring that only relevant information is provided [13].

Moreover, the available studies vary considerably in terms of the timing, sequencing, and location for delivery of the interventions evaluated. Some interventions are delivered in one or two short sessions of less than 30 min [7, 11 and 12], while others are delivered over a number of sessions [14]. Some interventions include family members and are provided in the home [14], while others are delivered in outpatient settings [7 and 8]. Some include follow up phone calls for reinforcement [10 and 12], while many report limited follow up or assessment of the long-term effects of any change. The cost effectiveness or feasibility of the educational strategies being incorporated into everyday clinical practice is rarely discussed.

3. Materials and methods

3.1. Conceptual framework

The present study is based on Green's PRECEDE model of health behavior [15]. This model identifies three categories of factors that may potentially influence a health behavior such as the use of effective strategies to minimize pain. These three categories include: predisposing factors, such as beliefs, attitudes and perceptions that might facilitate or hinder a person's motivation to perform a desired behavior; enabling factors, or the skills and resources necessary to perform the behavior; and reinforcing factors, such as feedback provided by family or health professionals that might influence continuance or discontinuance of the behavior. The intervention evaluated in the present study specifically targets what Green et al. refer to as predisposing and enabling factors. This approach is based on the assumption that strategies addressing beliefs, attitudes, and skills necessary for effective pain management (e.g. knowledge about pain and concerns about pain treatments) will result in more effective behaviors in response to pain (e.g. communication with health professionals regarding pain and use of pain relieving medication).

The specific predisposing and enabling factors targeted in the pain management intervention (PMI) for this study were developed following a review of the literature and a descriptive survey published elsewhere [6]. These factors are listed in Fig. 1. The primary outcome of interest in the present study is improvement on relevant measures of those factors that predispose and enable a patient to engage in effective pain management behaviors. Secondary outcomes hypothesized to benefit from such improvements include actual pain experience, patients' quality of life, and satisfaction with pain management.

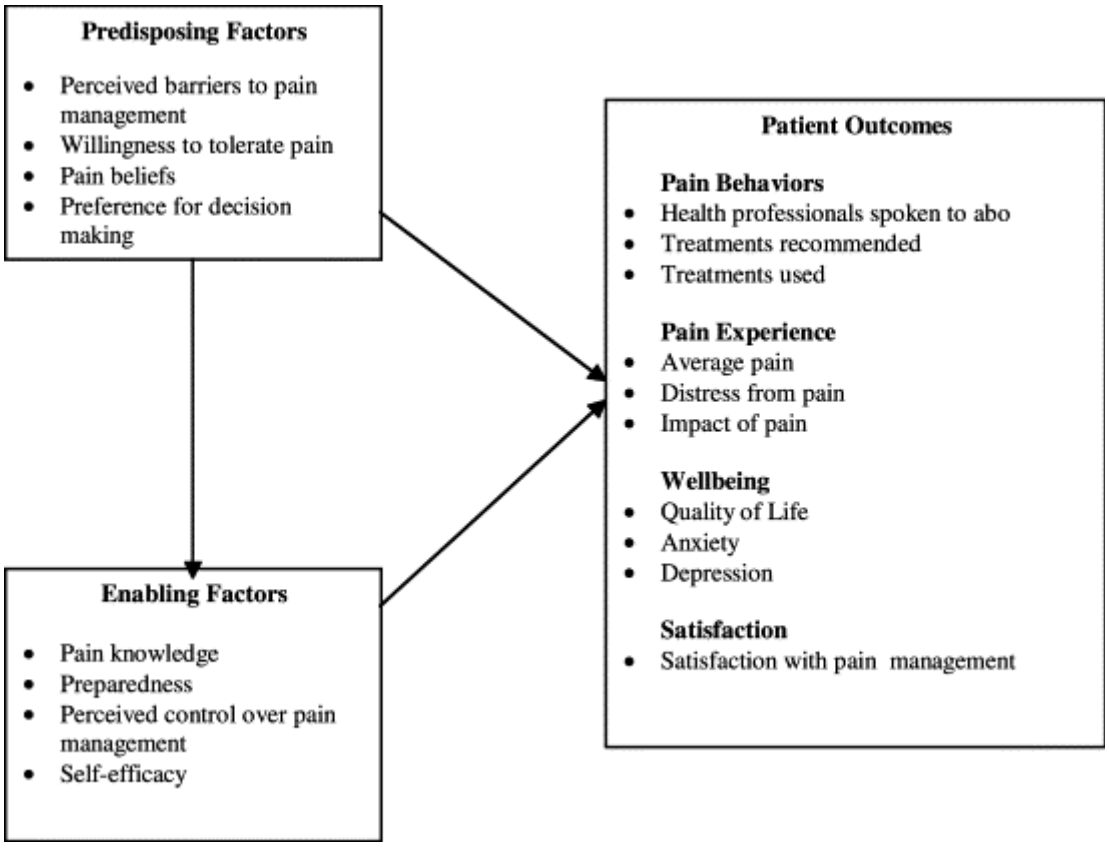


Fig. 1. Conceptual framework for the study: based on the PRECEDE model of health behavior [15].

3.2. Study design

The study used a randomized controlled experimental design. Eligible participants who consented to participate in the study completed a baseline assessment (T0) prior to randomization to treatment or control conditions. Participants allocated to the treatment condition received the pain management intervention comprising two sessions delivered 1 week apart, while participants allocated to the control condition received an educational intervention about cancer in general equivalent in time to the PMI. Post-intervention assessments for both treatment and control groups were conducted at 1 week (T1), and at 2 months following the second intervention session (T2).

