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Abstract

Objective: Unrelieved pain is common in patients with advanced cancer. Although psychoeducational interventions were found to decrease pain, effects were moderate. The purpose of this study was to evaluate the efficacy of a pain self-management intervention compared with usual care and to explore participants' experiences with pain management and study participation.

Methods: A multicenter randomized controlled trial design with post-trial interviews was used. Outpatients with cancer pain and their family caregivers were recruited from three Swiss university hospitals. The intervention group (IG) received the six-week intervention consisting of education, skills building, and nurse coaching. The control group (CG) received usual care. Outcome variables were analyzed using multilevel models. Interpretive description guided the qualitative study part.

Results: Twenty-one patients with advanced cancer and seven family caregivers completed the study. The group x time effect showed a statistically significant decrease in average pain ($P = 0.04$), but no significant group x time effect for worst pain ($P = 0.06$). Pain scores, pain-related knowledge, Pain Management Index, self-efficacy, and performance status improved in the IG ($P < 0.05$). Almost all of the interviewed participants perceived the pain management diary, tailored intervention sessions, and weekly support as useful. None experienced study participation as burdensome.

Conclusions: This study was the first to test the efficacy of a psychoeducational cancer pain self-management intervention in a German-speaking context, with most patients receiving palliative care. Clinicians can recommend the use of pain management diaries. Tailoring interventions to an individual's situation and dynamic pain trajectory may improve patients' pain self-management.

Registration number: This study has been registered via ClinicalTrials.gov: NCT02713919. https://clinicaltrials.gov/ct2/show/NCT02713919?term=NCT02713919&draw=2&amp;rank=1.

Introduction

Unrelieved cancer pain is a frequent and distressing symptom,1 with complex and dynamic trajectories.2 However, despite increased attention to cancer pain management and effective treatments, between 55% and 66% of patients undergoing treatment for or living with advanced cancer report pain3 that is treated with analgesics.4 In addition to health care– and system-related barriers, patient-related barriers can interfere with pain management. While these barriers include cognitive (e.g., patients' knowledge about pain and pain medication), affective (e.g., stress, anxiety, depression), and sensory (e.g., analgesic side effects) components, the major challenge for many patients is poor adherence with their analgesic regimen.5,6 In addition, the implementation of pain self-management strategies into daily life is a
Statistically significant decreases in pain intensity, the clinical relevance of these decreases was moderate at best. Of note, of the 26 randomized controlled trials (RCTs) that were reviewed, only eight reported statistically significant decreases in pain intensity. In addition, the lack of a standardized methodology decreases the ability to compare intervention effects. For example, educational interventions are prone to high levels of heterogeneity in terms of content, intensity, and duration, as well as length of follow-up and reported outcomes. Additional research is needed to evaluate the efficacy of self-management interventions aimed at cancer pain and associated side effects.

One promising psychoeducational intervention identified in earlier meta-analyses was the PRO-SELF® Pain Control Program (PCP). This intervention demonstrated significant decreases in patients’ pain intensity, as well as increases in patients’ and family caregivers’ cancer pain management knowledge. Based on these findings, the PCP intervention was extended from six to ten weeks, resulting in the PRO-SELF® Plus PCP. The latter program was translated and culturally adapted to a German-speaking setting. This adapted German PRO-SELF® Plus PCP was evaluated in a pilot RCT, which became the basis for the Swiss multicenter RCT. For this RCT, while focusing primarily on testing the efficacy of the adapted German PRO-SELF® Plus PCP, we aimed to explore the intervention’s effects on associated symptoms and other selected patient outcomes, as well as explore patients’ and family caregivers’ experiences with pain management and study participation.

**Methods**

A multicenter RCT design with post-trial interviews was used to evaluate the efficacy of the adapted German PRO-SELF® Plus PCP in outpatients with cancer and their family caregivers. Our qualitative component of the study was guided by interpretive description, a research approach for applied disciplines.

