Testing an Intervention Designed to Support Pain Self-Management in Cancer Patients: A Mixed Methods Study

Inauguraldissertation

zur
Erlangung der Würde eines Doktors der Philosophie
vorgelegt der
Medizinischen Fakultät
der Universität Basel

von

Antje Koller

aus Freiburg im Breisgau, Deutschland

Basel, den 21. März 2012

Genehmigt von der Medizinischen Fakultät

Auf Antrag von

Fakultätsverantwortliche:	Professor Sabina De Geest, PhD, RN, FAAN, FRCN
Dissertationsleitung:	Elisabeth Spichiger, RN, PhD
Co-Referat:	Professor Christine Miaskowski, RN, PhD, FAAN
Externe Expertin:	Professor Tone Rustœn, RN, PhD
Experte:	Professor Dr. med. Oliver Opitz

Basel, den ……

(Datum Zulassung durch die Fakultät)

……..

Professor Sabina De Geest

Table of Content

Acknowledgements **1**

Summary **4**

Introduction **11**

Chapter 1 Background **13**

Epidemiology of Cancer, Definition of Pain, and Prevalence of Cancer Pain 13
Treatment of Cancer Pain 14
Barriers to Effective Pain Management 15
Interventions to Support Cancer Pain Self-Management 17
Theoretical Framework 19
Placing the PRO-SELF© Plus PCP within the Theoretical Framework 21
Identified Gaps and Rationale for this Project 23
References 24

Chapter 2 Aims of the Research Project **29**

Chapter 3 A Systematic Evaluation of Content, Structure, and Efficacy of Interventions to Improve Patients' Self-Management of Cancer Pain **31**

Abstract 32
Introduction 33
Background 33
Methods 36
Results 37
Discussion 52
Conclusions 55
References 57

Chapter 4 Preparation, Translation, and Adaptation of Intervention and Study Materials for the Pilot RCT **63**

Learning PRO-SELF© Study Procedures 63
Translation and Adaptation of U. S. PRO-SELF© PCP Materials and Intervention 64
Testing Understanding and Usability of the First Version of the German PRO-SELF© Plus PCP 66
References 67

Chapter 5 Supporting Self-Management of Pain in Cancer Patients: Methods and Lessons Learned from a Randomized Controlled Pilot Study 70

Abstract 71
Introduction 72
Methods 73
“Lessons Learned” 77
Discussion 83
Conclusions 85
References 86

Chapter 6 Results of a Randomized Controlled Pilot Study of a Self-Management Intervention for Cancer Pain 90

Abstract 91
Introduction 92
Methods 94
Results 97
Discussion 102
Conclusions 105
References 106

Chapter 7 A Qualitative Substudy of Patients‘ Experiences of a Self-Management Intervention for Cancer Pain and Participation in a Randomized Controlled Pilot Study 110

Introduction 110
Methods 112
Results 113
Discussion 120
Conclusions 122
References 123

Chapter 8 Entscheidungswege von onkologischen Patienten im Umgang mit Schmerzmedikamenten im häuslichen Umfeld: eine qualitative Sekundäranalyse [Oncological Patients’ Decision-Making Processes Concerning their Pain Medication at Home: a Qualitative Secondary Analysis] **..... 126**

Summary 127
Zusammenfassung 128
Einleitung 129
Methodisches Vorgehen 132
Resultate 133
Diskussion 138
Schlussfolgerungen 140
Referenzen 141

Chapter 9 Discussion 143

Critical Appraisal of Methods Used 144
Comparison of PRO-Self© Plus PCP to Other Interventions in the Systematic Review . 147
Reflections on the Conceptual Frameworks 150
Limitations 151
Implications for Future Research 152
Conclusions 153
References 154

Curriculum Vitae 156

Acknowledgements

A research project like the one presented in this thesis cannot be the work of one person alone. Instead, it could only be realized through the collaboration of many people who supported me.

Above all, I give my special thanks to my mentor Dr. Elisabeth Spichiger who supported me during the whole course of my dissertation with great patience and effort. Without Dr. Spichiger's brilliant knowledge, dependability, and the moral support that she gave me throughout the whole project, I would not have accomplished my doctoral thesis.

Furthermore, the other members of my PhD committee, Professor Christine Miaskowski, Professor Sabina De Geest and Professor Oliver Opitz all contributed a great amount of time, know-how and thoughts supporting me during my dissertation. Professor Miaskowski in particular supported me with her extensive scientific experience and knowledge in the field of cancer pain self-management support; Professor De Geest provided me with the scientific environment and her excellent knowledge in nursing research; while Professor Opitz helped me generously to realize the clinical trial in the Comprehensive Cancer Center Freiburg, Germany. Furthermore, I want to thank Professor Tone Rustœn who assessed the thesis as an external expert and who therefore contributed to the project with her extensive knowledge in the research field of cancer pain self-management support.

For my dissertation, I especially appreciated the way in which the collaboration between the two institutions, the Institute of Nursing Science at the University of Basel/Switzerland and the University Medical Center of Freiburg, Germany, allowed me to combine my work as a nurse scientist with my clinical work in a very fruitful way. Collaboration between institutions only comes to life with the people who make it happen, therefore, I gladly thank the visionary leaders of these two institutions who established the cooperative framework, Mrs. Monika Hasemann, Professor De Geest, and Professor Opitz.

Words cannot express my gratitude particularly for Mrs. Monika Hasemann who always believed in my abilities, and who not only helped me start the dissertation, but also supported me with her spirit, good judgment, and reliability during the whole course of the project.

For this clinical project I needed open minded patients and family caregivers, who were curious enough to experience something widely unknown to the German public such as a nurse lead intervention for oncology outpatients with pain. I, therefore, thank all patients and family caregivers who participated in the study with all my heart. Conducting the study with these remarkable people has been a moving experience for me and has affected not only my clinical practice but also my view of living in general.

For the practical support I sincerely thank all colleagues on the wards and daycare clinics at the University Medical Center Freiburg, Germany who helped me to conduct the clinical pilot study. Furthermore, I thank my study nurses Anna Baum, Katja Haskarl, Santhal Niemeyer, and Klaus Brummel who not only gave me hands-on practical support with recruitment, data collection, and booklet preparation, but who also supported me with their useful ideas and enthusiasm. In addition, I very much appreciated Anne Rebafka's and Monika Wolf-Kienzler's commitment to conducting the qualitative interviews. Furthermore, I thank Irina Schwindt, Matthias Naegele, and Stefan Nagel for their contribution to data collection and entry. I genuinely thank Dawn Surratt, Claudia West and Janet Edrington who supported me during my special studies visit at the University of California San Francisco to learn intervention and study procedures.

My gratitude goes to my fellow doctoral students and colleagues from the Institute of Nursing Science for their support and the opportunity to discuss my work during doctoral seminars and breaks. I am particularly thankful for the friendship with Elisabeth Kurth and Gila Sellam who supported me along the way of this project.

For the statistical support I thank Dr. Kris Denhaerynck who helped me with the analysis. I thank Professor Sandra Engberg for editing some of the English manuscripts and Arlette Bernasconi who helped me edit the final manuscript. Furthermore, I thank all colleagues and friends who contributed with great enthusiasm to the translation of the intervention and study materials.

A research project cannot be conducted without financial support. We were very fortunate to be granted financial resources by the Ebnet Foundation, the Parrotia Foundation, and the Stiftung zur Krebsbekämpfung and I want to express my particular thanks to these organizations. I am thankful for the Ruth Quenzer Foundation which made my special studies visit at the University of California in San Francisco possible. There, I gained knowledge and experience working with Professor Miaskowski's research team. Furthermore, I want to give my special thanks to the Hans Hasbargen Co-.KG who provided me with weekly pillboxes.

I dedicate this thesis to my partner, my family and my friends. First of all, my family and friends provided me with the right amount of work-life-balance to allow me to maintain my enthusiasm and energy for a research project that deals so closely with life threatening illness and suffering. On the other hand, I am also extremely thankful for their curiosity about my research and their patience during all those conversations about the project that turned out to provide me with the important insight into the lay perspective that fruitfully supplemented my views of the project. Furthermore, my mother contributed to my thesis by editing the German manuscript. Above all and from the bottom of my heart I thank Frank Schmitt who accompanied me not only with ongoing emotional support through the “ups and downs” of this project but also with his smart inputs and large amount of time including booklet-binding, editing, and data management whenever necessary. On top of that, in his generosity, he provided the little red car without which the home visits would not have been possible.

Antje Koller, January 2012

Summary

Cancer is the second most frequent cause of death in Germany[1]. Patients with cancer experience multiple symptoms throughout the different stages of their illness, with pain as one of the most frequent symptoms. Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage"[2]. Cancer pain can occur at any time but the incidence increases over the course of the illness. Cancer pain management is to a great extent based on pharmacologic and non pharmacologic therapy[3]. Despite effective treatment options, pain control is not adequate in over 40% of patients with cancer[4].

The undertreatment of cancer pain has led researchers to determine the factors that impede effective pain management. Besides inadequate assessment and treatment, several patient-related barriers interfere with optimal pain management[5]. Patient-related barriers towards cancer pain management include cognitive (e.g., concerns about analgesic use), affective (e.g., stress, depression), sensory (e.g., experience of side effects), as well as practical components[6,7]. Oncology treatment takes place primarily in the outpatient setting. Therefore, patients and their family caregivers (FCs) need to implement cancer pain management mainly by themselves. Self-management consists of those strategies that patients and FCs perform in daily life to manage illness and treatment to avoid functional regression and health deterioration[8]. For optimal pain self-management, oncology patients and their FCs need to acquire and process a complex array of knowledge and skills (i.e., how to obtain, take, and titrate various analgesic medications, deal with side effects, and what to do if pain is not relieved)[3]. In view of the complexity of these impediments to adequate pain treatment, interventions to support cancer pain self-management are warranted.

Effects of interventions that were designed to support cancer pain self-management were examined in three systematic reviews[9-11]. It was shown that from 1962 to 2009, cancer pain self-management interventions gained increasing attention but were still an understudied approach. While improvements in pain were reported in all three systematic reviews, effects were moderate. Moreover, significant heterogeneity in study designs,

methods, and types of interventions may have weakened the findings. In addition, it was not possible to determine which components of interventions were most effective. To our knowledge, a detailed description and evaluation of components of cancer pain self-management interventions had not been done. Furthermore, only a few studies evaluated how patients' and their FCs' experienced cancer pain self-management interventions[6,12].

Interventions designed to support cancer pain self-management are largely unknown in German speaking populations. Therefore, the work of Miaskowski's PRO-SELF© Pain Control Program (PCP) research group[13,14] provided the basis for this thesis. The PRO-SELF© PCP was built on three key strategies (i.e., provision of information using academic detailing[15], skill building, and ongoing nurse coaching) and consisted of structured and tailored components. Patients and FCs were provided 3 visits and 3 phone calls over six weeks by a specially trained nurse. A randomized controlled trial (RCT) with 174 patients showed that the overall effects of the PRO-SELF© PCP represented statistically significant but moderate decreases in pain intensity scores. Therefore, based on the convergence of findings from quantitative[16] and qualitative[6] subanalyses, modifications to the Program resulted in the PRO-SELF© Plus PCP.