3.2.1. Sample

All patients with breast, colorectal, lung or head and neck cancer attending ambulatory oncology clinics at two tertiary hospitals for a new treatment event or phase were assessed for their eligibility for the study. To be eligible for the study, patients needed to: have experienced cancer related pain greater than everyday pain during the previous 2 weeks (assessed through patient self-report using a screening questionnaire), and/or have been ordered an opioid for cancer pain relief; have an anticipated life expectancy of at least 3 months (determined by clinic staff); be well enough to complete the study requirements; have had no surgery during the previous 4 weeks; be 18 years or older; be able to read and converse in English; be alert and orientated to time and place; and have access to a telephone. A total of 189 patients were recruited during an 18-month period from May 1999 to November 2000.

3.2.2. Measures

A self-report questionnaire comprising measures of factors which may predispose or enable a patient to engage in effective pain management behaviors, as well as measures of key pain outcomes was developed. The questionnaire assessed: (1) patients' attitudes and beliefs that may influence their pain responses; (2) patients' knowledge, preparedness and self-efficacy in communicating about pain; (3) pain experiences, pain behaviors and satisfaction with pain management; and (4) patients' overall wellbeing.

Seven subscales measured concerns about reporting pain and using analgesics, perceived as barriers to pain management. A further four scales measuring patients' beliefs that pain is an individual experience, willingness to tolerate pain and to ask for pain relief, attitudes to pain management decision making and perceived control over pain have been used by this research team in previous studies [6]. A 5-point rating scale of 1 (strongly agree) to 5 (strongly disagree) was used and scores reversed so high scores indicated a greater concern or stronger belief/attitude. A summary of the descriptive statistics for these eleven scales is presented in Table 1.

Scales (*possible range*)	Source	No. of items	Mean[a] (S.D.) T0	Actual range T0	Alpha T0
Perceived barriers to pain management (10–50)					
Fear that increased pain means progression of disease	Barriers questionnaire [3]	3	30.1 (9.2)	10–50	0.86
Fear of addiction to pain relieving medication		3	30.8 (8.6)	10–50	0.77
Fear of distracting physician from treating disease		3	22.2 (7.1)	10–43	0.65
Concern about side effects		6	30.2 (6.0)	10–45	0.65
Fatalism about pain		3	23.2 (7.0)	10–43	0.58
Concern about tolerance to pain relieving medication		3	24.6 (7.5)	10–43	0.56
Desire to be a 'good' patient		3	21.0 (6.6)	10–47	0.45
Pain management decision making	Lavies et al. (1992) [20]	3	31.0 (7.5)	10–50	0.61
Willingness to tolerate pain	Yates et al. (2002) [6]	6	21.1 (6.0)	10–42	0.83
Pain beliefs		6	39.0 (5.1)	15–50	0.71
Perceived control over pain	Survey of pain attitudes: Jensen and Karoly (1992) [21]	5	33.3 (5.6)	17–50	0.66
	Pain beliefs questionnaire: Edwards et al. (1992) [22]	2			
Knowledge (2–20)	Numerical rating scale	2	10.4 (5.5)	2–20	0.87
Preparedness (*1–10*)	Numerical rating scale	1	7.5 (2.3)	1–10	–

Table 1. Predisposing factors: distribution of scale scores and scale properties
T0: baseline score.

Two items assessed patients' knowledge about pain relieving medication and knowledge of side effects on a 10-point scale. The summed total represents the patient's knowledge score. Patients also indicated how well prepared they felt to manage pain. Patients' perceived self-efficacy in communicating with health professionals about pain and pain management was assessed in two subscales. Patients rated their perceptions of their difficulty and hesitancy in communicating with physicians and nurses. A score was calculated if at least three items were rated. The descriptive statistics for these six scales are summarized in Table 2.

Table 2. Enabling factors and pain outcomes: distribution of scale scores and scale properties

Scales (*possible range*)	Source	No. of items	Mean[a] (S.D.) *T0*	Actual range *T0*	Alpha *T0*
Self-efficacy					
Difficulty communicating with doctor (*1–4*)	Investigator generated	4	4.4 (2.3)	1–4	0.83
Hesitancy communicating with doctor (*1–4*)		4	4.2 (2.1)	1–3	0.87
Difficulty communicating with nurse (*1–4*)		4	2.9 (2.4)	1–4	0.94
Hesitancy communicating with nurse (*1–4*)		4	3.2 (2.8)	1–4	0.96
Pain behaviors					
Number of health professionals spoken to (*0–6*)	Investigator generated	6	1.7 (1.0)	0–6	–
Number of treatments recommended (*0–11*)		11	2.4 (2.0)	0–10	–
Number of treatments used (*0–11*)		11	3.3 (2.3)	0–11	–
Pain experiences					
Average pain (*0–10*)	Brief Pain Inventory (1992) [16]	1	4.1 (1.9)	0–9	–
Distress from pain (*0–10*)		1	4.9 (2.8)	0–10	–
Impact from pain (*0–70*)		7	30.7 (18.1)	0–69	0.89
Wellbeing					
Anxiety (*0–21*)	Hospital Anxiety and Depression Scale (1983) [23]	7	7.6 (4.2)	0–19	0.83
Depression (*0–21*)		7	6.6 (4.1)	0–17	0.79
Quality of life (*0–100*)	EORTC QLQ-30 (1993) [24]	2	52.4 (21.0)	0–100	0.80
Satisfaction					
Clarity of instructions (*2–8*)	American Pain Society's PSQ (1995) [25]	2	6.6 (2.0)	2–8	0.80
Clear instructions for pain relieving medication (*4–16*)		4	13.3 (3.6)	4–16	0.82
Satisfaction with pain management (*3–18*)		3	14.8 (3.2)	3–18	0.84

T0: baseline score.