**Setting and sample**

Patients and their family caregivers were recruited from oncology outpatient clinics at three university hospitals in Switzerland. Outpatients were eligible for inclusion if they: 1) had experienced any type of cancer pain with an average pain of ≥3 on a 0–10 numeric rating scale (NRS) during the last two weeks; 2) had an estimated life expectancy of >6 months; (3) were aged 18 years or older; (4) were able to understand, read, and write German; and (5) had access to a telephone. Patients were excluded if they: 1) had cognitive dysfunction or hearing impairment; (2) were hospitalized for >2 weeks during the study; or (3) experienced only neuropathic pain. Family caregivers who were aged 18 years or older; able to understand, read, and write German; had access to a telephone; and were willing to participate in all of the intervention sessions were included.

**Study procedures**

Research assistants (RAs), who worked as nurses in the outpatient clinics, were specially trained to screen patients and family caregivers for eligibility, to inform them about the study, to recruit and randomize them, and to collect data in the control group (CG). Patients who met the study’s inclusion criteria were invited to participate during their routine outpatient visits. If family caregivers were involved in the patient’s pain management, they were invited to participate.

Patients were stratified by site and randomized 1:1 by the RAs into either the intervention group (IG) or the CG. Using 2-, 4-, and 6-patient blocks, computerized randomization was done to create the two lists. While blinding was not possible for data collectors, treating clinicians were not informed about group allocation.

Participants in both groups received home visits at enrollment (week 0), week 1, and week 6. In addition, all of the patients completed a daily pain and symptom management diary. They were asked to complete the diary before bedtime to review their pain intensity, analgesic intake, side effects, and related strategies over a 24-h period of time.

Participants in both groups completed questionnaires at enrollment (week 0) and at week 6. Participants received a home visit at enrollment to explain the study questionnaires and the diary. Additional visits were done at week 1 and 6 to collect the questionnaires and diaries. For the CG, the RAs did the home visits. In addition, they called each patient/family caregiver every second week to ensure that the pain management diary was completed on a daily basis. In the IG, the intervention nurses (INs) performed the study visits and data collection.

**Ethical considerations**

The study was conducted according to the Helsinki Declaration and was approved by all responsible ethics committees (Approval No. EKNZ BASEC 2015-00012). Written informed consent was obtained from all participants before enrollment.

**Intervention**

The PRO-SELF® Plus PCP was developed for patients who have pain from cancer and their family caregivers. It includes structured and tailored components and is based on three key strategies: nurse coaching, self-care skills building to manage pain and associated symptoms, and provision of information through academic detailing. Academic detailing focuses on enhancing knowledge by providing key information and positive reinforcement, while stimulating the learner to be an active partner.

The intervention was provided by four specially educated INs, all of whom were oncology nurses with a Master’s degree in nursing. The INs’ training occurred over two days and included a review of current pain theory and pain management guidelines as well as education on each intervention component.

In terms of the structured components of the PCP, patients/family caregivers were instructed to monitor pain and analgesic side effects (e.g., nausea, fatigue), to document analgesics taken, and to use a week pillbox. They were educated to use a script to communicate with clinicians if pain control was inadequate. In terms of the tailored components, the IN reviewed each pain management diary and assessed each patient’s adherence with analgesic medications. In addition, she discussed the appropriateness of the analgesic prescription and side effect management with patients and family caregivers and taught them how to adjust their medications within the prescribed dose range in response to changing pain conditions and side effects. At each visit, the IN assessed the implementation and success of previous recommendations and discussed needed adaptations. Furthermore, she educated patients and their family caregivers to improve their self-management by evaluating their pain management diary entries. Then, based on these evaluations, patients/family caregivers were taught to set individual, achievable goals and establish a symptom management plan to achieve these goals. To identify patients’ and family caregivers’ pain management knowledge deficits, the INs evaluated their knowledge at enrollment using the Patient Pain Questionnaire (PPQ) and the Family Pain Questionnaire (FPQ). To reinforce their education and enhance their knowledge, patients and family caregivers received a teaching booklet as well as individualized academic detailing sessions.

The timing and dosing of the intervention followed a detailed protocol. Each IG participant received home visits or telephone calls to provide structured and tailored components of the PCP on a weekly basis.