The overall aims of this mixed methods research project were twofold: first, to analyze the state of knowledge regarding interventions designed to support pain self-management of patients with cancer; and second, to translate, adapt, improve, and pilot test a state of the art intervention designed to support self-management of cancer patients and their FCs in a German speaking population.

To address the first aim, a systematic review of experimental and quasi-experimental studies was performed to describe the structure and content components, as well as the efficacy of various components of cancer pain self-management interventions. Intervention components were categorized using content analysis and evaluated based on the effect sizes that were reported. Based on 34 publications (i.e., 24 interventions), seven structure (e.g., mode of delivery) and 16 content components (e.g., information about cancer pain and its treatment) were identified. No single component was found to have a discernable influence on effect sizes. To our knowledge, this review was the first that provided a detailed overview of the various structural and content components of cancer pain self-management interventions. However, because of a variety of limitations, the most efficacious intervention components remain to be determined in future studies[17].

To address the second aim, the German PRO-Self© Plus PCP was tested in a pilot study. In a first phase, instruments from the PRO-Self© Plus PCP were translated and intervention and study procedures were revised successfully resulting in the German PRO-Self© Plus PCP (see Chapter 4). To evaluate the latter, a nested concurrent mixed methods approach[18] was applied, in which a pilot RCT was combined with two qualitative substudies. The pilot study was guided by two theoretical frameworks: symptom management theory[19] and social cognitive theory[20].

The purpose of the pilot RCT was to evaluate feasibility and effect sizes for the German PRO-Self© Plus PCP for the planning of a multi-center RCT. Thirty-nine oncology outpatients with cancer-related pain were randomized to the intervention (n = 19) or control (n = 20) groups. Patients in the intervention group received the Program consisting of 6 visits and 4 phone calls over ten weeks. Patients in the control group received the same number of visits and phone calls and usual care. Primary outcomes were average and worst pain intensity. Secondary outcomes included pain-related knowledge, opioid intake, and self-efficacy. Data were collected at enrollment, weeks 6, 10, 14, and 22 after randomization. Findings from the pilot RCT were reported in two manuscripts.

The purposes of the first manuscript were to describe the methods used and the lessons learned during the pilot study, as well as the adaptations that were made for a larger clinical trial. During the study, inclusion criteria were expanded. In addition, the intervention may be improved by further adaptations (e.g., closer tailoring to patients' pain situation, inclusion of self-management support for nausea and vomiting). Furthermore, coaching cancer patients across a complex treatment team was an important function of the intervention. The pilot study proved to be useful to adapt study procedures, balance burden and benefit for participants, and customize the intervention to patients' needs and abilities in order to improve feasibility and efficacy[21].

In the second manuscript, quantitative findings from the German PRO-Self© Plus pilot RCT were reported. The group by time effect was statistically significant for knowledge scores (week 10: $p = 0.04$; week 22: $p < 0.01$), but not for pain, opioid intake, or self-efficacy. The mean difference at week 10 between the intervention and the control groups was -0.55 (Cohen's $d = -0.26$) for average pain and -0.73 ($d = -0.29$) for worst pain. At week 22, it was -0.51 ($d = -0.35$) for average pain and -0.47 ($d = -0.20$) for worst pain. It was the first study to evaluate the PRO-Self© Plus PCP for feasibility and potential effects in a German speaking population. While pain management related knowledge improved significantly, effect size calculations showed low to moderate reductions in average and worst pain[22].

The purpose of the first qualitative substudy was to explore how patients and FCs experienced intervention and study procedures of the German PRO-Self© Plus PCP pilot RCT. Debriefing interviews were conducted with nine patients and four FCs who finished the intervention. Interviews were transcribed verbatim, and analyzed using content analysis[23]. Findings confirmed that for patients and FCs, a trustful relationship with the intervention nurse was of utmost importance. Furthermore, the intervention's focus on cancer pain self-management was novel for and appreciated by the participants. The intervention nurse's expertise with pain self-management as well as her caring attitude, the discussion of everyday problems, and sufficient time to discuss problems repeatedly resulted in a high satisfaction of the participants and a meaningful pain reduction for most patients in this substudy (see Chapter 7).

The purpose of the second qualitative study was to explore decision-making processes of four women and four men in the intervention group concerning their pain medications. Audiotaped protocols of the 10-week intervention and debriefing interviews provided data for a secondary analysis which was done using content analysis[23]. Findings showed that cancer patients stayed ambivalent about the use of analgesics over the whole course of the intervention. Their need for adequate pain relief contrasted with their desire to avoid analgesic medications. Despite positive experiences with analgesics, decisions were reconsidered and overturned. Individually tailored counseling helped these patients adopt new attitudes towards analgesics and gradually reduce their pain levels[24].

To conclude this research project, methods were critically appraised to determine their appropriateness. For the systematic review, a narrative approach was chosen because a quantitative meta-analytic approach was considered to be inappropriate given the heterogeneity of intervention components and research methods. The narrative approach was appropriate to provide the basis for future trials to evaluate specific intervention components.

For the pilot study, the combination of qualitative and quantitative methods was found to be highly appropriate to evaluate the PRO-Self© Plus PCP for feasibility and for its potential to reduce cancer pain. Compared to other cancer pain self-management interventions that were summarized in a meta-analysis[10] and in our systematic review, the German PRO-Self© Plus PCP was an intensive and comprehensive intervention in terms of both its structure and its content. In this context, reductions in pain intensity scores in the German PRO-Self© Plus pilot RCT were relatively small. Reasons for the small effect sizes might include that patients' overall opioid intake was low. However, it could not be determined whether the low opioid intake was due to a lack of patients' adherence to the

intervention or because clinicians did not adapt the analgesic prescriptions. Therefore, the assessment of patients' adherence with the intervention and the quality of the analgesic prescription should be included in future research.

Furthermore, it was hypothesized that the interventions efficacy may be improved by addressing patient-related barriers more comprehensively; tailoring the number, timing, and duration of the intervention more closely to the patients' needs; including symptoms that severely impact pain self-management; guiding the patients more closely across the complex treatment team; and, with the patient's permission, including direct contact of research staff with the clinician in case the patient should become unable to self-manage their pain and FC support was not available.

This research project has several limitations. In our systematic review, the description of the intervention components did not include unpublished components because the analysis was based on available publications. Furthermore, because of the small sample, low recruitment, and high attrition, findings from the mixed methods study need to be interpreted with caution. In addition, all of the study visits for both the intervention and the control groups were performed by the same nurse, which may have resulted in an occasional unintentional contamination in the control group.

In summary, the systematic review in this thesis is the first to provide a comprehensive overview of components of cancer pain self-management interventions in view of their potential to reduce cancer pain. Furthermore, with the pilot study, the PRO-Self© Plus PCP was tested for the first time in a German speaking population. The transfer and evaluation of the Program were performed successfully. In the pilot RCT pain self-management related knowledge increased significantly and it was possible to calculate effect sizes for the intervention's potential for pain reduction. Findings demonstrated patients' high satisfaction with the German PRO-Self© Plus PCP and showed how patients remained highly ambivalent regarding analgesic intake even if they decided to take analgesics. Even though the effects were rather small, findings from this mixed methods research project provided valuable data on how to improve the intervention and plan a larger multicenter RCT.

References

1. Bundesamt für Statistik. Krebsstatistiken: Wie häufig ist Krebs in Deutschland? [Cancer statistics: How frequent is pain in Germany?], 2009, Retrieved October 27th, 2011, from http://www.krebsinformationsdienst.de/themen/grundlagen/krebs-statistiken.php.
2. International Association for the Study of Pain. Definition of pain, 1979, retrieved January 11th, 2012, from http://www.iasp-pain.org/Content/NavigationMenu/GeneralResourceLinks/PainDefinitions/default.htm#Pain.
3. National Comprehensive Cancer Network. NCCN Clinical Practice GuidelinesTM: Adult cancer pain, Retrieved Jan 14, 2012, from http://www.nccn.org/professionals/physician_gls/PDF/pain.pdf.
4. Breivik H, Cherny N, Collett B, et al. Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. Ann Oncol 2009;20:1420-1433.
5. Jacobsen R, Liubarskiene Z, Moldrup C, et al. Barriers to cancer pain management: a review of empirical research. Medicina (Kaunas) 2009;45:427-433.
6. Schumacher KL, Koresawa S, West C, et al. Putting cancer pain management regimens into practice at home. J Pain Symptom Manage 2002;23:369-382.
7. Jacobsen R, Moldrup C, Christrup L, Sjogren P. Patient-related barriers to cancer pain management: a systematic exploratory review. Scand J Caring Sci 2009;23:190-208.
8. Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. JAMA 2002;288:2469-2475.
9. Allard P, Maunsell E, Labbe J, Dorval M. Educational interventions to improve cancer pain control: a systematic review. J Palliat Med 2001;4:191-203.
10. Bennett MI, Bagnall AM, Jose Closs S. How effective are patient-based educational interventions in the management of cancer pain? Systematic review and meta-analysis. Pain 2009;143:192-199.
11. Devine EC. Meta-analysis of the effect of psychoeducational interventions on pain in adults with cancer. Oncol Nurs Forum 2003;30:75-89.
12. Ferrell BR, Cohen MZ, Rhiner M, Rozek A. Pain as a metaphor for illness. Part II: Family caregivers' management of pain. Oncol Nurs Forum 1991;18:1315-1321.

13. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.

14. West CM, Dodd MJ, Paul SM, et al. The PRO-SELF(c): Pain Control Program--an effective approach for cancer pain management. Oncol Nurs Forum 2003;30:65-73.

15. Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. JAMA 1990;263:549-556.

16. Miaskowski C, Dodd M, West C, et al. The use of a responder analysis to identify differences in patient outcomes following a self-care intervention to improve cancer pain management. Pain 2007;129:55-63.

17. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. A Systematic evaluation of content, structure, and efficacy of interventions to improve patients' self-management of cancer pain. J Pain Symptom Manage, in press.

18. Creswell JW, Plano Clark VL. Designing and Conducting mixed methods research, ed 2nd. Thousand Oaks, California, Sage 2011.

19. Humphreys J, Lee KA, Carrieri-Kohlmann V, et al. Theory of symptom management. In Smith MJ, Liehr PR (eds): Middle range theory for nursing. New York, Springer, 2008, pp 145-158.

20. Bandura A, Walters RH. Social Learning and personality developement. New York, Thomson, 1963.

21. Koller A, Miaskowski C, de Geest S, Opitz O, Spichiger E. Supporting oncology patients' pain self-management: Methods and lessons learned from a randomized controlled pilot study. Eur J Oncol Nurs, in press.

22. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. Results of a randomized controlled pilot study of a self-management intervention for cancer pain. Eur J Oncol Nurs, submitted.

23. Mayring P. Qualitative Inhaltsanalyse: Grundlagen und Techniken [Content Analysis: basics and techniques], ed 8th. Weinheim, Beltz, 2003.

24. Luescher C, Koller A, Schaefer I, Spichiger E. Entscheidungswege von onkologischen Patienten im Umgang mit Schmerzmedikamenten im häuslichen Umfeld: eine qualitative Sekundäranalyse [Oncological patients' decision-making processes concerning their pain medication at home: a qualitative secondary analysis]. Pflege, in press.

