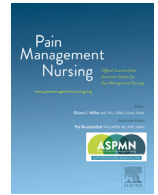




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Original Research

Empowering Cancer Patients with Self-Care and Pain Management Skills: A Quasi-Experimental Study

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ABSTRACT

Background: Cancer patients experience distress as a result of their health condition, which, in turn, contributes to the progression of the disease. Moreover, their daily activities, well-being, and health status are significantly impacted by pain and other symptoms. In this context, empowering these patients with self-care and pain management skills can greatly contribute to effective symptom control.

Aim: To develop and implement an educational approach focused on empowering family caregivers and patients with advanced cancer in effectively managing pain at home.

Method: An educational program, PECP/C-Pain Management, was developed to empower family caregivers and cancer patients to manage pain at home. A quasi-experimental study involving 52 participants with advanced cancer was conducted to test the program. Participants' skills, behaviors, and knowledge related to self-care and pain management were assessed before and after the intervention using an appropriate instrument, the Pain Management Knowledge and Behavior Scale.

Results: Pain was reported as the primary symptom, and following the educational program, participants were able to monitor pain and other symptoms and effectively self-manage their treatment.

Conclusions: The findings suggest that the PECP/C-Pain Management intervention was effective in improving participants' knowledge and skills in managing pain, leading to better symptom control. In addition, the Pain Management Knowledge and Behavior Scale is a reliable tool for measuring the outcomes of this intervention.

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According to the Organization for Economic Cooperation and Development (OECD), Portugal is one of the EU countries that fall below the EU average in terms of healthy life expectancy at birth, with oncological diseases being one of the main causes. In fact, oncological diseases are also the second leading cause of premature death in the EU (WHO, 2020).

Despite improvements in therapeutics and treatment techniques, cancer is often diagnosed at an advanced stage, making disease progression harder to control and increasing the likelihood of relapse. Educational approaches have been developed to promote symptom control in patients with advanced cancer. It is crucial to

manage symptoms from the onset to prevent unnecessary suffering for both patients and their loved ones (Courteau et al., 2018).

Pain is one of the most reported symptoms in advanced cancer patients, with a prevalence of approximately 66%. Among these cases, 38% are reports of severe pain events (Fallon et al., 2018; Valenta et al., 2018a). The causes of oncologic pain are complex and multifactorial, often arising from difficulties in controlling other symptoms (Makhlouf et al., 2020).

Educational approaches such as the PRO-SELF: Pain Control Program aim to improve patient and family caregiver awareness and education through skill-building coaching (Ekstedt & Rustøen, 2019). Such initiatives have been tested in several countries and have shown the benefits of empowering caregivers and patients with the skills needed to appropriately register pain events and manage treatment (Valenta et al., 2018b).

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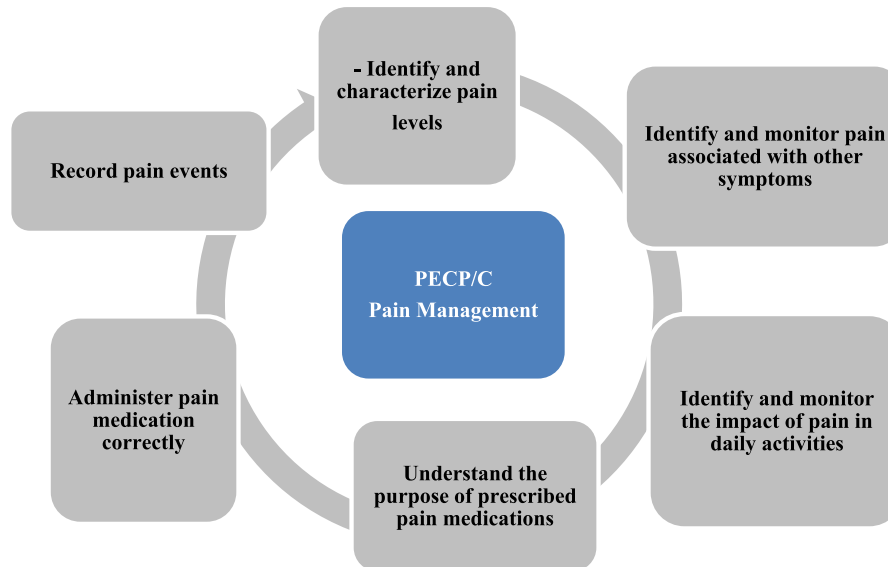


Figure 1. Objectives of the PEOP/C-Pain Management, an educational approach designed to provide family caregivers and advanced cancer patients with skills to manage pain at home.

However, no studies on the implementation of these interventions have been found in the relevant literature in Portugal (Correia & Frade, 2012). Therefore, the authors of the present work consider it relevant to create such an educational approach to improve symptom control and empower patients and family caregivers as central and active participants in the self-care process (Zhang et al., 2023), thus contributing to the greater well-being of these patients. The aim of this study was to implement an educational intervention program and evaluate the effect on the empowerment of cancer patients with advanced disease and caregivers in the management of the pain at home.