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for a total of seven intervention sessions. All participants received home visits after enrollment and at weeks 1 and 6. During study weeks 2 through 5, participants received weekly visits either in their homes or by telephone. The IN decided the format for the next visit using the following algorithm: pain score >3 on an NRS; the patient is dissatisfied with pain management; and/or patient adherence with pain medication or recommendations is <50%. If one or more of these criteria occurred, the IN scheduled a home visit; otherwise, the participant received a phone call. Home visits lasted no more than 1 h. Telephone calls lasted approximately 10 min. For quality assurance purposes, all intervention sessions and telephone calls were audio-recorded. The primary investigator reviewed these recordings to promptly discuss any deviations from the intervention protocol with the IN. Although no relevant protocol deviations occurred, the primary investigator and the INs discussed minor issues on a regular basis.

Usual care

The CG participants received usual care at participating centers (i.e., their physicians assessed pain and prescribed analgesic medications). No specific counseling was provided to this group. If participants raised concerns about pain or side effects during home visits or telephone calls for data collection, the RAs encouraged them to contact their physician.

Variables and measurement

As shown in Table 1, this study’s primary outcomes were average and worst pain intensity scores. Using the pain management diary on a daily basis, patients reported average and worst pain intensity scores for the previous 24 h using a 0 (no pain) to 10 (worst imaginable) NRS. These items are part of the German version of the Brief Pain Inventory (BPI).21

Secondary outcomes included pain relief (as a percentage), pain duration (in hours), and types and doses of analgesic medications (e.g., opioid, nonopioid, co-analgesics) assessed on a daily basis by the BPI.21 Pain interference with function was evaluated weekly using the BPI's Interference Scale.21 Quality of pain treatment was assessed weekly using the Pain Management Index (PMI).22 Daily doses of analgesics were converted to morphine equivalents (ME).23 In addition, patients rated the severity of 12 analgesic side effects on a weekly basis using 0 (none) to 10 (excruciating) NRSs.

To report the presence and severity of constipation, patients completed the Constipation Assessment Scale (CAS). Each CAS item was rated on a 0 (no problem) to 2 (severe problem) scale, with any score of ≥2 indicating constipation.24 Knowledge of cancer pain management was assessed using the PPQ and FPQ.20 For these instruments, each item was rated on a 0 to 10 NRS, with higher scores indicating greater knowledge.20,28 Self-efficacy was evaluated using the 15-item Self-Efficacy Questionnaire (SEQ).27 This self-report measure evaluates perceived ability to manage specific aspects of pain using a 10 (very uncertain) to 100 (very certain) scale. Functional status was evaluated using the Eastern Cooperative Oncology Group Performance Status scale.25 In addition, anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS).29

Quantitative data analysis

Data were retrieved from the SecuTrial® database and analyzed using SPSS, version 24.0.30 Demographic and clinical data were systematically examined for out-of-range values and inconsistencies. For all of the study variables, descriptive statistics were calculated. Differences in enrollment characteristics between the patients in the IG and the CG were evaluated using Student's t-tests or Mann–Whitney tests. Due to the small sample size of family caregivers, only descriptive statistics are reported for them. All analyses followed an intention-to-treat strategy. The level of significance was set at 0.05.

We quantified the intervention’s effect by calculating the mean differences between IG and CG average and worst pain intensity scores after four weeks and at the end of the intervention (week 6). To determine differences between the IG and CG regarding changes in average and worst pain intensity scores, daily duration of pain, pain relief, and

| Study variable | Instrument | Assessed in patients | Assessed in FCs | Week 0 | Week 1–5 | Week 6 |
|----------------|------------|----------------------|----------------|--------|----------|--------|
| **Primary outcomes** | Pain management diary<sup>a</sup> | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Average pain and worst pain | BPI | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Pain alleviation through pain medication | AM & PRN analgesic prescribed and taken per day converted to ME | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Pain interference with function | Pain management diary<sup>a</sup> | X | X | X | X |
| **Secondary outcomes** | Pain management diary<sup>a</sup> | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Bowel movements and use of laxatives | PMI | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Quality of analgesic prescription | CAS | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Constipation | PPQ | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Knowledge of cancer pain | FPQ | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Self-efficacy | SEQ in patients with cancer | X | X | X | X |
| **Demographics and clinical data** | Caregiver version of the SEQ | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Anxiety and depression | HADS | X | X | X | X |
| &nbsp;&nbsp;&nbsp;&nbsp;Functional status | ECOG performance status | X | X | X | X |
| **Demographics, patient Information** | Patient Information Questionnaire | X | X | X | X |
| **Demographics, FC** | FC Information Questionnaire | X | X | X | X |
| **Clinical data** | Medical record review Form | X | X | X | X |