Introduction

Despite effective treatment options[1,2], pain control is not adequate in over 40% of patients with cancer[3-6]. For optimal pain management, patients and their family caregivers (FCs) need to use self-management strategies on a daily basis. Interventions to support pain self-management in patients with cancer were shown to be effective but they need additional improvements because the effects to date are moderate[7]. Furthermore, little is known about which components of the intervention are most effective. In addition, little is known about the implementation and efficacy of an intervention that was developed for oncology patients in the United States (U. S.) in a German population.

In this project, we attempted to address these gaps. The two main elements of the research project are a systematic review in which components of interventions designed to support cancer pain self-management were analyzed and a pilot study in which an intervention for cancer pain self-management support was tested. In the pilot study, a mixed methods approach was used combining a randomized controlled pilot trial (pilot RCT) with two qualitative substudies. This doctoral thesis is divided into 9 chapters. In **Chapter 1**, an introduction to cancer pain, its treatment, barriers to effective cancer pain self-management, and interventions to support cancer pain self-management are presented. In addition, the PRO-SELF© Plus Pain Control Program (PCP) which served as the basis for this study is described, as well as a symptom management model and an adult learning theory that provided the theoretical foundation for this research project. **In Chapter 2,** the aims of this thesis are described. **Chapter 3** is the systematic review: "A Systematic Evaluation of Content, Structure, and Efficacy of Interventions to Improve Patients' Self-Management of Cancer Pain"[8]. In this systematic review, studies of interventions designed to support cancer pain self-management were analyzed regarding their various components and efficacy of these interventions. In **Chapter 4** an explanation is provided about how, in the first phase of this project, the PRO-Self© Plus PCP was translated and adapted for the pilot RCT, resulting in the German PRO-Self© Plus PCP.

Chapters 5 - 8 describe the results of the pilot RCT. **Chapter 5** contains the manuscript: "Supporting Self-Management of Pain in Cancer Patients: Methods and Lessons Learned from a Randomized Controlled Pilot Study"[9]. In this paper, the lessons

that were learned during the pilot RCT that tested an intervention designed to support cancer pain self-management are described. **In Chapter 6**, the main quantitative findings from the pilot RCT are reported in the manuscript: “Results of a Pilot Study of a Self-Management Intervention for Cancer Pain”[10]. In **Chapter 7,** findings from the qualitative substudy of the experiences of patients and FCs with the intervention and study procedures are summarized. In **Chapter 8,** findings from the qualitative substudy of patients’ decision processes about analgesic intake over the course of the 10-week intervention period are reported in the manuscript: “Entscheidungswege onkologischer Patienten bezüglich Schmerzmedikamenten [Oncology patients’ decision-making processes concerning their pain medication at home]”[11]. **Chapter 9** is a synthesis and critical discussion of the findings and an outline of the implications for a future research project that is being planned.

Chapter 1

Background

Epidemiology of Cancer, Definition of Pain, and Prevalence of Cancer Pain

In Germany, in 2006, an estimated 425'000 patients were diagnosed with cancer while approximately 210'000 patients (25% of all cases of death) died from this disease[12]. In oncology patients, pain can occur at any time but the incidence increases over the course of the illness. Twenty-eight percent of oncology patients experience pain at the time of diagnosis, while in advanced cancer, 40 % to 80% experience pain[5,13,14].

The most commonly used definition of pain is the one developed by the International Association for the Study of Pain. Pain is defined as "an unpleasant sensory and emotional experience arising from actual or potential tissue damage or described in terms of such damage"[15]. Pain that occurs during the course of cancer can be categorized into three types, pain related to: the cancer itself, to cancer treatment, or unrelated to the cancer diagnosis[16]. Tumors can invade adjacent tissues and cause pain. Treatment-related pain includes painful peripheral neuropathy from chemotherapeutic agents (e.g., vincristine), radiation-induced neural damage, or postsurgical pain syndromes (e.g., from amputation or thoracotomy). Furthermore, people with cancer can experience pain that is not related to cancer (e.g., peripheral neuropathy from diabetes, migraine, or low back pain). Pain associated with direct tumor involvement is the most common cause of cancer pain with bone pain being the most common type[17]. The occurrence of pain depends on the patient's cancer diagnosis. While prevalence rates vary between publications, the prevalence of pain is frequently reported to be highest in patients with the following cancer diagnoses: head and neck (67–91%); prostate (56–94%), uterine (30–90%), genitourinary (58–90%), breast (40–89%), pancreatic (72–85%), and lung cancer (27–76%)[18,19].

While effective treatment options exist, more than 40% of patients with cancer do not achieve adequate pain control[6,8]. In a recently completed descriptive prospective study, Spichiger et al.[20] confirmed these findings in the Swiss setting. At baseline, 49% (N = 77) of cancer outpatients reported an average pain score of 2.2 (on a scale from 0 = no pain to 4 = very strong pain). After three chemotherapy cycles, 55% (n = 53) of patients reported an average pain score of 2.1.

Apart from tumor type and disease status, pain is influenced by demographic and clinical factors. For example, women report higher pain scores than men[21]. In addition, higher pain levels were associated with higher levels of fatigue, sleep disturbance, depression and anxiety[22-24]. Furthermore, pain is negatively related with quality of life (QoL) and functional status[25].

Treatment of Cancer Pain

Effective pain management is based on four critical requirements: (1) detection of pain, (2) correct prescriptions and availability of medical treatments including analgesics[1,2], (3) the patient's ability to put optimal pain management into practice of everyday life[26], and (4) the patient's willingness to adhere to medical treatments[27]. Adequate pain treatment includes, if possible, treatment of the underlying causes of cancer pain and treatment of the pain itself[1,2]. State of the art treatment of cancer pain is outlined in international guidelines[1,2]. In these guidelines, cancer pain treatment recommendations are based on individual pain intensity, and consist of non-opioid and opioid analgesics. Palliative cancer therapy, adjuvant drugs, and other therapeutic measures may be integrated in the pain treatment regimen. In the guidelines the recommendation is that analgesics should be administered orally whenever possible and that basic treatment should consist of extended release agents with short-acting rescue doses when pain worsens temporarily or with worsening disease. Furthermore, a simplified analgesic regimen is recommended to improve adherence to analgesic medications[1,2].

Patients and their FCs play a central role in cancer pain management. Because oncology treatment takes place to a large extent in the outpatient setting, pain is managed primarily at home. As a result, patients and their FCs need to be able to integrate pain self-management into their daily life in order to achieve adequate pain control. Self-management consists of those strategies that patients and FCs perform in daily life to manage illness and treatment to avoid functional regression and health deterioration[28]. Pain self-management requires patients' and their FCs' active involvement in their care. For cancer pain self-management, patients must learn how to get their prescribed medication,

how and when to take it, how to monitor pain, and they must be able to react appropriately if pain is not alleviated[1,2,26]. While implementing pain management strategies at home and insecurity about the use of correct pain management strategies were found to be critical issues for patients and their FCs, only a few studies have evaluated the complex processes of pain self-management from the patients' and their FCs' perspectives[26,29].

Pain self-management is influenced greatly by demographic and individual factors such as previous experiences with illness, cognitive status, and socio-economic status[30]. While cognition can be impaired significantly in patients with cancer, for example because of fatigue or brain metastasis[31], the ability to concentrate, memorize, pay attention and execute tasks is vital for learning the necessary skills for pain management[32]. Cognitive deficits affect patients' understanding of disease and treatment requirements and limit their functional capacity and ability to implement treatment plans including pain management. For example, poor cognition has been shown to negatively affect medication taking[33].

Barriers to Effective Pain Management

The undertreatment of cancer pain, despite the availability of effective treatment options, has led researchers to attempt to determine the factors that impede effective pain management. Such factors are commonly referred to as barriers to pain management. To date, three types of barriers to effective pain management have been identified: (1) misconceptions and lack of knowledge on the part of health care professionals, (2) patient barriers, and (3) system barriers. While a variety of approaches have been tested to overcome some of the clinician and system barriers, the majority of these studies have not produced significant improvements in cancer pain management[34-37]. Rather than trying to decrease system and clinician barriers, this thesis focuses on changing the knowledge and behavior of patients and their FCs in relation to cancer pain management. This approach is justified because studies have shown that oncology patients take only 56% of their prescribed analgesics[38,39]. Furthermore, in some settings, oncology outpatients receive their pain management from their primary physicians and these primary physicians may neither be oncology specialists nor within reach of local educational intervention programs[40].

It is of vital importance for research and clinical practice to examine patient-related barriers towards cancer pain self-management in detail. So far, known patient-related barriers included cognitive, affective, and sensory barriers, as well as practical components[26,27]. While cognitive barriers have been studied extensively[41,42], research on affective, sensory, and practical barriers has been conducted more recently[26,27]. Cognitive barriers include concerns about analgesic use, concerns about communication with

clinicians, and pessimistic beliefs about the possibility of adequate pain control (see Table 1). Most of these cognitive barriers are not specific to patients with cancer but instead derive from beliefs about pain or analgesic medications that are rooted deeply in society. For example a Christian society's understanding that willful suffering will lead to salvation may underlie a high willingness to tolerate pain[43].

Table 1: Cognitive Patient-Related Barriers Towards Cancer Pain Self-Management[27]

Analgesic use

- fear of addiction
- fear of drug tolerance
- fear of side effects
- fear that analgesics mask pain as a sign of disease progression
- concerns about family reaction to pain
- concerns about the credibility of the need for opioid analgesics
- lack of trust in treatment and clinicians
- general dislike of taking pills

Communication about pain

- willingness to tolerate pain
- wish to be a good patient
- wish not to distract physicians from more important tasks such as treating the underlying disease

Pessimistic beliefs about the possibility to control pain in general

- belief that cancer pain is inevitable
- belief that analgesic medications are not efficient

Affective barriers relate to emotional changes in oncology patients with pain. They include mood disorders such as depression, anxiety, mood fluctuations, and stress that are frequent in patients with cancer pain. Affective barriers are interrelated with cognitive barriers even though a causal relationship with pain self-management and cognitive barriers has not yet been established[27]. Sensory barriers refer to the need for an optimal balance between an analgesic's effect and its side effects. Side effects from analgesic medications are distressing for patients with cancer pain and can lead patients to conclude that pain treatment is making them sick instead of alleviating their pain[42,44]. The occurrence of side effects depends largely on the type of analgesic medication. For non-opioids, such as acetylsalicylic acid or diclofenac, the most frequent side effects include gastrointestinal complications such as gastritis[16]. For opioids, the most frequent side effects include constipation, nausea, pruritus, or sedation[2,16].

The practical patient-related barriers to cancer pain self-management relate to difficulties with everyday implementation of pain relieving strategies. In their systematic exploratory review, Jacobsen et al.[27] identified adherence to the prescribed analgesic regimen and communication with clinicians as practical barriers. In addition, in their qualitative study, Schumacher et al.[26] found seven types of practical barriers: acquisition of the prescribed medication, accessing information, tailoring prescribed medication to individual needs, managing side effects, processing information cognitively, managing new pain, and simultaneously managing multiple symptoms.