Patients were asked to identify if they had spoken to a doctor, nurse, pharmacist, physiotherapist, occupational therapist, or other health professionals about their pain during the past week. In addition, patients were asked to indicate which pharmacological and non-pharmacological treatments had been recommended by health professionals for their pain management since their diagnosis, and to indicate whether or not they had used the recommended treatments for their pain management during the past week. The number of health professionals spoken to, the number of treatments recommended and the number of treatments used were totaled for each patient. The descriptive statistics for these measures are summarized in Table 2.

Various aspects of the patient's pain experience were assessed including location, intensity, duration, quality and the impact of their most distressing pain using items from the Brief Pain Inventory (BPI) [16]. In the present study, patients were asked to provide ratings of pain severity and distress for the pain site/s they identified as their most distressing pain/s. To assess the impact of pain on their wellbeing, patients rated the degree to which their pain had interfered with seven specific aspects of daily living [6]. The descriptive statistics for these measures are summarized in Table 2.

Anxiety and depression as well as patients' functional, symptom, social and cognitive functioning were assessed and a global quality of life score was calculated.

Patient satisfaction with pain management was assessed in terms of: (1) overall satisfaction with the adequacy of pain treatment and health care professionals' responses to pain; (2) an

evaluation of the adequacy of instructions; and (3) information to patients regarding pain management. The descriptive statistics for these measures are summarized in Table 2.

Demographic and medical data were collected from patients' records, including primary diagnosis and length of time since diagnosis, disease stage, reason for the current course of treatment, sites of metastases, treatment aim (cure, remission/control, palliation), and treatment of this event. In addition, patients were asked to provide demographic information including age, income, education, occupational status, and marital status.

3.2.3. Intervention

The PMI aimed to: (1) improve patients' knowledge and attitudes regarding cancer pain management; (2) increase patients' ability to communicate with health professionals about pain management; and (3) decrease patients' reluctance to take analgesia. The intervention used instructional and cognitive behavioral strategies and included general information giving about pain and pain management, coaching to assist patients to learn more adaptive ways to communicate pain, and the development of a personalized pain management plan, which included strategies to address patient-specific barriers to effective pain management. The intervention was administered over two sessions. The first session, approximately 30 min in length, was administered in the outpatient department and the second, approximately 15 min, was administered by telephone 1 week later.

Two experienced registered nurses who did not have clinical responsibilities in the study settings were trained to deliver the pain management intervention. Prior to the first intervention the research nurse reviewed the patient's baseline questionnaire to determine patient-specific factors to be targeted during the educational session. During the intervention, areas identified from patient responses to the baseline questionnaire as potential barriers to effective pain management were discussed, and further patient identified pain management problems were addressed where appropriate. Intervention strategies focused on identification of individual pain management concerns and barriers, targeted information giving, collaborative problem solving, rehearsal of cognitive and behavioral strategies for overcoming barriers, and reinforcement through use of verbal and written media. Efforts were made to assist the patient to integrate specific knowledge and skills into their daily lives. A booklet entitled "Managing Cancer Pain" was used to provide structured information and reinforce behavior change. This booklet was based on the Agency for Health Care Policy and Research Guidelines for cancer pain management [17]. At the close of the intervention the research nurse recorded specific recommendations in the patient booklet in a personalized pain management plan as recommended by Rimer et al. [7].

During the second intervention session, the research nurse reviewed the patient's pain control from the previous week, identified the patient's recall of previously suggested strategies, and discussed progress with and any barriers to use of recommended strategies and ways for overcoming these. The patient's pain management plan was reinforced and revised as appropriate.

Patients in the control group participated in a general patient education intervention, equivalent in timing and length to the PMI. As with the PMI, the first session of approximately 30 min was delivered in the outpatient setting, and the second session of approximately 15 min was delivered 1 week later by phone. Two research nurses who were not involved in delivering the PMI, and who had no clinical responsibilities in the study settings, were trained to deliver the control intervention. The intervention involved discussion

of general issues associated with living with cancer, and patients were provided with a general information booklet on cancer.

3.2.4. Procedure

Ethical approval was obtained from the institutional committees of both participating centers. All patients in the target group who were attending the study settings were assessed for eligibility by research staff. A research nurse approached each potentially eligible patient on his or her first visit to the outpatient department for a new treatment event or phase, and informed the patient of the study. Eligible patients were given an information sheet describing the study and their potential involvement and patients who provided written consent to participate completed a self-report baseline questionnaire in the clinic.