ATC, around the clock; BPI, Brief Pain Inventory; CAS, Constipation Assessment Scale; ECOG, Eastern Cooperative of Oncology Group; FC, family caregiver; FPQ, Family Pain Questionnaire; HADS, Hospital Anxiety and Depression Scale; ME, morphine equivalents; PMI, Pain Management Index; PPQ, Patient Pain Questionnaire; PRN, pro re nata (as needed); SEQ, Self-Efficacy Questionnaire.

* Pain management diary: daily assessment of average and worst pain, pain alleviation, and pain interference with function via the Brief Pain Inventory (BPI), as well as duration of pain, bowel movements/use of laxatives, side effects of pain and of cancer treatment via pain management diary.
changes in medication scores from the initiation to the end of the intervention, we used multilevel modeling. This statistical procedure is well suited for this analysis because 1) it accounts for the hierarchical structure of the data resulting in more accurately estimated standard errors; 2) it offers the option to actively model the changes in study outcomes, using the information from all of the assessments; and 3) it allows for testing the effects of the intervention at level 1 (time) and level 2 (study group) as well as to test for cross-level interactions. The relevant variables (i.e., time, study group, and group × time interaction) were entered successively into the models. For each patient, a random intercept and random slope were estimated.31

In addition, independent t-tests or Wilcoxon tests were calculated to determine whether secondary outcome scores changed significantly within the groups over the six weeks of the study. If so, effect sizes (Cohen’s d) were calculated.12

Qualitative data collection and analysis

After completing the RCT, patients and family caregivers from both groups were invited to participate in interviews to retrospectively explore participants’ experiences with pain management and study participation. Initially, the plan was to use purposive sampling to ensure approximately equal numbers per site and variation regarding pain intensity, adherence with the intervention, age, gender, education, living situation, and type of cancer. After the first two months of the study, because of recruitment challenges, all patients and family caregivers

Figure 1. Flowchart of included participants. Note. Flowchart of study participation. FC, family caregiver; RCT, randomized controlled trial.
were invited to participate in an interview.

The interviews were conducted by specially educated nurses, the study coordinator, or the principal investigator in participants' homes. Following an interview guide, open-ended questions were asked to explore patients’ and family caregivers’ experiences with pain and side effect self-management, the pain management diary, and the intervention. Interviews lasted between 21 and 51 min (mean = 37 min). They were audio-recorded and transcribed verbatim. For the qualitative analysis, we applied the thematic analysis approach of Braun et al. by following the six steps in an iterative process. To allow for integration of relevant new topics into the interview guide, the analysis started during the data collection period. For data analysis, the ATLAS.ti Scientific Software (version 8.0) was used.

Results

Patient and family caregiver characteristics

From March 2016 until December 2018, 34 patients and nine family caregivers were included in this study. Figure 1 illustrates the flow of IG and CG participants over this period. Characteristics of the patients and family caregivers are shown in Table 2. Cancer diagnoses included breast, prostate, lung, colon, pancreas, adrenal cortex, urothelium, ovary, and multiple myeloma.

Primary outcomes: changes in pain intensity

For average pain, effect size calculations demonstrated that on the 0 to 10 NRS, the mean difference of change between the IG and the CG was −0.37 (95% confidence interval [CI]: −0.80 to 0.06; Cohen's d = 0.14) at week 4 and −1.12 (95% CI: −1.56 to −0.68; Cohen's d = 0.41) at week 6. The weekly mean pain scores are listed in Table 3. Figure 2A–D illustrate the changes in IG and CG pain scores over the course of the study. For average pain, a significant group × time interaction (P = 0.04) as well as a significant main effect of time (P < 0.001) were found. However, no significant main effect of group (P = 0.67) was found.