Interventions to Support Cancer Pain Self-Management

It can be assumed that, in the complex process of pain self-management, patients and their FCs can greatly profit from supportive interventions. Three systematic reviews that examined the effect of interventions that support cancer pain self-management from 1962 to 2009 showed that these interventions are gaining increasing attention but are still understudied approaches[7,45,46]. These reviews are described in detail in Chapter 3 of this thesis. In brief, the first comprehensive systematic review, showed that only eight intervention studies were published between 1962 and 1999 that focused on patients and FCs to enhance cancer pain self-management[45]. Only two of these studies were randomized controlled trials (RCT). Improvements in pain were reported, but effects were moderate. A second review evaluated the effects of six experimental studies of interventions for pain self-management on pain intensity[46]. An important finding of this systematic review was that larger effect sizes were noted when patients (1) were not randomized, (2) reported pain verbally to the person who conducted the intervention, and (3) had average or present pain intensity scores of ≤ 3 (on a 0 to 10 numeric rating scale [NRS] with 0 = no pain and 10 = maximum pain) at the time of enrollment (floor effect). A medium effect size for pain intensity (d = 0.4) was found, when controlling for these three factors. The last review was a meta-analysis of 21 experimental studies examining the efficacy of interventions that targeted patients' and/or FCs' management of cancer pain[7]. The overall effect on average pain intensity was a statistically significant 1.1-point reduction (95% CI: -1.8/-0.41). Moreover, the overall effect on pain management related knowledge was statistically significant. In all three systematic reviews, significant heterogeneity, arising from differences in study designs, methods, and types of interventions, may have weakened the findings. Furthermore, it was not possible to determine which components of interventions were most effective.

One of the studies in Bennett's[7] meta-analysis will be discussed in detail, because the intervention that was tested in this dissertation, namely the PRO-SELF© Plus PCP, was based on that study[47]. This intervention was designed to decrease cancer pain through supporting oncology patients' and FCs' pain self-management[48]. This Program was chosen for three reasons. First, the Program was found to be effective in a large RCT in the U. S.[47]. Second, adaptations were published that were based on extensive qualitative and quantitative analyses which indicated that the revised version might show improved effects[26,49]. Third, the authors of the PRO-SELF© Plus PCP agreed to collaborate closely in order to implement the PRO-SELF© Plus PCP in a German speaking population.

Details of the PRO-SELF© Plus PCP are described in Chapters 4, 5 and 6 of this thesis. In brief, the PRO-SELF© PCP was based on three key strategies: (1) provision of information using academic detailing[50], (2) skill building, and (3) ongoing nurse coaching. The Program consisted of structured and tailored components. To test the Program's efficacy, 174 patients were randomized to standard care (n=81) or the PRO-SELF© PCP (n=93). The standard care group received the patient version of the Cancer Pain Guideline published by the Agency for Health Care Policy and Research[51] and were seen for data collection by a nurse in their homes at 3 time points and had 3 phone calls between the home visits over 6 weeks. Patients in the PRO-Self© PCP group received 3 visits and 3 phone calls by specially trained oncology nurses over a 6 week period. Patients in both groups participated either alone (55%) or with a FC (45%).

While the overall effects of the PRO-SELF© PCP represented a statistically significant decrease in pain intensity scores and significant improvements in analgesic prescriptions, a more detailed evaluation of the efficacy of the intervention within the PRO-Self© PCP group revealed that only 50% of these patients had a complete response (defined as ≥ 30% decrease in pain intensity scores), 25% had a partial response (defined as a decrease in pain intensity scores between 0 and 30%), and 25% did not respond to the educational intervention[49]. Statistical analyses revealed no differences between the demographic or clinical characteristics of the three groups. The authors hypothesized that the dose of the intervention may not have been adequate to achieve a ≥ 30% reduction in average and worst pain intensity scores for every patient.

Through a qualitative study of the audio-taped interactions between patients, FCs, and intervention nurses, numerous difficulties were identified in the implementation of the pain management regimen in patients' daily life[26]. While some of these difficulties were addressed in the nurse coaching/problem-solving component of the intervention, the qualitative analysis revealed that problem-solving was a process that took place over time

and that the majority of patients were still actively involved in problem-solving to achieve better pain control at the final home visit. With this convergence of quantitative and qualitative evidence, the authors concluded that patients needed additional time to achieve optimal pain control (i.e., a higher dose). In addition, the previous study of the PRO-SELF© PCP did not determine if the behavior changes that occurred as a result of the intervention were sustained once the study ended[47].

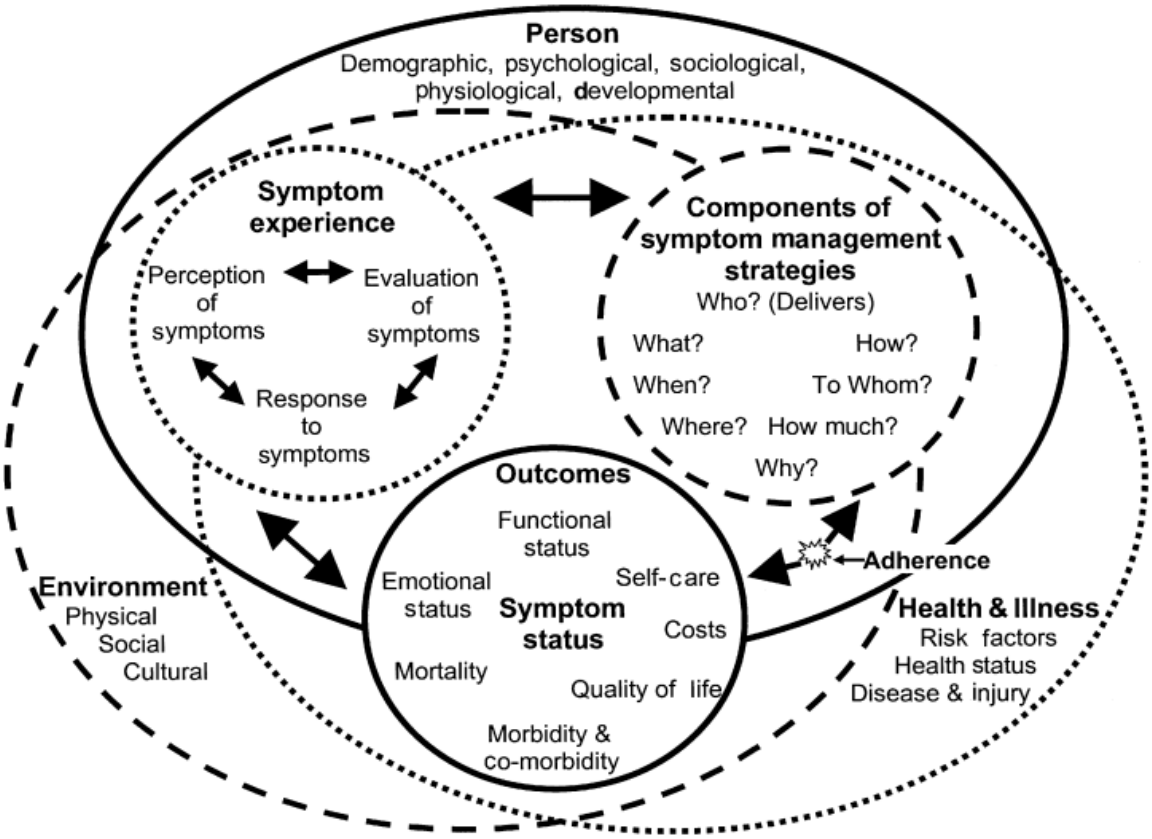
Based on these findings the authors modified the intervention to enhance its efficacy which resulted in the PRO-SELF© Plus PCP. A second RCT is currently underway in which low dose PRO-SELF© Plus PCP is being compared with high dose PRO-SELF© Plus PCP. For both doses of the PRO-SELF© Plus PCP, the PRO-SELF© PCP was expanded to a period of ten weeks and the number of visits and phone calls was increased resulting in a higher dose of the intervention in both groups compared with the original PRO-SELF© PCP. The low dose intervention consists of 4 visits and 6 phone calls (8.0 hours over 10 weeks). The high dose intervention consists of 6 visits and 10 phone calls (12.3 hours over 10 weeks). As described in Chapter 4, this study is based on the low dose PRO-SELF© Plus PCP which includes weekly contacts over ten weeks. We chose this version in order to test an increased dose compared to the original PRO-SELF© PCP and at the same time balance costs with expected benefits. Adaptations to the Program were made in close collaboration with the PRO-SELF© study group at the University of California in San Francisco (UCSF). Furthermore, in this thesis, we were guided by two theoretical frameworks: symptom management theory (SMT)[52] and social cognitive theory[53].

Theoretical Framework

The overall framework for this study was the SMT which was developed by Dodd et al.[54] and refined in 2008[52] at UCSF (Figure 1). SMT is described as a mid range theory that guides researchers in the planning of interventions in the complex environment of symptom management. In this model, a symptom such as cancer pain, is defined as a “subjective experience reflecting changes in the biopsychosocial functioning, sensation, or cognition of an individual”[52]. The three dimensions of the SMT that influence each other reciprocally include symptom experience, symptom management strategies, and symptom status outcomes. The “Symptom Experience” dimension includes the individual’s perceptions, evaluation, and responses to a symptom. The “Symptom Management Strategies” dimension includes both the self-management strategies individuals do for themselves and the treatments that clinicians prescribe. It also includes questions that relate to the structure and content of self care activities (e.g., how, when, where, or how much). The “Symptom Status Outcomes” dimension specifies that outcomes emerge from the symptom

management strategies, as well as from the symptom experience. In this model, the "Symptom Status Outcomes" dimension focuses on eight outcomes (i.e., functional status, emotional status, self-care, costs, QoL, morbidity, co-morbidity, mortality). However, these eight outcomes only provide examples of symptom-related outcomes instead of being all inclusive. Clinicians and researchers can select these and other outcomes depending on their targeted symptom and purpose. According to SMT, "Symptom Status Outcomes" are directly depending on adherence to symptom management strategies (i.e., whether an intended person actually uses an assigned symptom management strategy). SMT states that nonadherence (illustrated by the broken arrow between "Symptom Management Strategies" and "Symptom Outcome Status") occurs if interventions are too challenging for the person or are applied inconsistently. In order to allow for the major impact of contextual factors, the model places symptom management within the context of the domains of the person (e.g., age, gender, socio economic status, mood), health- and illness-related factors (e.g., kind and status of disease), and the environment (e.g., setting, social support).

Figure 1: Symptom Management Theory



Note: Reprinted with permission from Humphreys J, Lee KA, Carrieri-Kohlmann V, et al. Theory of symptom management. In Smith MJ, Liehr PR (eds): Middle range theory for nursing. New York, Springer, 2008, pp 145-158.