Materials and Methods

As mentioned previously, the present work focuses on the development and implementation of an educational program, PECP/C-Pain Management. This program was designed to provide family caregivers and advanced cancer patients with the necessary skills to effectively manage pain at home. Figure 1 illustrates the purpose of this initiative.

Study Design

To appraise the impact of the program, a quasi-experimental study was conducted to assess participants' awareness, knowledge, behaviors, and skills related to self-care and pain management before and after their involvement in the initiative.

The program was developed over a six-week period and intended to include two or three direct educational interventions, along with a final evaluation session. Throughout the implementation, the program's evaluation took place at three different time points, namely T1, T2, and T3. T1 and T2 evaluations occurred before the second and third educational intervention sessions, respectively, while T3 corresponded to the final assessment session.

Participants

The study was conducted in the chemotherapy department of a Portuguese hospital, with the collaboration of nurses and doctors in the unit. The authors were able to identify 52 initial candidates who were advanced cancer patients experiencing pain events.

The study received approval from the hospital's ethics committee and adhered to the ethical principles of nursing research, the Declaration of Helsinki, and the Oviedo Convention. All participants signed an informed consent form before participating in the program. Additionally, permission to use the Edmonton Symptom Assessment System (ESAS) – a measurement tool – was obtained from the author who translated and adapted it into Portuguese in 2005. Participants were selected based on the following criteria:

- Diagnosis of advanced cancer or attending the second/third cycle of chemotherapy at a day hospital;
- Reported at least one pain event;
- Over 18 years of age;
- Awareness of their health status;
- Willingness to respond to surveys/questionnaires;
- Ability to assess and monitor symptoms and make decisions about treatment;
- Ability to self-manage pain or having a caregiver for home care and medical appointments.

After signing the informed consent form, the 52 participants attended the first educational intervention session. The first evaluation point (T1) was carried out with 50 participants, as two patients passed away during the follow-up period. Subsequently, 17 patients were lost to follow-up due to deterioration of health status, and the second evaluation point (T2) was conducted with 33 participants. Finally, 14 patients were assessed and discontinued their participation, resulting in 19 participants attending the third intervention session and the final evaluation point (T3), as shown in Figure 2.

Intervention

Based on the PRO-SELF: Pain Control Program, the PECP/C-Pain Management initiative also followed the guidelines established by the Portuguese Directorate-General of Health (DGS) for self-management of pain (Fallon et al., 2018). The program included activities described in the Nursing Interventions Classification (NIC) system, specifically activities related to the nursing intervention "Pain Control" (Butcher et al., 2018), as shown in Table 1. Participants were provided with logbooks to record their pain experiences.