For worst pain, effect size calculations demonstrated that on the NRS, the mean difference of change between the IG and the CG was −1.05 (95% CI: −1.67 to −0.42; Cohen's d = 0.26) at week 4 and −1.53 (95% CI: −2.14 to −0.93; Cohen's d = 0.41) at week 6. No significant main effects of group (P = 0.56) or group × time interaction (P = 0.06) were found, whereas a significant main effect of time (P < 0.001) was found.

Secondary outcomes

For pain relief, pain duration, and ME intake, no significant group × time interactions were found (Table 3). Results for PMI, constellation, pain management knowledge, self-efficacy, and performance status for the IG and CG at enrollment, week 4, and week 6 are shown in Table 4. As illustrated in Figure 3, the analgesic side effects with the highest severity scores were fatigue, daytime sleepiness, difficulty concentrating, and nausea.

Qualitative results

As shown in Figure 1, of the 13 interviews conducted after RCTs, eight were with IG participants and five were with CG participants. Four family caregivers were included in joint interviews. Four patients declined to

Table 2

Characteristics of patients and families at enrollment.

| Characteristics                              | Patients with cancer | Family caregivers |
|----------------------------------------------|----------------------|-------------------|
|                                              | IG (n = 17)          | CG (n = 9)        | P     |
| Demographic characteristics                 |                      |                   |       |
| Age in years, mean (SD)                     | 66.6 (14.5)          | 64.1 (11.0)       | 0.66  |
| Female, n (%)                               | 6 (35.3)             | 4 (44.4)          | 0.66  |
| Married/partnered, n (%)                    | 12 (70.6)            | 7 (77.8)          | 0.76  |
| Employed, n (%)                             | 1 (5.9)              | 1 (11.1)          | 1.0   |
| Highest education, n (%)                    |                      |                   | 0.52  |
| University degree                           | 7 (41.1)             | 4 (44.4)          |       |
| Elementary school                           | 7 (41.1)             | 1 (11.1)          | 0.00  |
| Vocational training                         | 1 (5.9)              | 2 (22.2)          | 0.00  |
| Commercial school                           | 1 (5.9)              | 2 (22.2)          | 0.00  |
| Other                                        | 1 (5.9)              | 0 (0.0)           | 0.00  |
| Clinical characteristics*                   |                      |                   |       |
| Therapeutic goal palliative, n (%)          | 14 (82.4)            | 7 (77.8)          | 1.0   |
| Current anticancer therapy*, n (%)           |                      |                   |       |
| Chemotherapy                                | 2 (11.8)             | 5 (55.6)          | 1.0   |
| Radiotherapy                                | 4 (23.5)             | 3 (33.3)          | 1.0   |
| Steroids                                    | 12 (70.6)            | 8 (88.9)          | 1.0   |
| Bisphosphonates                             | 16 (94.1)            | 8 (88.9)          | 1.0   |
| Pain and medication characteristics*        |                      |                   |       |
| Average pain, mean (SD)                     | 4.3 (1.8)            | 3.7 (1.3)         | 0.27  |
| Worst pain, mean (SD)                       | 5.3 (1.9)            | 5.1 (2.0)         | 0.46  |
| Total ME per day, mean (25/75 percentiles)  | 43.5 (23.8/48.3)     | 46.7 (26.9/56.1)  | 0.56  |
| PMI scores, mean (SD)                       | 0.2 (0.8)            | 0.2 (1.0)         | 0.84  |
| Pain interference with function, mean (SD)  | 3.8 (1.6)            | 3.6 (1.7)         | 0.83  |
| Symptom severity scores                     |                      |                   |       |
| CAS scores, mean (SD)                       | 0.6 (0.4)            | 0.5 (0.6)         | 0.79  |
| PPQ/FPQ total score, mean (SD)              | 5.7 (1.1)            | 6.0 (1.7)         | 0.67  |
| SEQ total score, mean (SD)                  | 69.2 (18.5)          | 69.9 (10.1)       | 0.68  |
| HADS Anxiety score, mean (SD)*              | 1.4 (0.6)            | 1.6 (0.8)         | 0.42  |
| HADS Depression score, mean (SD)*           | 2.1 (0.3)            | 2.1 (0.2)         | 0.42  |
| ECOG performance status, mean (SD)*         | 2.9 (1.0)            | 2.9 (0.8)         | 0.97  |