In order to frame the content and structure of the intervention, adult learning theory was chosen as a theoretical foundation. More specifically, Bandura's social cognitive theory was chosen as conceptual framework[53]. This theory was used because it is one of the most frequently used paradigms in health promotion today. It establishes that human behavior is influenced and affected reciprocally by the individual (i.e., a person's expectations, beliefs, self-perception, goals, capabilities, intentions, and emotional responses form and guide behavior), their behavior (i.e., a person's behavior will determine the environment to which the person is exposed, and behavior is, in turn modified by that environment), and the environment (i.e., expectations, beliefs, and cognitive competencies are developed and modified by social influences and physical structures within the environment).

According to social cognitive theory, each individual possesses a self-regulating system that affects learning. As part of this self-regulatory system, Bandura[55] introduced the concept of self-efficacy. Bandura defines self-efficacy as one's belief in one's ability to succeed in specific situations. Individuals accumulate perceptions about their performance (experience) that influence their self-belief. In other words, the achievements or failures that people experience are closely related to the ways that they have learned to view themselves and their relationships with others. The thoughts that result from this interrelationship become a mediator between knowledge and behavior and influence an individual's ability to complete a task and reach an attainable goal, affect the level of resilience the individual develops, and can become the motivational drive that accompanies action. These experiences are processed, stored, and used by the self-efficacy beliefs system, which in turn affects future experiences, thoughts, behavior, and environment. According to social cognitive theory, methods for increasing self-efficacy include mastery experience (i.e., enabling the person to reach a desirable and attainable goal in order to build a sense of success), improving physical and emotional states, or verbal persuasion (e.g., encouragement by another person to induce efforts towards behavior change)[56].

Placing the PRO-SELF© Plus PCP within the Theoretical Framework

Details of the intervention and study procedures are described in Chapters 4 and 5 of this thesis. However, in order to place the German PRO-SELF© Plus PCP within the context of the theoretical frameworks, some of its key features are described briefly in the following paragraphs. Consistent with SMT, in this research project cancer pain was viewed as a complex and multidimensional experience that included patients' responses to and evaluation of the pain experience[52]. In addition, pain was not expected to be a solitary symptom experienced by oncology patients but to be frequently accompanied by other

symptoms that may be closely related to the patient's disease, pain, or treatment (e.g., constipation as side effect of treatment with opioids). Within the "Symptom Management Strategies" dimension, the intervention in this research project focused on supporting patients' pain self-management which means that patients and FCs were viewed as key players in cancer pain management: While a specifically trained intervention nurse provided support for the patients and their FCs, actual pain self-management strategies were supposed to be performed by the patients and their FCs. Furthermore, a goal of the intervention was to indirectly influence the pain management strategies prescribed by clinicians by teaching patients how to communicate with their treating clinicians if pain control was not sufficient. Furthermore, for the intervention, essential structure and content components (e.g., dose, setting, content of the intervention) were clearly defined.

Within the "Symptom Status Outcomes" dimension, cancer pain was established as key outcome of the German PRO-Self© Plus PCP. Because of the significant impact that cancer pain has on patients' QoL and daily function[57], these variables were measured as secondary outcomes. Furthermore, concurrent symptoms that were expected to be closely related with pain were included in this project[58,59]: Common side effects of analgesic medication (e.g., constipation) were addressed as part of the intervention and measured as secondary outcomes of the study. Other symptoms that have been shown to occur frequently in oncology patients (e.g., fatigue) were measured and included as covariates in the quantitative analysis[60,61]. Furthermore, demographic and clinical data (e.g., age, gender, socio-economic status, mood status) were included in order to control for their potential influence on pain self-management. The pilot RCT was positioned within the context of the domains of the person (i.e., by taking into account the patients' age, socio economic status, and mood status), health- and illness-related factors (i.e., by taking into account the kind and status of disease and the patients' cognitive status) and the environment (i.e., by meeting the patients in their home setting and including FCs).

Furthermore, the PRO-SELF© Plus PCP was designed in accordance with social cognitive theory[53]. The individual patient's pain self-management was addressed within the three key features of the Program by supporting patients' and FCs' expectations (e.g., ongoing coaching that included individual goal setting) and capabilities (e.g., provision of information, skills building). In addition, by using the academic detailing approach which allowed the intervention nurse to focus the education on a patient's and FC's individual knowledge deficits[48,50], the provision of information was based on previous experiences of patients and their FCs with common patient-related barriers towards pain self-management[41,62]. Changes in these patient-related barriers were assessed and included in

the analysis while patients' and FCs' intentions and emotional responses to the barriers were addressed during discussions by the intervention nurse.

Regarding the patients' behavior, pain self-management strategies were discussed with patients and FCs, noted in a weekly pain and side effect management plan, and evaluated. The patient's social and physical environment was expected to have a large influence on their pain self-management, therefore the intervention took place within the patients' homes and FCs were explicitly included. Furthermore, self-efficacy was addressed in the intervention and assessed in the study. Verbal persuasion was used repeatedly to increase patients' and FCs' self-efficacy as part of the nurse coaching component of the PRO-SELF© Plus PCP by the specially trained intervention nurse. Furthermore, in order to build up positive mastery experience of patients and their FCs, attainable goals were included in the intervention that were closely related to the patient's daily activities.

Identified Gaps and Rationale for this Project

In summary, interventions that are designed to support oncology patients' pain self-management warrant additional investigation. To date, the heterogeneity in study and intervention designs prevent definitive conclusions about which components of these interventions are essential to improve pain self-management.

The PRO-SELF© Plus PCP is a promising approach to support oncology patients' pain self-management. Adaptations that were made based on qualitative and quantitative analyses from the original PRO-SELF© study need to be tested for efficacy. Furthermore, to our knowledge, the translation of a cancer pain self-management intervention from the U. S. into the German health care setting, which requires cultural and other adaptations, has not been examined. Prior to implementation of a large scale RCT, a pilot study is advisable in order to test an intervention's feasibility and determine effect sizes[63]. Because patients and theirs FCs play a critical role in pain management, the patients' perspective needs to be evaluated to establish an intervention's feasibility. Furthermore, little is known about the processes that oncology patients and their FCs use to come to a decision about whether to take analgesic medication. With the research presented in this doctoral thesis these gaps are addressed.

References

1. Dy SM, Asch SM, Naeim A, et al. Evidence-based standards for cancer pain management. J Clin Oncol 2008;26:3879-3885.
2. National Comprehensive Cancer Network. NCCN Clinical Practice GuidelinesTM: Adult cancer pain, Retrieved Jan 14, 2012, from http://www.nccn.org/professionals/physician_gls/PDF/pain.pdf.
3. Cleeland CS, Gonin R, Hatfield AK, et al. Pain and its treatment in outpatients with metastatic cancer. N Engl J Med 1994;330:592-596.
4. Mercadante S. Pain treatment and outcomes for patients with advanced cancer who receive follow-up care at home. Cancer 1999;85:1849-1858.
5. Mercadante S. Why are our patients still suffering pain? Nat Clin Pract Oncol 2007;4:138-139.
6. Breivik H, Cherny N, Collett B, et al. Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. Ann Oncol 2009;20:1420-1433.
7. Bennett MI, Bagnall AM, Jose Closs S. How effective are patient-based educational interventions in the management of cancer pain? Systematic review and meta-analysis. Pain 2009;143:192-199.
8. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. A systematic evaluation of content, structure, and efficacy of interventions to improve patients' self-management of cancer pain. J Pain Symptom Manage, in press.
9. Koller A, Miaskowski C, de Geest S, Opitz O, Spichiger E. Supporting oncology patients' pain self-management: Methods and lessons learned from a randomized controlled pilot study. Eur J Oncol Nurs, in press.
10. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. Results of a randomized controlled pilot study of a self-management intervention for cancer pain. Eur J Oncol Nurs, submitted.
11. Luescher C, Koller A, Schaefer I, Spichiger E. Entscheidungswege von onkologischen Patienten im Umgang mit Schmerzmedikamenten im häuslichen Umfeld: eine qualitative Sekundäranalyse [Oncological patients' decision-making processes concerning their pain medication at home: a qualitative secondary analysis]. Pflege: Die wissenschaftliche Zeitschrift für Pflegeberufe, in press.

12. Bundesamt für Statistik. Krebsstatistiken: Wie häufig ist Krebs in Deutschland? [Cancer statistics: How frequent is pain in Germany?], 2009, Retrieved October 27th, 2011, from http://www.krebsinformationsdienst.de/themen/grundlagen/krebs-statistiken.php.

13. O'Connor M, Weir J, Butcher I, et al. Pain in patients attending a specialist cancer service: prevalence and association with emotional distress. J Pain Symptom Manage;43:29-38.

14. Van den Beuken-van Everdingen MH, de Rijke JM, Kessels AG, et al. Prevalence of pain in patients with cancer: a systematic review of the past 40 years. Ann Oncol 2007;18:1437-1449.

15. International Association for the Study of Pain. Definition of pain, 1979, retrieved January 11th, 2012, from http://www.iasp-pain.org/Content/NavigationMenu/GeneralResourceLinks/PainDefinitions/default.htm#Pain.

16. McCaffery M, Pasero C. Pain: Clinical Manual, ed 2. St.Louis, CV Mosby Co., 1999.

17. Foley KM. Advances in cancer pain. Arch Neurol 1999;56:413-417.

18. Potter J, Higginson IJ. Pain experienced by lung cancer patients: a review of prevalence, causes and pathophysiology. Lung Cancer 2004;43:247-257.

19. International Association for the Study of Pain. Global year against cancer pain: Epidemiology of Cancer Pain, 2009, retrieved October 27th, 2011, from http://www.iasp-pain.org.

20. Spichiger E, Mueller-Froehlich C, Denhaerynck K, et al. Prevalence of symptoms, with a focus on fatigue, and changes of symptoms over three months in outpatients receiving cancer chemotherapy. Swiss Med Wkly, DOI: w13303.

21. Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley JL, 3rd. Sex, gender, and pain: a review of recent clinical and experimental findings. J Pain 2009;10:447-485.

22. Dodd MJ, Miaskowski C, Paul SM. Symptom clusters and their effect on the functional status of patients with cancer. Oncol Nurs Forum 2001;28:465-470.

23. Miaskowski C, Dodd M, Lee K. Symptom clusters: the new frontier in symptom management research. J Natl Cancer Inst Monogr 2004:17-21.

24. Beck SL, Dudley WN, Barsevick A. Pain, sleep disturbance, and fatigue in patients with cancer: using a mediation model to test a symptom cluster. Oncol Nurs Forum 2005;32:542.

25. Ferreira KA, Kimura M, Teixeira MJ, et al. Impact of cancer-related symptom synergisms on health-related quality of life and performance status. J Pain Symptom Manage 2008;35:604-616.

26. Schumacher KL, Koresawa S, West C, et al. Putting cancer pain management regimens into practice at home. J Pain Symptom Manage 2002;23:369-382.

27. Jacobsen R, Moldrup C, Christrup L, Sjogren P. Patient-related barriers to cancer pain management: a systematic exploratory review. Scand J Caring Sci 2009;23:190-208.

28. Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. JAMA 2002;288:2469-2475.

29. Ferrell BR, Cohen MZ, Rhiner M, Rozek A. Pain as a metaphor for illness. Part II: Family caregivers' management of pain. Oncol Nurs Forum 1991;18:1315-1321.