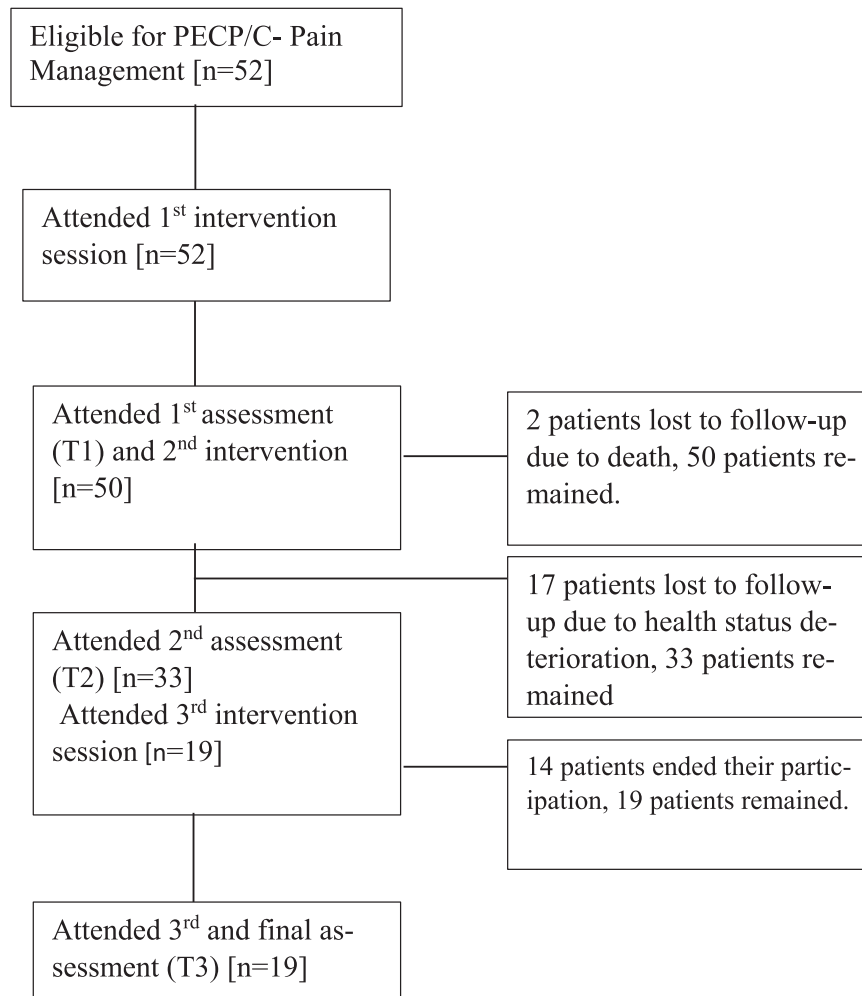


Figure 2. Flow chart describing the various stages of development and evaluation of PECP/C-Pain Management (based on the CONSORT 2010 guidelines [Schulz et al., 2010]).

Objectives

In order to assess whether PECP/C-Pain Management provides family caregivers and advanced cancer patients with the skills needed to fully document pain experiences, the following objectives were defined:

- To evaluate their knowledge of pain perception before and after attending the program.
- To assess their ability to maintain a comprehensive record of the pain experience: their aptitude in monitoring pain location, intensity, duration, and frequency; the impact of pain on daily activities; and the relationship between pain and other symptoms at three different time points.

In order to appraise whether PECP/C-Pain Management empowers patients to self-manage pain medication, the following objectives were defined:

- To evaluate their ability to maintain a complete pain medication record at three different time points and analyze their behavior and knowledge regarding the use of prescribed analgesics before and after attending the program.

Instruments

A questionnaire was used to characterize the sociodemographic profiles of the participants. Furthermore, in order to assess their knowledge and behavior pre- and post-intervention, a measure-

ment tool called the “Pain Management Knowledge and Behavior Scale” (PMKBS) was developed and validated. This instrument, structured as a five-point Likert-type scale, comprises 21 nursing outcome (NOC) indicators, including 11 indicators pertaining to pain knowledge and 10 indicators pertaining to pain control, falling under the domain of “Knowledge and Health Behavior”. The NOC indicators measure the participants’ scores before and after the intervention, with values ranging from 1 to 5, where 1 represents the lowest score and 5 represents the highest score (Johnson et al., 2018).

To document the experience of pain, a logbook was utilized that incorporated the ESAS. This tool has been extensively tested in various studies conducted across different countries, including: Canada (Davison et al., 2006), the United States (Chang et al., 2000), South Korea (Kwon et al., 2013), and Japan (Yokomichi et al., 2015). In addition to capturing pain intensity, the logbook also encompasses details about the pain’s location, duration, correlation with other symptoms, impact on daily activities, and analgesic medication intake.

Statistical analysis

Statistical analysis was conducted using IBM SPSS Statistics 24.0, employing various techniques, such as univariate and bivariate analysis, to examine measures of location, dispersion, association, and correlation. A significance level of 5% was utilized for the analysis.

Table 1
Description of the PEOP/C-Pain Management Initiative.

PECP/C-Pain Management – Educational Session Plan				
Phase	Objectives	Activities	Outcome	Duration
Introduction	- To empower and involve patients and family caregivers in the care process.	- Provide time and a place for patients and caregivers to express their concerns, needs, and pain experiences.	- Patients and caregivers felt empowered and involved in the care process, enabling them to recognize and record pain events.	5 min.
Development	- To empower the patient/family caregiver to assess and monitor pain.	- Provide information and instructions about: <ul style="list-style-type: none"> • Recording symptom intensity in the logbook, using the ESAS; • Identifying and recording the location of pain in the logbook; • Describing the type of pain (e.g., aching, twinge, colic, or burning); • Describing the range and depth of the pain. Is it superficial or deep? Is it spreading? Is it different/worse than usual? • Writing brief descriptions of the pain events in the logbook. 	- Patients and caregivers were able to identify pain events and take appropriate action in response to pain experiences.	15 min.
- Individualized learning	- To empower the patient/family caregiver to assess and monitor pain in the context of other symptoms.	<ul style="list-style-type: none"> • Document the frequency of pain and other symptoms, in the logbook, writing a dash for each pain event. • Record the duration of pain and other symptoms in the logbook, placing a dash under the approximate time they occurred. 		
- Training	- To empower the patient/family caregiver to assess and monitor the impact of pain on daily activities.	<ul style="list-style-type: none"> • Identify and record in the logbook how pain events affect daily activities. 		

Table 2
Internal Consistency Analysis of the Edmonton Symptom Assessment System (ESAS) at the Three Time Points.

Edmonton Symptom Assessment System (ESAS)			
Time Point (number of participants)	T1 (n = 50)	T2 (n = 33)	T3 (n = 19)
Cronbach's alpha	0.861	0.864	0.898

Table 3
Internal Consistency Analysis of the Pain Management Knowledge and Behavior Scale^a/PMKBS, Post-intervention.