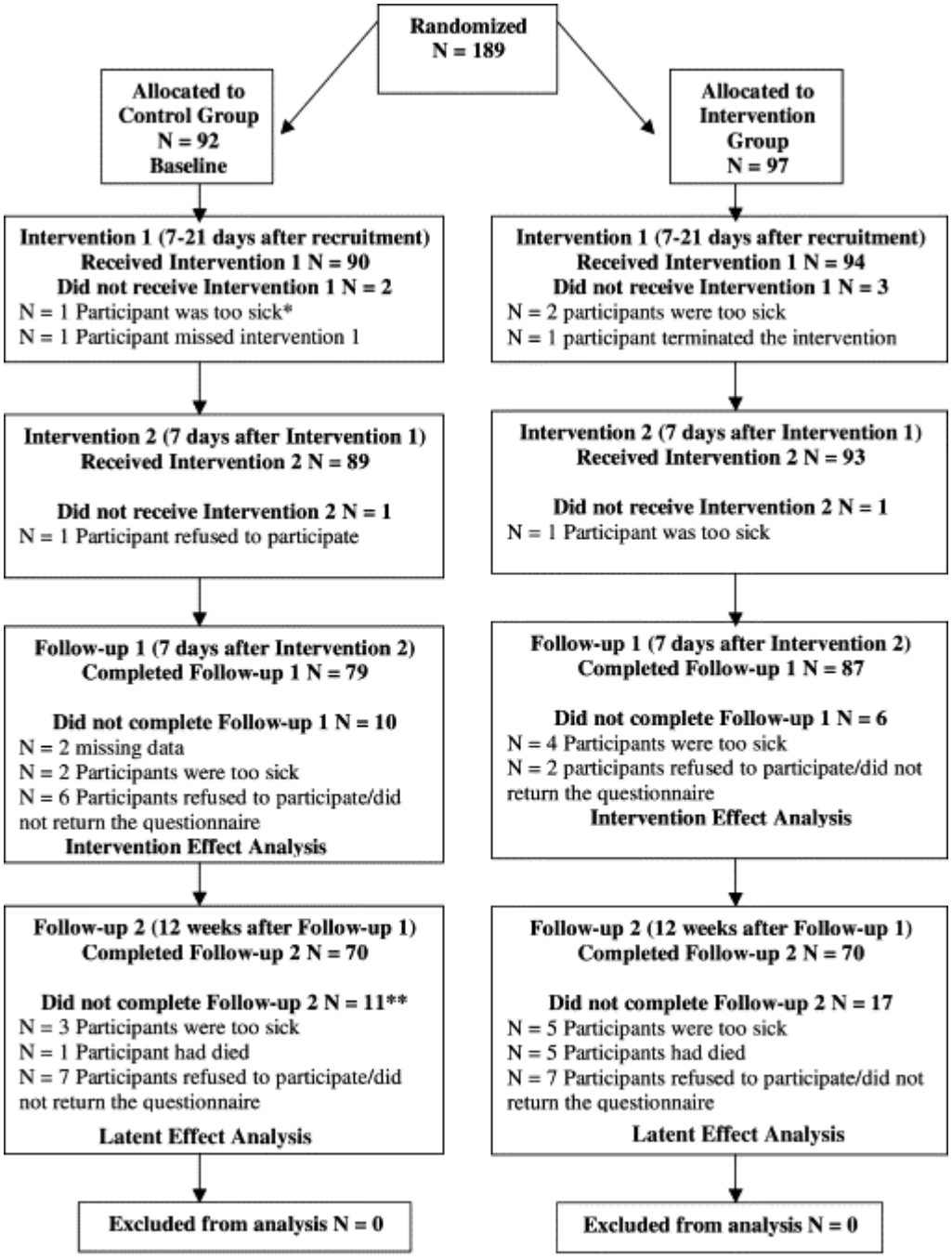
Following completion of the baseline questionnaire, patients were randomly assigned to control and treatment groups stratified by center, using a computer-generated table of random numbers. Clinic staff and the research nurses involved with recruitment and conducting baseline and follow up assessments were not informed of study group allocation, although during the course of routine clinical practice, some patient responses may have revealed to clinic staff the group to which patients had been allocated. Patients received the first session of the PMI or control intervention at their next clinic visit (7–21 days after recruitment), and the second session 1 week later by phone.

Follow up assessment was conducted at 1 week (T1) and 8 weeks (T2) following the second intervention session. The follow up questionnaires were mailed for patients to complete at home and return by reply paid mail. Research staff not involved in delivering interventions phoned patients to assist with completion and facilitate timely return of the questionnaire, and to confirm medication usage data.

Data were entered and analyzed using SPSS® Version 11. To identify any baseline differences between groups, chi-square analyses were conducted for categorical variables, and independent t-tests were conducted for continuous variables. Continuous variables were then examined for normality to confirm the choice of analysis. To evaluate the effectiveness of the intervention, multiple regression analysis of the change scores for intervention and control groups over time were conducted. The calculated change scores (T1 − T0, and T2 − T0) were the dependent variables, with the baseline value of the variable also included in the model to adjust for the possibility that a large value of a variable at baseline can result in a greater change over time. Demographic variables on which the baseline variables differed between experimental groups were also included.

4. Results

Fig. 2 illustrates recruitment rates and retention for the study.



*condition had deterioated since last contact and was now too ill to continue participating in the study

** 2 participants with missing data at Follow up 1 were included in Follow up 2 analysis

Fig. 2. Flow of participants through the study.

Of the 189 eligible patients from the two centers who completed the baseline assessment (T0) and who were subsequently randomized, 166 (87.8%) completed the T1 follow up assessment, and 140 (74.1%) completed the T2 follow up assessment. Attrition rates did not differ between intervention and control groups, with the main reason for attrition being deteriorating condition or death.

Details of the sample are included in Table 3. Two-thirds (66.1%) of the sample were female with a mean age of 56 years (S.D.: 11.93; range: 28–84 years). The median time since diagnosis was 3 months (range: 0–331 months).