30. Fillingim RB. Individual differences in pain responses. Curr Rheumatol Rep 2005;7:342-347.

31. Nelson CJ, Nandy N, Roth AJ. Chemotherapy and cognitive deficits: mechanisms, findings, and potential interventions. Palliat Support Care 2007;5:273-280.

32. Spitzer M. Lernen. Gehirnforschung und die Schule des Lebens [Learning. Brain research and the school of life]. Heidelberg, Berlin, Spektrum, 2006.

33. Hutchison LC, Jones SK, West DS, Wei JY. Assessment of medication management by community-living elderly persons with two standardized assessment tools: a cross-sectional study. Am J Geriatr Pharmacother 2006;4:144-153.

34. Dahl JL, Saeger L, Stein W, Huss RD. The new JCAHO pain assessment standards: implications for the medical director. J Am Med Dir Assoc 2000;1:S24-31.

35. Du Pen SL, Du Pen AR, Polissar N, et al. Implementing guidelines for cancer pain management: results of a randomized controlled clinical trial. J Clin Oncol 1999;17:361-370.

36. Vallerand AH, Riley-Doucet C, Hasenau SM, Templin T. Improving cancer pain management by homecare nurses. Oncol Nurs Forum 2004;31:809-816.

37. Jones PS, Fink R, Pepper G, et al. Improving nursing home staff knowledge and attitudes about pain. Gerontologist 2004;44:469-478.

38. Miaskowski C, Dodd MJ, West C, et al. Lack of adherence with the analgesic regimen: a significant barrier to effective cancer pain management. J Clin Oncol 2001;19:4275-4279.

39. Valeberg BT, Miaskowski C, Hanestad BR, et al. Prevalence rates for and predictors of self-reported adherence of oncology outpatients with analgesic medications. Clin J Pain 2008;24:627-636.

40. Klabunde CN, Ambs A, Keating NL, et al. The role of primary care physicians in cancer care. J Gen Intern Med 2009;24:1029-1036.

41. Ferrell BR, Rhiner M, Ferrell BA. Development and evaluation of the family pain questionnaire. J Psychosoc Oncol 1993;10:21-35.

42. Ward SE, Goldberg N, Miller-McCauley V, et al. Patient-related barriers to management of cancer pain. Pain 1993;52:319-324.

43. Rey R. The history of pain. Cambridge, Harvard University Press, 1995.

44. Ward SE, Carlson-Dakes K, Hughes SH, Kwekkeboom KL, Donovan HS. The impact on quality of life of patient-related barriers to pain management. Res Nurs Health 1998;21:405-413.

45. Allard P, Maunsell E, Labbe J, Dorval M. Educational interventions to improve cancer pain control: a systematic review. J Palliat Med 2001;4:191-203.

46. Devine EC. Meta-analysis of the effect of psychoeducational interventions on pain in adults with cancer. Oncol Nurs Forum 2003;30:75-89.

47. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.

48. West CM, Dodd MJ, Paul SM, et al. The PRO-SELF(c): Pain Control Program--an effective approach for cancer pain management. Oncol Nurs Forum 2003;30:65-73.

49. Miaskowski C, Dodd M, West C, et al. The use of a responder analysis to identify differences in patient outcomes following a self-care intervention to improve cancer pain management. Pain 2007;129:55-63.

50. Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. JAMA 1990;263:549-556.

51. Jacox A, Carr DB, Payne R. Management of cancer pain. Clinical practice guideline No. 9 AHCPR Publication No. 94-0592: Agency for Health Care Policy and Research, US Department of Health and Human Services, Public Health Service. Rockeville, 1994.

52. Humphreys J, Lee KA, Carrieri-Kohlmann V, et al. Theory of symptom management. In Smith MJ, Liehr PR (eds): Middle range theory for nursing. New York, Springer, 2008, pp 145-158.

53. Bandura A, Walters RH. Social Learning and personality developement. New York, Thomson, 1963.

54. Dodd M, Janson S, Facione N, et al. Advancing the science of symptom management. J Adv Nurs 2001;33:668-676.

55. Bandura A. Self-efficacy mechanisms in psychological activation and health promoting behavior. In Madden J, Matthysse S, Barchas (eds): Adaptation, learning and affect. New York, Raven Press, 1989, pp 1-51.

56. Glanz K, Rimer B, Lewis F, Jossey-Bass S. Health behavior and health education: theory, research, and practice. Education for Health 2004;17:399-402.

57. Niv D, Kreitler S. Pain and quality of life. Pain Pract 2001;1:150-161.

58. Dodd MJ, Miaskowski C, Lee KA. Occurrence of symptom clusters. J Natl Cancer Inst Monogr 2004:76-78.

59. Kirkova J, Aktas A, Walsh D, Rybicki L, Davis MP. Consistency of symptom clusters in advanced cancer. The American Journal of Hospice & Palliative Care 2010;27:342-346.

60. Portenoy RK, Thaler HT, Kornblith AB, et al. The Memorial Symptom Assessment Scale: an instrument for the evaluation of symptom prevalence, characteristics and distress. Eur J Cancer 1994;30A:1326-1336.

61. Spichiger E, Muller-Frohlich C, Denhaerynck K, et al. Symptom prevalence and changes of symptoms over ten days in hospitalized patients with advanced cancer: a descriptive study. Eur J Oncol Nurs 2011;15:95-102.

62. Gunnarsdottir S, Donovan HS, Serlin RC, Voge C, Ward S. Patient-related barriers to pain management: the Barriers Questionnaire II (BQ-II). Pain 2002;99:385-396.

63. Beebe LH. What can we learn from pilot studies? Perspect Psychiatr Care 2007;43:213-218.

Chapter 2

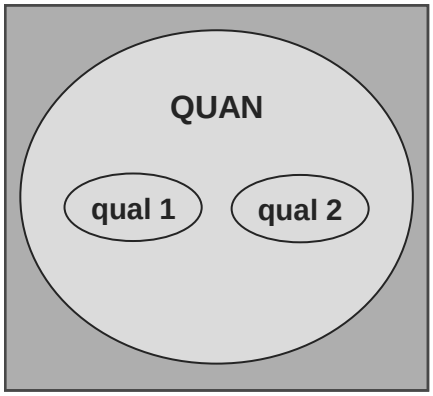
Aims of the Research Project

To promote optimal pain self-management in patients with cancer and their family caregivers (FCs), effective interventions are needed to overcome patient-related barriers towards pain self-management. The overall aims of this mixed methods research program were twofold: first, to analyze the state of knowledge regarding interventions designed to support pain self-management in patients with cancer; and second, to translate, adapt, improve, and evaluate a state of the art intervention designed to support self-management of cancer patients and their FCs in a German speaking context.

To address the first aim, a systematic literature review was conducted in order to summarize evidence from experimental studies on components of interventions to support cancer pain self-management. In this review, the aim was to systematically describe structure and content components, as well as the efficacy of various components of interventions designed to improve patients' and their FCs' self-management of cancer pain.

To pilot test the adapted German version of the PRO-SELF© Plus Pain Control Program (PCP), an intervention that was designed to support the pain self-management of patients with cancer and their FCs a nested concurrent mixed methods design was utilized[1]. In the main part of the pilot study a randomized controlled trial design was used and in two substudies, qualitative methods were applied (Figure 1). With this approach, topics that are traditionally addressed in pilot studies (e.g., attrition rates)[2] were augmented with the contextual field-based patient perspective. Debriefing interviews with patients and FCs after the intervention and audiotapes of intervention sessions provided valuable data that helped determine how patients experienced the intervention and study procedures and to explore patients' decision-making processes regarding analgesic intake.

Figure 1: Nested Concurrent Mixed Methods Design of Pilot Study[1]



To prepare for the pilot RCT, instruments were translated and intervention and study procedures were revised in order to adapt the PRO-SELF© PLUS PCP for a German speaking population. The preparation phase was part of this thesis and is described in Chapter 4.

Specific Aims of the Pilot RCT:

1. To examine the feasibility of study procedures, including recruitment procedures, interventions, data collection and management, and the attrition rate.

2. To establish effect sizes for the main outcome variables (i.e., worst and average intensity of pain) for subsequent power calculations.

Specific Aims of the Qualitative Substudies of the Pilot RCT:

1. To explore patients' and FCs' experiences with their pain management, with the educational intervention, and their view of burden and benefit from study participation.

2. To explore patients' decision-making processes regarding the intake of analgesic medications over the course of the 10-week intervention period.

References

1. Creswell JW, Plano Clark VL. Designing and Conducting mixed methods research, ed 2nd. Thousand Oaks, California, Sage 2011.

2. Beebe LH. What can we learn from pilot studies? Perspect Psychiatr Care 2007;43:213-218.

Chapter 3

A Systematic Evaluation of Content, Structure, and Efficacy of Interventions to Improve Patients' Self-Management of Cancer Pain

Antje Koller, MNS[1]; Christine Miaskowski, PhD, RN, FAAN[2];
Sabina De Geest, PhD, RN, FAAN, FRCN[1]; Oliver Opitz, MD[3]; Elisabeth Spichiger, PhD, RN[1,4]

[1] Institute of Nursing Science, Faculty of Medicine, University of Basel, Switzerland
[2] Department of Physiological Nursing, School of Nursing, University of California, San Francisco, USA
[3] Tumorzentrum Ludwig Heilmeyer - Comprehensive Cancer Center Freiburg, Faculty of Medicine, University of Freiburg, Germany
[4] Inselspital Bern University Hospital, Switzerland

Accepted for publication by the Journal of Pain and Symptom Management

Abstract

Context: Cancer pain continues to be extensively under treated, despite established guidelines. While the efficacy of interventions that support patients' self-management of cancer pain was demonstrated in several studies, the most effective components of these interventions remain unknown.

Objectives: The purpose of this review of experimental and quasi-experimental studies was to systematically describe the structure and content components, as well as the efficacy of various components of interventions designed to improve patients' self-management of cancer pain.

Methods: A systematic review of the literature was done that supplemented Bennett and colleagues' meta-analysis (2009). Intervention components were categorized using content analysis. The intervention components were compared based on their calculated largest effect sizes (ESs) within each study (i.e., Hedges' G_u for between group differences in pain intensity scores).

Results: Based on 34 publications (i.e., 24 interventions), seven structure and 16 content components were identified. In eleven studies with statistically significant ESs, the largest ESs within each study ranged from -1.87 to -0.44, which represented clinically meaningful effects. No single component was found to have a discernable influence on ES.

Conclusions: This analysis provides researchers and clinicians with a detailed overview of the various structural and content components, as well as various combinations that were tested in intervention studies to improve cancer pain management. However, because of a variety of limitations, the most efficacious intervention components or combination of components remain to be determined in future studies.

Introduction

Despite the availability of analgesics and established guidelines to maximize treatment efficacy[1,2] cancer pain remains undertreated[3-5]. An extensive portion of this undertreatment can be attributed to patient factors or barriers that hinder effective pain management[6,7]. While many interventions to support patients' self-management of cancer pain were developed and tested, it remains unclear which intervention components are most effective[8-10]. Therefore, the purpose of this review of experimental and quasi-experimental studies was to systematically describe the structure and content components, as well as the efficacy of various components of interventions designed to improve patients' self-management of cancer pain.