Scales (Global and Subsets)	No. of Items	Cronbach's Alpha (after the intervention)
Knowledge and Behavior in Pain Management	21	0.967
Knowledge in Pain Control	11	0.928
Behavior in Pain Management	10	0.971

Paired samples within the same group of participants were analyzed at two and three different time points (T1, T2, and T3) using non-parametric statistical tests, including the Wilcoxon test for two paired samples, the Friedman test, and the chi-squared (χ^2) test of independence. To evaluate the response to change before and after the PECP/C-Pain Management intervention, the “Responsiveness” tool of the MedCalc statistical software was utilized. This tool allowed assessment through various indices and indicators such as the percentage change (rate of change), the ceiling effect and floor effect, magnitude of effect (1.30), and average normalized response (Cohen, 1992; Juandi et al., 2021).

The internal consistency of the ESAS and the PMKBS was assessed using Cronbach's alpha and is presented in Tables 2 and 3, respectively. The psychometric properties of the PMKBS were evaluated before and after the PECP/C-Pain Management intervention,

and demonstrated a high internal consistency after the intervention, with Cronbach's alpha values exceeding 0.9 at both global and partial levels. The symmetry and distribution of individual items were assessed using coefficients and charts such as histograms, Q-Q Plots, and Box plots. The data showed asymmetry and non-normal distribution.

Spearman's correlation was used for the exploratory and factorial analysis (EFA), and revealed strong and significant correlations ($r_s > 0.7$; $p < .001$) between variables. The homogeneity of all variables was analyzed using the Kaiser-Meyer-Olkin (KMO) coefficient, which had a value of 0.866, confirming the suitability of the EFA (Marôco, 2018). Following the intervention, EFA was applied to the 21 items of the PMKBS, with subsequent factor extraction using the principal component analysis method and orthogonal rotation (Varimax with Kaiser standardization). The number of factors retained was determined through scree plot analysis (Marôco, 2018).

The relational structure of pain management knowledge and behavior was revealed through the identification of three latent factors, which collectively account for 81.4% of the total variance. The first factor encompasses variables associated with the empowerment to monitor and record pain events (items 3, 4, 5, 6, 7, 8, 9, 10, and 11), focusing on behavior and health indicators. The second factor consists of variables related to the utilization of analgesic medication and the empowerment to manage medication effectively (items 12, 13, 14, 15, 16, 17, 18, 19, 20, and 21), indicating knowledge of pain and explaining 9.3% of the total variance. The third factor consists of variables linked to the knowledge required to identify pain (items 1 and 2), relating to understanding pain and explaining 6.0% of the total variance. All variables possess a measure of sampling adequacy (MAS) greater than 0.8.

To assess the intervention's impact on the knowledge of pain identification among family caregivers/patients, we employed the non-parametric Wilcoxon Signed Rank-Sum test. Additionally, we utilized that Wilcoxon test to examine the correlation between pain intensity and tiredness, as well as to compare the levels of sadness/depression, the influence of pain on daily life activities,

and the connection between pain and the will to live, as reported by patients during the first and second evaluation time points (T1 and T2). The Friedman test was employed to compare the values recorded across the three evaluation time points.

Results

The participants attended the oncology unit as outpatients. Palliative care was not implemented in the service, and they did not attend the pain clinic.

Characterization of the Participants

Most (63.5%) are female. Their ages range from 27 to 87 years, with an average of 63 years and a standard deviation of 11.6 years. The male participants, for the most part, are older than the women. Most participants (73.1%) are married. In terms of education, 3.8% of participants were college graduates, 48.1% had only completed the 4th year of schooling, and one participant did not know how to read or write. Intestinal cancer was the most prevalent medical diagnosis, accounting for 46.2% of the cases, followed by breast cancer, which accounted for 23.1% of the cases. Before the intervention, 22 patients reported feeling a lot of pain, 16 reported feeling some pain, 9 reported feeling little pain, and only 4 reported feeling no pain.

Assessment of knowledge and ability to monitor pain intensity, duration, and frequency

All participants were able to identify and record their pain experiences at the three assessment time points (T1, T2, and T3). After the first direct intervention session and first evaluation time point (T1), 92.2% (50) of participants were able to identify pain and record its intensity using the ESAS. This number dropped to 63.5% (33) of participants at the second evaluation time point (T2), and to 36.5% (19) of participants at the third evaluation time point (T3). This decrease was due to 13 participants deciding they had achieved the proposed objectives and wishing to leave, and 18 participants needing hospitalization due to the worsening of their health status.

Table 4 summarizes the outcome/impact of the PECP/C-Pain Management intervention by presenting the pre- and post-intervention median scores (hereinafter referred to as “Me”) for each item of the PMKBS. As can be seen, there are significant differences observed in all items of empowerment regarding monitoring and registering pain before and after the intervention ($p < .001$). However, a substantial increase in the level of knowledge was observed after the intervention.