Table 3. Demographic and medical characteristics of the sample

	Control group ($N = 92$)		Treatment group ($N = 97$)	
	N	%	*N*	%
Age (years)				
<44	16	7.4	15	15.5
45–59	41	44.6	51	52.6
60–74	29	31.5	24	24.7
≥75	6	6.5	7	7.2
Marital status				
Single never married	11	12.0	8	8.3
Married/defacto	52	56.5	63	65.6
Divorced/separated	13	14.1	16	16.7
Widowed	16	17.4	9	9.4
Primary cancer				
Breast	49	53.3	34	35.1
Colorectal	20	21.7	26	26.8
Lung	11	12.0	22	22.7
Head and neck	12	13.0	15	15.5
Site of metastases[a]				
None known	43	46.7	39	40.2
Bone	25	27.2	25	25.8
Lung/pleura/chest wall	18	19.6	13	13.4
Liver	13	14.1	17	17.5
Colon	5	5.4	5	5.2
Intra-abdominal	4	4.3	5	5.2
Lymph nodes	8	8.7	11	11.3
Cerebral	3	3.3	3	3.1
Other	14	15.2	10	10.3
Current course of treatment is for				
New diagnosis	46	50.0	59	60.8
Recurrence	14	15.2	13	13.4
Disease progression	27	29.3	23	23.7
New treatment/unresponsive disease	2	2.2	1	1.0
New symptom	3	3.3	1	1.0
Treatment aim				
Cure	45	48.9	51	52.6
Remission/control	5	5.4	2	2.1
Palliation	38	41.3	44	45.4
N/A or unknown	4	4.4	0	0.0
Time patient has had pain				
Hours	5	5.5	4	4.1
Days	6	6.6	10	10.3
Weeks	30	33.0	33	34.0
Months	41	45.1	44	45.4
Years	9	9.9	6	6.2
Performance status				
Fully active	23	25.0	27	27.8
Ambulatory — capable of light work	48	52.2	51	52.6
Immobile <50% of the time	17	18.5	13	13.4
Immobile >50% of the time	4	4.3	6	6.2

Despite randomization of patients into experimental groups, chi-square analysis identified significant differences between the control and treatment groups at baseline for marital status and diagnostic group. The control group comprised a greater number of patients with breast cancer, and patients who were married, however there was no significant difference in the proportion of females and males in the control and intervention groups. Furthermore, although no significant baseline differences existed between groups with regard to disease stage, or treatment aim, patients in the treatment group reported significantly greater distress from pain, lower satisfaction with overall pain treatment, greater hesitancy in communicating with their doctor, higher levels of anxiety and depression, and lower levels of global quality of life. Further analysis of baseline data indicated significant differences between tumor groups for many of these same variables. That is, compared to patients with other tumor types, patients with breast cancer reported significantly less interference from pain, significantly greater knowledge about pain, less anxiety and depression, greater personal control, higher quality of life, and greater desire for involvement in decision making regarding pain.

Hence, to evaluate the effectiveness of the intervention, regression analyses to predict mean change scores for intervention and control groups over time were conducted to control for these differences. The model was T2 − T0 or T1 − T0 = constant + marital status + diagnosis + T0 variable + treatment group. Table 4 and Table 5 present the estimated marginal mean scores from this model for control and treatment groups for each time point for variables measuring factors that may predispose and enable effective pain management.

Table 4. Mean scores for predisposing factors at baseline (T0), 1 week post-intervention (T1) and 8 weeks post-intervention (T2)

Scale	Treatment group	*T0* (*N* = 189) mean (S.D.)	*T1* (*N* = 166) mean (S.D.)	*T2* (*N* = 140) mean (S.D.)	*T1* − *T0*[a] (*N* = 166) estimated marginal mean (S.E.M.)	*T2* − *T0*[a] (*N* = 140) estimated marginal mean (S.E.M.)
Addiction	Control	30.5 (8.7)	29.6 (9.0)	28.5 (8.4)	−1.5 (0.8)**	−2.4 (0.9)**
	Intervention	31.1 (8.5)	23.4 (7.7)	23.0 (7.7)	−7.8 (0.8)	−7.7 (0.9)
Be good	Control	20.2 (6.8)	20.0 (6.9)	18.4 (5.5)	0.4 (0.7)*	−2.1 (0.6)
	Intervention	21.8 (6.3)	18.3 (5.8)	18.0 (5.6)	−2.9 (0.6)	−3.4 (0.6)
Tolerance	Control	23.9 (7.8)	22.7 (7.6)	21.5 (7.2)	−1.5 (0.7)**	−2.3 (0.7)*
	Intervention	25.3 (7.1)	19.3 (6.8)	20.0 (7.2)	−5.6 (0.7)	−4.5 (0.7)
Willingness to tolerate pain	Control	21.0 (5.8)	20.5 (5.9)	20.1 (4.9)	−0.3 (0.6)**	−0.6 (0.5)**
	Intervention	21.2 (6.3)	18.6 (5.3)	18.1 (5.0)	−2.6 (0.6)	−2.6 (0.5)
Side effects	Control	29.9 (6.1)	30.0 (6.0)	29.1 (5.4)	−0.2 (0.5)*	−1.0 (0.7)
	Intervention	30.4 (5.9)	28.6 (5.4)	28.2 (7.7)	−1.6 (0.5)	−2.2 (0.7)
Distraction	Control	22.1 (7.2)	22.0 (7.3)	20.8 (6.5)	−0.4 (0.7)	−1.5 (0.7)
	Intervention	22.4 (7.1)	20.4 (6.6)	20.4 (6.8)	−2.1 (0.7)	−2.2 (0.7)
Progression	Control	29.8 (9.0)	28.8 (9.9)	27.6 (8.8)	−0.7 (0.9)	−1.7 (1.0)
	Intervention	30.5 (9.3)	27.9 (9.9)	26.7 (9.7)	−2.3 (0.9)	−3.1 (1.0)
Individuality	Control	39.2 (4.7)	39.2 (4.9)	38.6 (4.9)	0.0 (0.5)	−0.5 (0.6)
	Intervention	38.9 (5.5)	38.1 (4.8)	38.3 (5.2)	−0.8 (0.4)	−0.7 (0.6)
Fatalism	Control	23.0 (7.0)	21.7 (6.4)	21.2 (5.9)	−1.4 (0.7)	−1.6 (0.7)**
	Intervention	25.3 (7.0)	20.2 (7.3)	18.9 (6.2)	−2.5 (0.7)	−4.3 (0.7)

T0: baseline score; T1: 1 week post-intervention; T2: 8 weeks post-intervention; S.E.M.: standard error of the mean.