Background

Pain is one of the most frequent symptoms that oncology patients experience[1,11]. Even though effective treatments exist[3,5], more than 40% of cancer patients experience moderate to severe pain[2,12,13]. Because of its deleterious effects on mood, functional status, and quality of life, pain control is an essential component of cancer treatment[14,15]. Established guidelines describe five steps that are crucial for optimal pain management by clinicians and patients: assessment, planning and implementation of actions, evaluation of these actions, and adaptations if pain management is inadequate[3,5,16]. While clinicians diagnose and treat pain, patients and their family caregivers (FCs) need to follow these five steps on a daily basis in order to achieve pain control. Cancer patients and their FCs need to apply complex self-management strategies, such as self-monitoring of pain and related symptoms, obtaining the prescribed pain medication, taking pain medication on a regular schedule, and using nonpharmacologic pain management strategies. Finally, patients need to evaluate the effectiveness of their strategies and make adaptations if necessary by titrating as needed medications and effectively communicating with their clinicians if their pain is not relieved[16].

If applied correctly, pain management can reduce pain in 95% of oncology patients[12]. However, an extensive portion of undertreatment of cancer pain is attributed to patient barriers. For example, oncology patients took only 56% to 70% of their medication despite being in severe pain, even if analgesics were prescribed correctly[6,17]. Patient barriers are multi-factorial and often a consequence of a lack of knowledge about cancer pain and its self-management[6,18,19]. For example, opioids are associated with fears and

misconceptions[6,20,21]. In addition, practical problems such as difficulties obtaining prescribed pain medication, difficulties tailoring medications to individual needs, or inadequate management of side effects were found to inhibit optimal pain control[6,22].

Lorig defines interventions that support patients' self-management as a "set of planned activities designed to improve patients' behaviors, health status, or both" (p. xiii) and describes self-management and its support as a complex process[23]. It is no longer sufficient for patients with cancer pain to learn and practice distinct skills. In addition, they need to manage their pain as part of daily life using advanced problem solving skills[23,24]. Often, interventions that are designed to support patients' self-management are guided by theoretical frameworks that provide directions on how to change patients' cognitions (i.e., alterations in persons' knowledge, beliefs, and attitudes)[23,25] and behaviors (i.e., alterations in persons' actions and skills)[25]. In addition, affective aspects of an intervention have received more attention particularly in terms of the identification of specific factors that drive peoples' actions[25]. It is increasingly important for patients to gain advanced skills in how to deal with the consequences of their disease within their social environment (e.g., problem solving and decision-making skills, skills to form effective partnerships with clinicians, and the achievement of confidence in being able to deal with problems)[23]. For this review, interventions were viewed as planned activities that support patients to achieve optimal pain control. Interventions that focused exclusively on the use of nonpharmacologic interventions (e.g., distraction, relaxation) were not included in this review.

Based on three systematic reviews[8-10], evidence on the efficacy of interventions to improve patients' self-management of cancer pain has increased. In a 2001 systematic review, only eight interventions were evaluated and only two were randomized controlled trials (RCTs)[8,26,27]. Interventions varied greatly in type, duration, and content. Improvements in pain intensity were reported in five studies[20,26-30], but most studies did not have appropriate control groups. In addition, in one RCT[27] where effect sizes (ESs) were calculated, the ESs were small and not statistically significant (i.e., d = 0.20-0.25). However, Allard et al.[8] concluded that interventions directed at patients and FCs may be effective in improving patients' attitudes towards pain self-management. The authors emphasized the importance of using a pain diary to monitor pain. However, it is not clear how they reached this conclusion because none of the studies tested the effects of different components of the intervention.

In a second review of six studies of interventions for pain self-management[10] Devine noted that the interventions varied greatly in terms of type, duration, and content. Larger ESs were noted when patients were not randomized; patients reported pain verbally to the

person who conducted the intervention; and patients had average or present pain intensity scores of ≤ 3 (on a 0 to 10 numeric rating scale [NRS] with 0 = no pain and 10 = maximum pain) at the time of enrollment. A medium ES for pain intensity (d = 0.4) was found, while controlling for those three factors that had confounding effects on pain intensity. Devine concluded that interventions designed to support self-management of cancer pain frequently but not invariably reduced pain.

In 2009, Bennett et al.[9] published a meta-analysis of 21 experimental studies on the efficacy of interventions that targeted patients' and/or FCs' management of cancer pain. The overall effect on pain intensity in ten of 12 studies that used the same outcome measure (i.e., 0 to 10 NRS with 0 = no pain and 10 = maximum pain) was a statistically significant 1.1-point reduction (95% CI: -1.8/-0.41) in average pain, a statistically significant 0.98-point reduction (95% CI: -1.68/-0.28) in least pain, a statistically significant 0.78-point reduction (95% CI: -1.21/-0.35) in worst pain, and a statistically significant 0.65-point reduction (95% CI: -1.21/-0.09) in current pain. In addition, the overall effect on pain management related knowledge and attitudes was statistically significant. Despite these findings, the authors concluded that the relationships between the interventions, improved knowledge and attitudes, medication adherence, decreased pain scores, and decreased pain interference with daily life remain unclear. Significant heterogeneity, arising from differences in study designs, as well as methods and types of interventions were present, which may have weakened the results. The authors hypothesized that other factors, including the specific components of the interventions, could have influenced their findings.

In summary, over the past fifteen years, the number of studies and the proportion of RCTs have increased while outcome criteria have shifted from an improvement in patients' knowledge about cancer pain management to a clinically significant decrease in pain intensity. While statistically significant decreases in pain intensity were found across studies the effects in terms of being clinically meaningful were in the moderate range (i.e., d = 0.2 to 0.4, weighted mean differences = 0.65 to 1.1). All systematic reviews[8-10] concluded that interventions varied greatly in terms of type, duration, and content. In addition, it was not possible to determine which types of interventions were most effective. In order to improve the efficacy of interventions for cancer pain management, it is essential to determine which structure and content components contribute to the best outcomes. A comprehensive evaluation of the efficacy of the components of interventions studied to date is a critical first step to optimize oncology patients' ability to effectively manage pain. Therefore, in this systematic review, structure and content components of interventions tested to date to support adult oncology patients' self-management of cancer pain were categorized and their efficacy evaluated.

Methods

Review of the literature. Studies included in Bennett and colleagues' 2009 meta-analysis[9] served as foundation for this review. This literature search was updated in Medline, CINAHL, and the Cochrane Library from December 2007 to November 2010 using the same search terms as Bennett et al.[9]. An additional search was performed within references of identified studies.

Interventions to support oncology patients' pain self-management were defined by Bennett et al.[9] as "information, behavioral instructions, and advice in relation to management of cancer pain by means of verbal, written, audio- or video-taped or computer-aided modalities, which are given by a healthcare provider or peer, for example expert patients" (p. 193). Trials were included if they met the following criteria: "experimental design with a comparison group (RCTs or controlled trials), where the control group received usual care or attention only; included adults with pain from active cancer and not pain from cancer treatment such as surgery or chemotherapy; used a patient-based educational intervention on an individual basis; assessed pain-related outcomes" (p. 193). Bennett et al.[9] excluded studies that included psycho-behavioral methods in the intervention. For this review, the same inclusion and exclusion criteria were used. However, in this review, two studies that were included in Bennett et al. meta-analysis were excluded because they only evaluated interventions on relaxation, distraction, and massage but not on pharmacologic interventions[31] or they did not report pain outcomes for a control group[32].

Bennett et al.[9] assessed the studies' validity using the following criteria: randomization method, groups' baseline differences, groups treated similarly apart from the intervention, blinding of outcome assessors, reporting of outcomes for both groups, and the use of intent to treat analysis. These criteria were used to judge the additional studies included in this review.

Categorization of intervention components. Based on the work of Mayring[33], content analysis was used to categorize the structure and content components of the interventions. For each study, the first author categorized each of its intervention components. In the second step, the first and the last author collapsed these categories and refined them based on discussions with the third author. Finally, the last author read all of the publications and categorized the components of the intervention. Results were compared with the first author's categorizations and disagreements were discussed until consensus was reached. Based on these analytical steps, components of interventions were categorized into seven structure components (see Table 1) and 16 content components (see Table 2).

Calculation of effect sizes. When possible, Hedges' G_u, a unit free ES was calculated for between group effects for each pain intensity measure at each time-point[34]. If information was not sufficient in study publications, additional online information from Bennett et al.[9] was used. Hedges' G_u is a standardized mean difference parameter which differs from other commonly used ES calculations in that it contains a sample bias corrector which results in an unbiased estimation of effects especially for small studies[35] The greater a negative ES differs from zero, the larger the difference in pain reduction is between the two groups in favor of the intervention group. A G_u of < -0.3 was considered a clinically meaningful ES in accordance with health outcomes research in oncology patients[36,37]. Furthermore, we defined a large ES as G_u < -0.8 and a medium ES as G_u -0.3 to -0.8[38]. The largest ES within each study was used for evaluation.

Because of the small number of studies, it was not possible to use quantitative methods (e.g., moderator analysis) to analyze the efficacy of single intervention components. Instead, by way of example, as shown in Table 3 for the structure component of FC involvement, smaller tables that included only statistically significant studies, were developed to evaluate for patterns or trends associated with a specific structure or content component of an intervention. For each of these analyses, the statistically significant studies were first grouped according to ESs and then examined visually for patterns for each of the defined intervention components based on their ES.

Finally, components of studies with large ESs were summarized. Studies were categorized as statistically significant if the p-value was < 0.05 at any time-point for any pain intensity measure.

Results

Nineteen studies were included from Bennett et al. meta-analysis[9]. While additional 12 studies were identified through the literature search, only five met the inclusion criteria. Four were found within databases[39-42] and one by hand search[43]. Another ten papers were identified that contained additional information on seven of these studies[44-53]. Therefore, a total of 24 studies (i.e., 24 interventions) and ten additional papers were included in this review.