Ability to record pain duration and location throughout the intervention

At the first evaluation time point, T1, 38% of patients reported persistent pain, and 36% reported pain with an intensity less than or equal to 2. At time points T2 and T3, there was a prevalence of reports of persistent pain (T2: 52%; T3: 42%). The recording of pain location was carried out by 86% (50) of participants at T1, by 78.1% (33) at T2, and by 94.7% (19) at T3.

Evaluation and monitoring of pain related to other symptoms

In the three evaluation time points, the logbook records showed that the most frequently reported symptom was tiredness. The intensity of the symptoms was obtained by summing the scores of 10 items from the ESAS questionnaire for each participant. The minimum symptom intensity value was observed at T1, with one participant presenting a score of 12, and the maximum at T2, with

one patient presenting a score of 94. There were no significant differences in symptom intensity across the three registration times ($n[T1] = 50$, $Me[T1] = 44$; $n[T2] = 33$, $Me[T2] = 41$; $n[T3] = 19$, $Me[T3] = 42$; $p = .443$).

Monitoring pain impact on daily activities

Between 80% and 95% of participants identified and monitored the impact of pain on daily activities, recording this at all three evaluation time points. The daily activities most affected by pain were mobility, work, having fun, and sexual activity, with the latter being reported as the most affected at the second evaluation time point. There were no significant changes between time points T1 and T2, or among all three time points ($p > .05$). It should be noted that most patients reported that pain did not significantly interfere with their will to live.

Ability to record pain therapeutics

The participants recorded their medication usage at T1, T2, and T3 without any significant difference in the percentage of records made during the three time points ($p > .05$). After the intervention, a significant increase in knowledge level was observed for all items related to medication management empowerment (all with $p < .001$), as shown in Table 5. Some patients reported not taking the prescribed analgesic medication. The main reason stated for not taking the medication throughout the three evaluation time points was the ability to endure pain.

However, related concerns such as the fear of side effects and habituation mentioned at T1 (29% and 12%, respectively) decreased by T2 (0% and 17%, respectively) and were no longer mentioned by T3. The PECP/C-Pain Management intervention had a significant impact on raising patients' awareness and improving behavior regarding pain management ($p < .001$). The effect size, with a magnitude higher than 1.30, is considered to be of high magnitude. There was an improvement in well-being over the course of the PECP/C-Pain Management, although it was not significant between the first two time points ($n = 33$; $Me[T1] = 3$; $Me[T2] = 3$; $Me[T3] = 4$; $p = .314$) or between all time points ($n = 19$; $Me[T1] = 3$; $Me[T2] = 3$; $Me[T3] = 4$; $p = .693$).

Pain did not significantly interfere with the will to live between the first two registers ($n = 33$; $Me[T1] = 3$; $Me[T2] = 3$; $Me[T3] = 4$; $p = .314$) nor between the 3 registers ($n = 19$; $Me[T1] = 3$; $Me[T2] = 3$; $Me[T3] = 4$; $p = .693$). In the comparison of pain intensity between the groups, the effect of PECP/C-Pain Management on the reduction of pain intensity was significant, considering the disease's progression throughout the intervention ($n = 19$; $Me[T1] = 6$; $Me[T2] = 4$; $Me[T3] = 6$; $p = .079$).

Discussion

We assessed participants' knowledge, before and after the PECP/C-Pain Management intervention using the PMKBS. Specifically, by applying the subscale with knowledge assessment indicators, we found a significant change in knowledge after the PECP/C-Pain Management intervention. This change was evident in most participants, as their knowledge progressed from “moderate” (level 3) to “substantial” (level 4) or “extensive” (level 5). Therefore, the PECP/C-Pain Management intervention demonstrated a positive outcome, with participants increasing their knowledge of pain signs, symptoms, causes, and triggering factors by 1 or 2 levels.

In their study, Lopes et al. (2020b) emphasize the importance of placing the patient as the primary self-care provider and stress the need for collaborative decision-making between patients and healthcare professionals. In this context, empowering patients to appraise, monitor, and record their pain events also improves communication with healthcare professionals.

Table 4

Impact of the PEO/C-Pain Management Intervention on Self-care Empowerment for Pain Management in Cancer Patients: Median (Me) Scores Before and After the Intervention are Presented, Along with the Corresponding *p* Values from the Wilcoxon Rank-Sum Test (*n* = 52).