Table 5. Mean scores for enabling factors and behavioral outcomes at baseline (T0), 1 week post-intervention (T1) and 8 weeks post-intervention (T2)

Scale	Treatment group	T0 (*N* = 189) mean (S.D.)	T1 (*N* = 166) mean (S.D.)	T2 (*N* = 140) mean (S.D.)	T1 − T0[a] (*N* = 166) estimated marginal mean (S.E.M.)	T2 − T0[a] (*N* = 140) estimated marginal mean (S.E.M.)
Knowledge	Control	11.0 (5.6)	12.1 (5.4)	14.1 (4.2)	1.2 (0.4)**	3.0 (0.5)
	Intervention	9.8 (5.3)	13.1 (4.4)	13.4 (4.7)	3.0 (0.4)	2.6 (0.5)
Preparedness	Control	7.8 (2.1)	8.3 (1.5)	9.4 (8.5)	0.7 (0.2)	0.7 (0.2)
	Intervention	7.2 (2.5)	8.0 (1.7)	8.0 (1.9)	0.7 (0.2)	0.5 (0.2)
Perceived control	Control	33.7 (5.6)	33.5 (5.2)	34.0 (6.1)	−0.2 (0.6)*	0.0 (0.6)
	Intervention	32.9 (5.6)	34.9 (5.5)	34.5 (5.4)	1.7 (0.5)	1.3 (0.6)
Decision making	Control	32.0 (8.0)	31.9 (7.9)	33.3 (8.2)	−0.2 (0.7)	1.3 (0.9)
	Intervention	30.0 (7.0)	31.2 (8.0)	32.1 (9.1)	0.8 (0.7)	1.8 (0.9)
Difficult to communicate with doctors	Control	4.4 (2.2)	4.0 (2.2)	4.0 (1.8)	0.0 (0.2)	−0.3 (0.2)
	Intervention	4.4 (2.4)	4.4 (2.5)	3.5 (2.1)	0.3 (0.2)	−0.8 (0.2)
Hesitant to communicate with doctors	Control	4.1 (2.2)	4.0 (2.0)	3.7 (1.5)	0.0 (0.2)	−0.5 (0.2)
	Intervention	4.3 (2.1)	4.4 (2.6)	3.5 (1.9)	0.3 (0.2)	−0.8 (0.2)
Number of health professionals spoken to about pain	Control	1.7 (1.0)	1.5 (1.0)	1.1 (1.0)	−0.2 (0.1)	−0.6 (0.1)
	Intervention	1.7 (1.0)	1.7 (1.1)	0.9 (0.9)	−0.1 (0.1)	−0.7 (0.1)
Number of treatments recommended	Control	2.4 (2.2)	2.6 (2.1)	2.9 (2.3)	−0.1 (0.2)**	0.5 (0.3)
	Intervention	2.3 (1.9)	3.5 (2.4)	3.0 (2.4)	1.3 (0.2)	0.9 (0.3)
Number of treatments used	Control	3.4 (2.3)	3.2 (2.3)	3.0 (2.4)	−0.2 (0.2)	−0.4 (0.3)
	Intervention	3.3 (2.3)	3.6 (2.3)	2.6 (2.4)	−0.3 (0.2)	−0.6 (0.3)

T0: baseline score; T1: 1 week post-intervention; T2: 8 weeks post-intervention; S.E.M.: standard error of the mean.

Table 6 presents similarly estimated mean scores for secondary outcome variables assessing pain behaviors, other dimensions of the pain experience, and quality of life.

Scale	Treatment group	T0 (*N* = 189) mean (S.D.)	T1 (*N* = 166) mean (S.D.)	T2 (*N* = 140) mean (S.D.)	T1 − T0[a] (*N* = 166) estimated marginal mean (S.E.M.)	T2 − T0[a] (*N* = 140) estimated marginal mean (S.E.M.)
Average pain	Control	4.1 (2.0)	4.5 (2.2)	3.6 (1.6)	0.2 (0.2)	−0.7 (0.2)
	Intervention	4.1 (1.8)	3.9 (1.8)	3.5 (1.7)	−0.3 (0.2)	−0.7 (0.2)
Distress	Control	4.4 (2.7)	4.8 (3.0)	4.1 (2.6)	0.0 (0.3)	−0.6 (0.4)
	Intervention	5.3 (2.9)	4.6 (2.7)	4.2 (2.6)	−0.6 (0.3)	−0.9 (0.4)
Impact of pain	Control	28.3 (17.9)	27.2 (18.4)	25.0 (17.5)	−3.3 (1.9)	−4.7 (2.2)
	Intervention	33.0 (18.0)	28.3 (17.3)	24.8 (16.7)	−4.5 (1.7)	−8.0 (2.2)
Anxiety	Control	6.7 (4.2)	6.9 (4.2)	6.4 (4.4)	0.0 (0.1)	−0.6 (0.4)*
	Intervention	8.4 (4.0)	7.2 (3.9)	6.5 (4.1)	−0.2 (0.1)	−1.8 (0.4)
Depression	Control	5.6 (3.9)	6.1 (4.3)	6.0 (4.3)	0.0 (0.1)	0.3 (0.5)
	Intervention	7.6 (4.2)	7.4 (4.7)	6.6 (4.6)	−0.0 (0.1)	−0.6 (0.5)
Quality of life	Control	55.9 (20.4)	53.8 (20.5)	57.7 (20.0)	−0.6 (2.3)	2.8 (2.5)
	Intervention	49.2 (21.1)	52.8 (22.8)	56.8 (22.1)	2.8 (2.2)	4.4 (2.4)
Satisfaction with pain management	Control	14.9 (3.2)	15.0 (3.0)	15.0 (3.3)	0.7 (0.3)	0.4 (0.4)
	Intervention	14.6 (3.2)	15.4 (2.4)	14.8 (3.3)	0.9 (0.3)	0.3 (0.4)

Table 6. Mean scores for pain experiences and wellbeing measures at baseline (T0), 1 week post-intervention (T1) and 8 weeks post-intervention (T2)

T0: baseline score; T1: 1 week post-intervention; T2: 8 weeks post-intervention; S.E.M.: standard error of the mean.