Note. Differences in demographic and clinical characteristics between the patients with cancer in the intervention and control groups at enrollment as well as family caregivers’ demographic characteristics.

CAG, Constipation Assessment Scale; CG, control group; ECOG, Eastern Cooperative of Oncology Group; FPQ, Family Pain Questionnaire; HADS, Hospital Anxiety and Depression Scale; IG, intervention group; ME, morphine equivalence in mg/day; PMI, Pain Management Index; PPQ, Patient Pain Questionnaire; SD, standard deviation; SEQ, Self-Efficacy Questionnaire.

* Not applicable for family caregivers.

† Patients could be receiving more than one type of treatment simultaneously.
participate in an interview. The findings were assigned to three main themes, namely, experiences with the pain management diary, experiences with the intervention, and experiences with study participation.

**Experiencing the pain management diary as supportive**

According to most participants, including all CG participants and all family caregivers, the pain management diary reinforced their pain self-management efforts. It assisted them in reviewing the course of their pain over the week, in becoming more attentive to their pain, in overviewing the timing and dosing of pain medications, and in reconstructing how they had managed previous pain situations or analgesic side effects (e.g., constipation). "I just filled it [the diary] out late in the evening, before going to bed. And accordingly, I could really look back at my day and deal with it," said a patient. Two IG participants used the diary to report pain to their physician. After the study, several participants in the IG continued using another diary that was recommended by the IN because it provided a sense of control and security and supported pain reporting to their physician. Three CG participants were willing to continue to use the diary. "For me, it [the diary] was such a companion. My husband and I, we have already discussed how I could actually keep a personal diary like this," mentioned one of them. However, eight participants experienced some difficulties with diary completion. For some, it was just forgotten or became boring after a while, assessing pain duration or pain relief was difficult, or rating pain using the NRS was problematic. For some patients, expressing pain in words would have been easier.

**Experiencing the intervention as mostly beneficial**

All IG participants and family caregivers noted that the structured individualized intervention sessions supported their daily pain self-management. They felt more secure and some were more confident in

| Table 3 | Mean scores for the primary and secondary outcomes and P-values for the group × time interactions. |
|---------|--------------------------------------------------------------------------------------------------|
|         | Week 0 | Week 4 | Week 6 | Group × time interactions |
|         | Mean (SD) | Mean (SD) | Mean (SD) | P |
| Primary outcomes | | | | |
| IG | 17/9 | 12/9 | 12/9 | |
| CG | | | | |
| Average pain | 4.3 (1.8) | 2.6 (1.4) | 2.0 (1.2) | 0.04 |
| Worst pain | 3.7 (1.3) | 3.0 (1.1) | 3.1 (1.3) | |
| IG | 5.3 (1.9) | 3.1 (1.6) | 2.3 (1.5) | 0.06 |
| CG | 5.1 (2.0) | 4.1 (2.2) | 3.8 (2.0) | |
| Secondary outcomes | | | | |
| IG | 57.1 (20.4) | 68.6 (25.8) | 72.8 (28.6) | 0.19 |
| Pain relief (%) | 50.7 (23.2) | 50.0 (30.8) | 47.5 (31.5) | |
| CG | 10.6 (7.0) | 9.0 (7.0) | 8.9 (9.0) | 0.29 |
| Hours per day in pain | 7.0 (6.2) | 9.3 (9.2) | 10.3 (9.2) | |
| Total ME per day | 43.5 (20.7) | 40.0 (19.1) | 37.8 (16.8) | 0.77 |
| IG | 46.7 (22.2) | 47.5 (23.5) | 42.9 (21.9) | |
| CG | | | | |

CG, control group; IG, intervention group; ME, morphine equivalence in mg/day; SD, standard deviation.