List of Items (by Subscale)	Me (Before)	Me (After)	<i>p</i> Value
Knowledge About Pain			
1 – Causes and factors that trigger pain	3	4	< .001
2 – Pain signs and symptoms	3	4	< .001
Empowerment – Pain Monitoring and Recording			
3 – Monitoring the intensity of pain events	1	5	< .001
4 – Monitoring the intensity of associated symptoms	1	5	< .001
5 – Monitoring the frequency of pain events	1	4	< .001
6 – Monitoring the frequency of associated symptoms	1	4	< .001
7 – Monitoring the duration of pain events	1	5	< .001
8 – Monitoring the duration of associated symptoms	1	4	< .001
9 – Monitoring localized pain	1	5	< .001
10 – Using a logbook to record pain symptoms in daily life	1	4	< .001
11 – Keeping a daily record of pain experiences	1	4	< .001
Empowerment – Medication Management			
12 – Understanding prescribed medications	3	5	< .001
13 – Appropriate use of prescribed medications	3	4	< .001
14 – Correct use of prescribed medications in emergency situations (SOS)	3	4	< .001
15 – Ensuring safe and correct use of prescribed medications	3	4	< .001
16 – Understanding the therapeutic effects of prescribed medications	3	4	< .001
17 – Awareness of possible side effects of prescribed medications	3	4	< .001
18 – Recording prescribed medication doses, time, and administration methods on a personal record sheet	1	4	< .001
19 – Maintaining a comprehensive record of administered medications	1	4	< .001
20 – Understanding the importance of complying with the therapeutic treatment	3	4	< .001
21 – Importance of informing healthcare professionals about current medication usage	3	5	< .001

Table 5

Progression of Medication Record Management Evaluated at Three Different Time Points (T1, T2, T3), with the Corresponding *p* Values from the Chi-squared (χ^2) Independence Test.

List of Items		T1	T2	T3	<i>p</i> Value
1 – Drug name	Yes	68.0% (34)	51.5% (17)	42.1% (8)	.100
	No	32.0% (16)	48.5% (16)	57.9% (11)	
2 – Dose(s)	Yes	66.0% (33)	51.5% (17)	36.8% (7)	.077
	No	34.0% (17)	48.5% (16)	63.2% (12)	
3 – Schedule	Yes	62.0% (31)	51.5% (17)	47.4% (9)	.455
	No	38.0% (19)	48.5% (16)	52.6% (10)	
4 – Intake record	Yes	48.0% (24)	51.5% (17)	36.8% (7)	.687
	No	52.0% (26)	48.5% (16)	63.2% (12)	
5 – Emergency (SOS) intake record	Yes	36.0% (18)	39.4% (13)	31.6% (6)	.8514
	No	64.0% (32)	60.6% (20)	68.4% (13)	
Number of records		50	33	19	

Concomitantly, a study conducted in the United States on pain self-management in cancer patients (Valenta et al., 2018b) also highlights the significance of pain awareness/knowledge, monitoring, and documentation by patients. This is because the records provided by patients enable doctors to make accurate therapeutic decisions. Therefore, it is crucial for patients to have their pain-related records readily available during medical appointments.

PECP/C-Pain Management was found to be effective at all three evaluation time points. Its use at home had been recommended during the direct intervention sessions, as the participants demonstrated the ability to complete their records without assistance. The duration of the intervention was tailored to individual circumstances and did not exceed 60 minutes in total.

After the intervention, there was a significant improvement in monitoring and recording of pain and other symptoms, with the score increasing three levels from 1 to 4. In addition, there was a notable improvement in monitoring and recording of local symptoms, specifically in terms of frequency and duration, as well as the existence of pain-related symptoms. In this case, the score increased four levels, from 1 to 5.

Other initiatives, such as the PRO-SELF: Pain Control Program, have also been effectively used to empower cancer patients in

managing their pain while receiving home care. Regarding the PRO-SELF: Pain Control Program, three direct intervention sessions were conducted during domiciliary visits, with one or two phone calls in between (West et al., 2003; Vallerand et al., 2004; Valenta et al., 2018b).

Valenta et al. (2022) reported a significant improvement in patient knowledge and confidence in pain management as a result of an educational program that empowered cancer patients to manage their pain. To assess knowledge and behavior in medication management, the researchers utilized a subscale with medication management indicators. The intervention had a positive effect on patients' knowledge about their medication. All patients experienced at least a one-level improvement in knowledge, with half of them reaching an "extensive" level of knowledge (level 5) by the end of the intervention. This improvement was significant, not only in terms of the appropriate use and safety of medications, but also in understanding therapeutic effects and side effects.

It is crucial for patients to inform healthcare professionals about any medication side effects, and this aspect showed a significant improvement of two levels. These findings are consistent with those of a previous randomized study conducted by

Koller et al. (2018), which examined the impact of a pain management program on cancer patients.

Other studies, including the research conducted by Yamanaka and Suzuki (2021), have highlighted the positive impact of implementing educational programs to empower patients in recording their pain experiences and effectively managing their treatments. Furthermore, the intervention resulted in improved well-being and a reduction in pain intensity among patients (Yamanaka and Suzuki, 2021).