These results indicate a number of significant intervention effects for the primary study outcomes at 1 week following completion of the intervention. Patients who participated in the PMI had a significantly greater increase in knowledge about pain and greater increase in the number of treatments recommended when compared to patients in the control group. Patients in the treatment group also reported greater reduction in concerns about addiction, side effects, being a "good" patient, developing tolerance to pain relieving medication, and willingness to tolerate pain, and a greater increase in feelings of control over their pain. No significant differences were noted on secondary outcome measures, including pain severity, impact, distress, quality of life, anxiety or depression.

Analysis of change scores from baseline to T2 (2 months following the intervention) identified significant differences for some of these same variables, with patients who received the intervention continuing to report greater reduction in concerns about addiction, tolerance and willingness to tolerate pain. In addition, compared to patients in the control group, patients who received the intervention also reported a greater reduction between baseline and T2 in levels of anxiety, and fatalistic views about their pain. However, change scores for the variables assessing feelings of control were not significantly different between groups.

5. Discussion

The purpose of this study was to evaluate the effectiveness of a brief nurse-administered educational intervention in overcoming attitudinal and behavioral barriers to cancer pain management for patients receiving treatment in ambulatory settings. Our results suggest the intervention is effective in decreasing a number of commonly held patient concerns regarding cancer pain and its treatment. The intervention also appears to have been effective in achieving a greater reported willingness for patients to communicate with health care professionals regarding pain. However, apart from findings that suggest the intervention may result in lower levels of anxiety over time, the attitudes and behaviors affected by this intervention did not result in significant improvements on measures of pain intensity, pain impact, or quality of life.

These results are consistent with findings from previous work which suggest that educational interventions that utilize individualized instructional techniques, and employ strategies that enhance patient ability to overcome barriers to effective pain management can result in reduced attitudinal barriers to the use of recommended pain therapies [9 and 11]. These results support the view that structured intervention strategies that target specific contexts for an individual patient are an effective means for decreasing barriers to behaviors that may potentially achieve better symptom control.

However, pain management is a complex problem, with numerous potential etiologies and many available therapeutic options from which clinicians and patients can choose. Our results indicate that the changes that occurred to patient beliefs and knowledge in this study do not necessarily result in reduced pain levels. While previous studies have identified significant relationships between pain attitudes and levels of pain [18], the failure to achieve consistently significant improvements for important clinical outcomes including pain and quality of life raises questions about the extent to which these findings are clinically significant. There are a number of possible responses to this issue.

Firstly, it may be that the brief intervention evaluated in this study was not of sufficient strength or appropriately targeted to impact on the particular behaviors necessary for achieving reductions in pain scores. While patients who participated in the intervention

reported being less willing to tolerate pain than those in the control intervention, we did not obtain detailed information about the nature or outcomes of that communication, to enable an assessment of its effectiveness in addressing patient-specific pain problems. Perhaps additional attention needs to be given to such issues, and when combined with information and verbal coaching, strategies that are more directive may be required. For example, the use of prompt sheets to guide patient questions and interactions, more attention to rehearsal of communication strategies, and involvement of the nurse in the patient–doctor encounter may be of additional benefit. Some of these strategies are reported to have been effective in studies with cancer patients [19], but require further testing.

Secondly, it is also important to consider whether this type of intervention is more effective for some groups of patients than others. In this study, regression analyses to predict mean change scores for the entire sample were used. While these analyses did control for baseline differences, it may be appropriate to identify if the intervention is more effective in some medical or social circumstances (e.g. for patients with severe versus mild pain or those with high barriers). It may be that no matter how much coaching is provided, the social meaning of pain is such that patients will prefer not to take pain relieving medication unless the pain significantly impacts on their quality of life. Such a view might suggest that outcomes such as increased activity or improved wellbeing are as important from the patients' perspective. Further research to explore the complex relationships between changes in beliefs, use of pain medication and pain outcomes in patients from various social and medical backgrounds is needed.

Thirdly, the findings of this study suggest that the success of this type of patient mediated intervention aimed at improving communication with health professionals regarding pain is dependent on additional factors not targeted by this intervention. That is, this study did not specifically aim to directly influence health care professional and family knowledge and behaviors that may reinforce patient responses to and communication about pain. In their model of health behavior, Green et al. [15] identify these as reinforcing factors, suggesting they play an important role in facilitating behavior change, as well as long-term maintenance of any such change.

6. Practice implications

Despite the additional questions raised by this work, the findings from the present study add to the growing body of evidence that nurse-administered educational interventions are able to correct important beliefs that may impact on pain severity and emotional wellbeing, such as concerns about addiction and tolerance. Moreover, the intervention evaluated in the present study was delivered in an outpatient setting, did not require extensive resources and was not time-intensive, and is thus clinically sustainable. The success of the intervention in decreasing some important patient concerns and in increasing their perceptions of control over pain suggests that the strategies appear to have much potential for improving patient outcomes. Further work to develop nursing skills in delivering this type of intervention and to achieve the necessary system changes to facilitate individualized assessment and patient education should be considered.