Figure 2. Changes over time in pain scores. Note. Changes over time in (A) average pain scores, (B) worst pain scores, (C) pain relief scores, and (D) duration of pain over time for patients with cancer in the intervention and control groups plotted as means.
adapting their analgesic regimen. One family caregiver stated: “It [the intervention] just provides security. You just know that you have one more contact point.” These positive experiences were directly related to the IN: She listened attentively, had sufficient time to discuss individual problems, responded to previous experiences, supported individual goal setting, and provided useful explanations. One patient explained: “Mrs. S [IN] has written down goals with me that one wants to achieve. In any case, I have achieved all these goals. [...] Well, actually through the intervention, this motivated me.”

In addition, the IN was perceived as knowledgeable, competent, and trustworthy. In this RCT, this motivated me. It [the intervention] just provides security. You just know that you have one more contact point. The improved PMI in the IG findings is consistent with the results of previous research that highlighted the use of a pain management algorithm to determine the number and type of intervention sessions. In the IG, this motivation was based on the hypothesis that owing to the trustful nurse-patient/family caregiver relationship, an “attention control intervention” could have influenced pain self-management. In their systematic review, Prip et al. emphasized the importance of a trustful relationship and open communication with clinicians about the patients’ ability to cope with cancer, its treatments, and daily life. Our participants highlighted their trustful relationship with the IN as an important and conducive factor in improving their pain self-management. These types of patient-family caregiver-provider relationships and good communication are considered as a central component of care for patients with cancer.

Regarding pain medication doses, the decreases in pain in both groups were achieved even though patients in this study took lower doses of opioids than in previous studies. In our IG and CG participants found the pain management diary useful because they provided an overview of their daily medication plan, previous handling of pain situations, and changes in their pain scores throughout the day. This finding is consistent with the results of previous research that highlighted the use of a pain management diary combined with tailored intervention sessions as an effective approach in decreasing present and average pain intensity.

Regarding side effects, patients in this study were most affected by fatigue. Given the high prevalence of fatigue in patients with cancer, this finding is not surprising. Other side effect scores were rather low in both the IG and the CG.

**Limitations**

This study’s major limitation was its small sample size. Therefore, findings must be interpreted with caution. While multilevel modeling estimations using the restricted maximum likelihood method are relatively robust for small sample sizes, this limitation was primarily due to challenges with recruitment. Of the 473 patients who were screened, the majority reported no pain, leaving only 184 (39%) eligible patients. Of
that number, only 34 (18%) agreed to participate. Several patients cited fear of additional burden as their reason for declining participation. Another explanation for the small sample size was an overestimation of the number of eligible patients by clinicians. In addition, a certain level of “gatekeeping” by the RAs cannot be excluded. Budgetary restrictions prevented the use of RAs not involved in the patient’s care to recruit patients.

The attrition rate of 38% was very close to what was expected (35%). Thirteen participants dropped out owing to hospitalization or declining health status. Previous evidence suggests that the challenges with recruitment of patients with cancer are numerous and can be particularly difficult for symptom management studies because patients/family caregivers often feel too ill or too overwhelmed to participate in time-consuming studies or experience participation as burdensome.44

Conclusions

This study is the first to test the efficacy of a psychoeducational cancer pain self-management intervention in German-speaking outpatients with cancer. The implementation of post-RCT interviews was an excellent investment because these interviews increased our understanding of the efficacy of the adapted German PRO-SELF® Plus PCP. While none of the patients and family caregivers experienced study participation as burdensome, most participants appreciated the diary and the competent, trustworthy IN.

Based on our findings, we suggest that clinicians recommend the use of a pain management diary to patients with cancer pain. In addition, tailoring interventions to patients’ individual situations and to their dynamic pain trajectories as well as coaching by a competent nurse may improve patients’ and family caregivers’ skills and knowledge to adequately implement pain self-management strategies in their daily lives.

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Declaration of competing interest

There are no conflicts of interest.

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