Similarly, Valenta et al. (2018b) emphasized the significance of interventions that empower patients to monitor and record pain and medication side effects. However, it is important to note that this change did not lead to a significant reduction in symptom intensity, especially when symptoms were associated with pain that affects quality of life.

The assessment of the educational program during the evaluation periods revealed a significant decrease in the number of patients who failed to take their medication. The demystification of medication also showed remarkable progress. Initially, two patients reported not taking the medication due to fear of habituation, and five patients expressed concerns about potential side effects. However, in the second evaluation time point, only one patient reported fear of habituation, and in the third evaluation time point, no patients reported fear or false information regarding the medication.

We also observed that, in general, patients make efforts to manage their pain as effectively as possible, and this may be influenced by cultural factors or individual autonomy. Urits et al. (2019) and Yeager et al. (2019), in their studies on the therapeutic use of analgesic medication, identified side effects as one of the reasons for non-compliance. Healthcare professionals should therefore carefully adjust the therapeutic dose to minimize secondary symptoms. These studies also emphasize the importance of involving patients in the decision-making process regarding their therapeutic prescription, ensuring they understand the potential side effects and appropriate dosage through regular evaluation and symptom monitoring. It is crucial to address the need for demystifying information related to opioids.

Conclusions

We found that PECP/C-Pain Management had a significant impact on patients' ability to manage their pain. The intervention led to positive changes in health behaviors, resulting in improved knowledge of how to assess and monitor pain intensity, location, duration, relationship to other symptoms, and impact on daily activities. In addition, there was an improvement in overall well-being. The intervention also showed significant results in empowering patients and family caregivers to effectively manage analgesic medications. PECP/C-Pain Management promotes a comprehensive assessment that includes a coordinated multidisciplinary response to pain control. We emphasize the importance of replicating this study and validating PECP/C-Pain Management, not only in patients with advanced cancer, but also in those with early-stage disease, to prevent long-term adverse outcomes and improve pain self-management.

Limitations

The present study has several limitations. First, it was based on nursing intervention educational programs that have been tested and validated in other countries, but not in Portugal. The measurement tools used, such as the ESAS, have been translated and adapted but have not been validated for the Portuguese population. However, they have shown good internal consistency in the

population studied. The outcome assessment was performed with an instrument based on indicators already identified for the appraisal of pain control, but with its own compilation and adaptation to the objectives of the intervention. It is recommended that both the intervention and the outcome assessment tool be replicated in other studies.

Clinical Implications

The aim of this study is to contribute to an educational approach that empowers cancer patients to manage their pain at home. The patient, who is the focus of the intervention, becomes an active participant in self-care, actively contributing to his/her own health and disease management.

Declaration of competing interest

The authors declare having no conflicts of interest to report.

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References

- Butcher, H.K., Bulechek, G.M., & Dochterman, J.M. & Wagner (2018). *Classificação das intervenções de enfermagem (NIC)-E-Book*.
- Chang, V.T., Hwang, S.S., & Feuerman, M. (2000). Validation of the edmonton symptom assessment scale. *Cancer*, 88(9), 2164–2171. [https://doi.org/10.1002/\(sici\)1097-0142\(20000501\)88:9\(2164::aid-cnrc24\)3.0.co;2-5](https://doi.org/10.1002/(sici)1097-0142(20000501)88:9(2164::aid-cnrc24)3.0.co;2-5).
- Cohen, J. (1992). Quantitative methods in psychology: A power primer. *Psychological Bulletin*.
- Correia, I. M., & Frade, M. d. A. (2012). *Programa educacional ao cuidador do doente oncológico com dor no domicílio*. Coimbra: III Congresso de Investigação em Enfermagem Ibero Americano e de Países de Língua Oficial Portuguesa.
- Courteau, C., Chaput, G., Musgrave, L., & Khadoury, A. (2018). Patients with Advanced Cancer: When, Why, and How to Refer to Palliative Care Services. *Current Oncology (Toronto, Ont.)*, 25, 403–408.
- Davison, S. N., Jhangri, G. S., & Johnson, J. A. (2006). Longitudinal validation of a modified Edmonton symptom assessment system (ESAS) in haemodialysis patients. *Nephrology, Dialysis, Transplantation: Official Publication of the European Dialysis and Transplant Association - European Renal Association*, 21(11), 3189–3195.
- Ekstedt, M., & Rustøen, T. (2019). Factors that hinder and facilitate cancer patients' knowledge about pain management: A qualitative study. *Journal of Pain and Symptom Management*, 57(4), 753–760 .e1.
- Fallon, M., Giusti, R., Aielli, F., Hoskin, P., Rolke, R., Sharma, M., & Ripamonti, C. I. (2018). Management of cancer pain in adult patients: ESMO Clinical Practice Guidelines†. *Annals of Oncology*, 29(Suppl 4), iv166–iv191.
- Johnson, M., Maas, M., Moorhead, S., & Swanson, E. (2018). *Classificação dos resultados de enfermagem (NOC) (4ª)*. Elsevier.
- Juandi, D., Kusumah, Y., Tamur, M., Perbowo, K., Siagian, M., Sulastri, R., & Negara, H. (2021). *The effectiveness of dynamic geometry software applications in learning mathematics: A meta-analysis study*.
- Koller, A., Gaertner, J., De Geest, S., Hasemann, M., & Becker, G. (2018). Testing the implementation of a pain self-management support intervention for oncology patients in clinical practice: A randomized controlled pilot study (ANTiPain). *Cancer Nursing*, 41(5), 367–378.