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References

1. S.C. Weiss, L.L. Emanuel, D.L. Fairclough and E.J. Emanuel, Understanding the experience of pain in terminally ill patients. Lancet 327 (2001), pp. 1311–1315.

2. D.S. Zhukovsky, O. Abdullah, M. Richardson and D. Walsh, Clinical evaluation in advanced cancer. Semin. Oncol. 27 (2000), pp. 14–23.

3. S.E. Ward, N. Goldenberg, V. Miller-McCauley, C. Muellar, A. Nolan, D. Pawlik-Plank et al., Patient-related barriers to management of cancer pain. Pain 52 (1993), pp. 319–324.

4. B.A. Elliott, T.E. Elliott, D.M. Murray, B.L. Braun and K.M. Johnson, Patients and family members: the role of knowledge and attitudes in cancer pain. J. Pain Symptom Manage. 12 (1996), pp. 209–220.

5. J.A. Paice, C. Toy and S. Shott, Barriers to cancer pain relief: fear of tolerance and addiction. J. Pain Symptom Manage. 16 (1998), pp. 1–9.

6. P. Yates, H. Edwards, R. Nash, A. Walsh, B. Fentiman, H. Skerman et al., Barriers to effective pain management: a survey of cancer patients in Australian hospitals. J. Pain Symptom Manage. 23 (2002), pp. 393–405.

7. B. Rimer, M.H. Levy, M.K. Keintz, L. Fox, P.F. Engstrom and N. MacElwee, Enhancing cancer pain control regimens through patient education. Patient Educ. Counsell. 10 (1987), pp. 267–277.

8. D.J. Wilkie, A.R. Williams, P. Grevstad and J. Mekwa, Coaching persons with lung cancer to report sensory pain. Literature review and pilot study findings. Cancer Nurs. 18 (1995), pp. 7–15.

9. R. de Wit, F. van Dam, L. Zandbelt, A. van Buuren, K. van der Heidjen, G. Leenhouts et al., A pain education program for chronic cancer pain patients: follow-up results from a randomized controlled trial. Pain 73 (1997), pp. 55–69.

10. R. de Wit, F. van Dam, S. Loonstra, L. Zandbelt, A. van Buuren, K. van der Heijden et al., Improving the quality of pain treatment by a tailored education programme for cancer patients in chronic pain. Eur. J. Pain 5 (2001), pp. 241–256.

11. J.W. Oliver, R.L. Kravitz, S.H. Kaplan and F.J. Meyers, Individualized patient education and coaching to improve pain control among cancer outpatients. J. Clin. Oncol. 19 (2001), pp. 2206–2212.

12. S. Ward, H.S. Donovan, B. Owen, E. Grosen and R. Serlin, An individualized intervention to overcome patient-related barriers to pain management in women with gynecologic cancers. Res. Nurs. Health 23 (2000), pp. 393–405.

13. C.J. McPherson, J.J. Higginson and J. Hearn, Effective methods of giving information in cancer: a systematic literature review of randomized controlled trials. J. Public Health Med. 23 (2001), pp. 227–234.

14. B.R. Ferrell, M. Grant, J. Chan, C. Ahn and B.A. Ferrell, The impact of cancer pain education on family caregivers of elderly patients. Oncol. Nurs. Forum 22 (1995), pp. 1211–1218.

15. Green LW, Kreuter MW, Deeds SG, Partridge KB. Health education planning: a diagnostic approach. CA: Mayfield Publishing Company; 1980.

16. Cleeland CS, Syrjala KL. How to assess cancer pain. In: Turk DC, Melzack R, editors. Handbook of pain assessment. New York: Guilford Press; 1992. p. 362–87.

17. Agency for Health Care Policy and Research Guidelines. Cancer pain management: a patient guide. Managing cancer pain. Rockville: US Department of Health and Human Services; 1994.

18. S. Ward and J. Gatwood, Concerns about reporting pain and using analgesics: a comparison of persons with and without cancer pain. Cancer. Nurs. 17 (1994), pp. 200–206.

19. R. Brown, P.N. Butow, M.J. Boyer and M.H. Tattersall, Promoting patient participation in the cancer consultation: evaluation of a prompt sheet and coaching in question-asking. Br. J. Cancer 80 (1999), pp. 242–248.

20. N.G. Lavies, L. Hart, B. Rounsefell and W. Runciman, Identification of patient, medical, and nursing staff attitudes to postoperative opioid analgesia: stage 1 of a longitudinal study of postoperative analgesia. Pain 48 (1992), pp. 313–319.

21. Jensen MP, Karoly P. Survey of pain attitudes. In: Turk DC, Melzack R, editors. Textbook of pain assessment. New York: Guilford Press; 1992. p. 228–30.

22. L.C. Edwards, S.A. Pearce, L. Turner-Stokes and A. Jones, The pain beliefs questionnaire: an investigation of beliefs in the causes and consequences of pain. Pain 51 (1992), pp. 267–272.

23. A.S. Zigmond and R.P. Snaith, The hospital anxiety and depression scale. Acta Psychiatr. Scand. 67 (1983), pp. 361–370.

24. N.K. Aaronson, S. Ahmedzai, B. Bergman, M. Bullinger, A. Cull, N.J. Duez et al., The European organisation for research and treatment of cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. J. Natl. Cancer Inst. 85 (1993), pp. 365–376.

25. American Pain Society Quality of Care Committee. Quality improvement guidelines for the treatment of acute pain and cancer pain. JAMA 1995:274;1874–80.

Corresponding author. Tel.: +61-7-3864-3835; fax: +61-7-3864-3814.