- Kwon, J. H., Nam, S.-H., Koh, S., Hong, Y. S., Lee, K. H., Shin, S.-W., Hui, D., Park, K. W., Yoon, S. Y., Won, J. Y., Chisholm, G., & Bruera, E. (2013). Validation of the Edmonton Symptom Assessment System in Korean patients with cancer. *Journal of Pain and Symptom Management*, 46(6), 947–956.
- Lopes, M., Fonseca, C., & Barbosa, P. (2020). The individual care plan as electronic health record: A tool for management, integration of care, and better health results. In (pp. 1–12).
- Makhlouf, S. M., Pini, S., Ahmed, S., & Bennett, M. I. (2020). Managing pain in people with cancer—a systematic review of the attitudes and knowledge of professionals, patients, caregivers and public. *Journal of Cancer Education*, 35, 214–240.
- Marôco, J. (2018). *Análise Estatística com o SPSS Statistics*. 7ª edição ReportNumber, Lda.
- Schulz, KF, Altman, DG, & Moher, D for the CONSORT Group. (2010). *CONSORT 2010 Statement: Updated guidelines for reporting parallel group randomised trials*.
- Urits, I., Adamian, L., Fiocchi, J., Hoyt, D., Ernst, C., Kaye, A. D., & Viswanath, O. (2019). Advances in the understanding and management of chronic pain in multiple sclerosis: A comprehensive review. *Current Pain and Headache Reports*, 23(8), 1–11.
- Valenta, S., Spirig, R., Miaskowski, C., Zaugg, K., & Spichiger, E. (2018a). Testing a pain self-management intervention by exploring reduction of analgesics' side effects in cancer outpatients and the involvement of family caregivers: A study protocol (PEINCA-FAM). *BMC Nursing*, 17(1), 54.
- Valenta, S., Spirig, R., Miaskowski, C., Zaugg, K., & Spichiger, E. (2018b). Testing a pain self-management intervention by exploring reduction of analgesics' side effects in cancer outpatients and the involvement of family caregivers: A study protocol (PEINCA-FAM). *BMC Nursing*.
- Valenta, S., Miaskowski, C., Spirig, R., Zaugg, K., Denhaerynck, K., Rettke, H., & Spichiger, E. (2022). Randomized clinical trial to evaluate a cancer pain self-management intervention for outpatients. *Asia-Pacific Journal of Oncology Nursing*, 9(1), 39–47.
- Vallerand, A. H., Riley-Doucet, C., Hasenau, S. M., & Templin, T. (2004). Improving cancer pain management by homecare nurses. *Oncology Nursing Forum*, 31(4), 809–816.
- West, C. M., Dodd, M. J., Paul, S. M., Schumacher, K., Tripathy, D., Koo, P., & Miaskowski, C. (2003). The PRO-SELF©: Pain Control Program—An Effective Approach for Cancer Pain Management. *Oncology Nursing Forum*, 30(1), 65–73.
- WHO. (2020). *Global Cancer Observatory* <https://gco.iarc.fr/>.
- Yamanaka, M., & Suzuki, K. (2021). Evaluation of appropriateness of a nursing intervention program to promote pain self-anagement for adult outpatients with cancer pain. *Asia-Pacific Journal of Oncology Nursing*, 8(1), 33–39.
- Yeager, K. A., Williams, B., Bai, J., Cooper, H. L. F., Quest, T., Meghani, S. H., & Bruner, D. W. (2019). Factors related to adherence to opioids in black patients with cancer pain. *Journal of Pain and Symptom Management*, 57(1), 28–36.
- Yokomichi, N., Morita, T., Nitto, A., Takahashi, N., Miyamoto, S., Nishie, H., Matsuoka, J., Sakurai, H., Ishihara, T., Mori, M., Tarumi, Y., & Ogawa, A. (2015). Validation of the Japanese version of the Edmonton Symptom Assessment System—Revised. *Journal of Pain and Symptom Management*, 50(5), 718–723.
- Zhang, J., Chan, D. N. S., Liu, X., Cai, Y., Chen, J., & Xie, M. (2023). Effects of self-management interventions for cancer patients with pain: A systematic review of randomised controlled trials. *Journal of Clinical Nursing Advance* online publication. <https://doi.org/10.1111/jocn.16669>.