Table 1. Structure Components of Interventions to Support Oncology Patients' Pain Self-Management

Auth. year[I]	Mode of delivery[II]	Material given to patient	Receiver of inter-vention	Provider of intervention	Inter-action provider/ receiver[III]	Structured and/or tailored[IV]	Intensity of intervention[V]	Brief description of intervention[VI]	Pain measurement method	Time points of measurement[VII]	Effect size G_u (95% CI)[VIII]	
Aubin 2006[a,18]	face-to-face video	booklet	patient or patient and FC	specially trained home-care nurses video: nr	questions	structured and tailored	1 session: duration nr video: duration 15 minutes	Interactive cognitive behavioral session at patients' homes. HCPs were contacted directly by home-care nurses if patients had contacted them with problems.	average and worst pain intensity (time frame not specified) NRS: 0 (no pain) to 10 (worst imaginable pain)	**2 weeks T1/2**	average pain* **worst pain***	-1.18 (-1.75/-0.62) **-1.87 (-2.50/-1.25)**
										4 weeks T2/2	average pain worst pain*	-0.57 (-1.21/0.07) -1.25 (-1.93/-0.56)
Yildirim 2009[43]	face-to-face slide presenta-tion	booklet	patient	2 PhD prepared registered nurses, physician	questions	structured and tailored	1st session: duration 30-40 minutes 2nd session after 3 days: 5-15 minutes ("as required") 3rd session after 7 days: 5-15 minutes ("as required")	Interactive cognitive sessions in patient's room in hospital.	present, worst and least pain intensity (timeframe not specified) NRS: 0 (no pain) to 10 (worst imaginable pain)	2 weeks T1/3	present pain* worst pain least pain*	-1.29 (-1.97/-0.61) -0.49 (-1.12/0.14) -0.82 (-1.47/-0.18)
										4 weeks T2/3	**present pain*** worst pain least pain*	**-1.56 (-2.27/-0.85)** -0.48 (-1.11/0.15) -0.82 (-1.47/-0.18)
										8 weeks T3/3	present pain* worst pain least pain*	-1.48 (-2.18/-0.78) -0.37 (-1.00/0.25) -0.96 (-1.62/-0.31)
Lai 2004[59]	face-to-face	booklet	patient	Master prepared oncology nurse	questions	structured and tailored	5 sessions over 5 days: duration 10-15 minutes each	Interactive cognitive session performed during hospitalization.	average, least current and worst pain intensity (time frame not specified) NRS 0 (no pain) to 10 (worst imaginable pain)	**2 weeks T1/1**	average pain **least pain*** current pain* worst pain	-0.52 (-1.25/0.20) **-0.94 (-1.70/-0.19)** -0.87 (-1.62/-0.12) -0.08 (-0.79/0.64)
Oliver 2001[47,55]	face-to-face	booklet	patient	Master level psychology student or four year medical student	inter-action	structured and tailored	1 session: duration 20 minutes	Interactive cognitive behavioral session.	average pain in past 2 weeks NRS: 0 (no pain) to 10 (worst imaginable pain) converted into 0-100 scale	**2 weeks T1/1**	**average change pre-post compared between groups***	**-0.61 (-1.01/-0.21)**
Vallières 2006[19]	nr	booklet	patient	nr	nr	structured	1 session: duration nr	Cognitive behavioral session.	average and worst pain intensity in past 48 hours NRS: 0 (no pain) to 10 (worst pain)	**3 weeks T2/2** (week 1 T1/2 nr)	**average pain*** worst pain	**-0.59 (-1.09/-0.09)** -0.46 (-0.95/0.04)

Auth. year[I]	Mode of delivery[II]	Material given to patient	Receiver of inter-vention	Provider of intervention	Inter-action provider/ receiver[III]	Structured and/or tailored[IV]	Intensity of intervention[V]	Brief description of intervention[VI]	Pain measurement method	Time points of measurement[VII]	Effect size G_u (95% CI)[VIII]	
Lin 2006[63]	face-to-face	booklet	patient and FC	research assistant	questions	structured and tailored	1 session: duration 30-40 minutes 2 follow-up sessions after 2 and 4 weeks: duration nr phone-number to call if questions arose	Interactive cognitive session in private room at routine visits at outpatient clinic and two follow-up sessions to reinforce information.	worst pain intensity in past 24 hours NRS: 0 (no pain) to 10 (worst imaginable pain)	2 weeks T1/2 **4 weeks T2/2**	worst pain **worst pain***	-0.16 (-0.67/0.34) **-0.53 (-1.05/-0.02)**
Miaskowski 2004[50,60]	face-to-face phone call	booklet pill box	patient or patient and FC	specially trained oncology nurses	inter-action	structured and tailored	3 sessions over 6 weeks (week 1, 3, 6) 1st session: mean duration 107 minutes (including ~ 20 minutes for study questionnaire) 2nd session: mean duration 48 minutes 3rd session: mean duration 69 minutes (including ~ 20–30 minutes for study questionnaire and exit interview) 3 phone calls over 6 weeks (week 2, 4, 5) mean duration 13–16 minutes	Interactive cognitive behavioral sessions at patient's home or clinic and 3 phone calls.	average, worst and least pain intensity in past 24 hours NRS: 0 (no pain) to 10 (excruciating pain)	**1 week T1/1**	worst pain* **average pain*** least pain*	-0.47 (-0.78/-0.16) **-0.51 (-0.82/-0.21)** -0.43 (-0.74/-0.12)
Keefe 2005[62]	face-to-face video audio-tapes	booklet video audio-tapes	patient and FC	registered nurse-level nurse educator knowledgeable about cancer pain and skilled in coping skills training interventions video: nr	inter-action	structured and tailored	3 sessions over approximately 1-2 weeks: duration 45 to 60 minutes each (average length of sessions: 56 minutes [range 20-90 minutes]; average number of days from first to last session: 14 days [range 8-32 days]) videotape: duration nr ('brief")	Interactive cognitive behavioral sessions at patients' homes.	usual and worst pain intensity during past week NRS: 0 (no pain) 10 (worst imaginable pain)	**1 week T1/1**	**usual pain unadjusted*** worst pain unadjusted	**-0.49 (-0.95/-0.04)** -0.38 (-0.83/0.06)

Auth. year[I]	Mode of delivery[II]	Material given to patient	Receiver of inter-vention	Provider of intervention	Inter-action provider/ receiver[III]	Structured and/or tailored[IV]	Intensity of intervention[V]	Brief description of intervention[VI]	Pain measurement method	Time points of measurement[VII]	Effect size G_u (95% CI)[VIII]	
Ward 2009b[40,45,51]	face-to-face	nr	patient or patient and FC	5 Master prepared nurses, 2 psychologists	inter-action	structured and tailored	1 session: duration 20-80 minutes 2 phone calls 2 and 4 weeks after the session: duration 5-10 minutes	Interactive cognitive behavioral session at a location that was convenient for the patient, usually at patients' homes. Phone call for evaluation of strategies and revise plans.	pain severity (composite T-score of Z-scores of 5 values): pain duration during past week VRS (never, sometimes, often, almost always, always) usual pain during past week VRS (none, mild, moderate, and severe) and of worst, least pain intensity during past week and pain now NRS 0 (no pain) to 10 (worst imaginable pain)	**5 weeks T1/2**	pain severity: Solo vs. dyad pain severity: Dyad vs. control **pain severity: Solo vs. control***	0.38 (-0.05/0.82) -0.02 (-0.45/0.41) **-0.44 (-0.88/-0.01)**
										9 weeks T2/2	pain severity: Solo vs. Dyad pain severity: Dyad vs. control pain severity: Solo vs. control	-0.29 (-0.75/0.16) -0.14 (-0.60/0.32) 0.12 (-0.35/0.59)
Clotfelter 1999[26,48]	video	booklet	patient or patient and FC	nr	no inter-action	structured	video: duration 14 minutes	Cognitive behavioral video presentation in office in private oncology practice.	present pain intensity VAS: 0 mm (no pain) to 100 mm (worst imaginable pain)	2 weeks T1/1	present pain intensity*	not calculated
Lovell 2010[41,52]	video	booklet video	patient or patient and FC	video: patients, caregiver, health professionals	no inter-action	structured	video: duration nr	Cognitive behavioral booklet and video presentation at home.	worst and average pain intensity NRS 0 (no pain) to 10 (worst imaginable pain)	2 weeks T1/2 (4 weeks T2/2 nr: effects of the treatment groups were averaged across both post-randomization time points)	worst pain: video and booklet vs. control* worst pain: booklet vs. control worst pain video vs. control average pain: video and booklet vs. control* average pain: booklet vs. control average pain: video vs. control	not calculated

Auth. year[I]	Mode of delivery[II]	Material given to patient	Receiver of inter-vention	Provider of intervention	Inter-action provider/ receiver[III]	Structured and/or tailored[IV]	Intensity of intervention[V]	Brief description of intervention[VI]	Pain measurement method	Time points of measurement[VII]	Effect size G_u (95% CI)[VIII]	
Wells 2003[b,57]	face-to-face phone call	written information	patient and FC	session: not specified video: experts (physician and nurse) and patients weekly telephone calls: oncology nurse specialist	ques-tions (inter-action in group 3)	structured and tailored	1 session: duration 20-30 minutes group 2: access to a pain hotline: duration nr (only 18% of all patients in this group used the hotline) group 3: 4 weekly phone calls over the month following the educational session	All groups: Interactive cognitive intervention session following a video presentation of 15-minutes. Group 2: Patients were encouraged to call a toll-free hotline if they had questions or concerns about pain control. Group 3: patients received phone calls to reinforce information of intervention.	worst pain and average pain intensity in past 24 hours NRS 0 (no pain) to 10 (worst imaginable pain)	1 month T1/6 (T2 to T5 nr) data from Bennett	average pain: hotline vs. control	-0.08 (-0.76/0.61)
											average pain: phone calls vs. control	-0.28 (-0.99/0.43)
											worst pain: hotline vs. control	-0.39 (-1.08/0.30)
											worst pain: phone calls vs. control	-0.41 (-1.12/0.30)
										6 months T6/6 data from Bennett	**average pain hotline vs. control**	**0.71 (-0.27/1.69)**
											average pain: phone calls vs. control	0.30 (-0.59/1.18)
											worst pain: hotline vs. control	0.46 (-0.51/1.42)
											worst pain: phone calls vs. control	0.40 (-0.49/1.29)
van der Peet 2008[27,39,44]	face-to-face	booklet	patient or patient and FC	palliative care nurses	inter-action	structured and tailored	3 sessions over 6 weeks (week 1, 3 and 6): duration 60-90 minutes each	Interactive cognitive behavioral sessions at patient's home. Research staff contacted HCP in order to report findings and give advice if applicable.	present pain intensity (timeframe not specified) NRS: 0 (no pain) to 10 (worst imaginable pain)	**4 weeks T1/2**	**present pain**	**-0.40 (-0.83/0.03)**
										8 weeks T2/2	present pain	-0.28 (-0.71/0.16)
Yates 2004[61]	face-to-face phone call	booklet	patient	2 experienced registered nurses	inter-action	structured and tailored	1 session: duration ~30 minutes phone call 7 days after intervention session: duration ~15 minutes	Interactive cognitive behavioral session at clinic visit at outpatient department. Phone call was made so that the patient could clarify questions and make comments.	average pain intensity (time frame not specified) NRS: 0 (no pain) to 10 (worst imaginable pain)	**1 week T1/2**	**average pain**	**-0.30 (-0.60/0.01)**
										13 weeks T2/2	average pain	-0.06 (-0.39/0.27)

Auth. year[I]	Mode of delivery[II]	Material given to patient	Receiver of inter-vention	Provider of intervention	Inter-action provider/ receiver[III]	Structured and/or tailored[IV]	Intensity of intervention[V]	Brief description of intervention[VI]	Pain measurement method	Time points of measurement[VII]	Effect size G_u (95% CI)[VIII]	
Ward 2008[45,51,66]	face-to-face phone call	booklet	patient	Master prepared oncology nurse	inter-action	structured and tailored	1 session: duration 20-60 minutes phone call after 2 to 3 days: duration nr	Interactive cognitive session in a private room at clinic visit. Phone call to give patients the opportunity to clarify questions and make comments.	pain severity score (mean of least, and worst pain in past week and pain now) NRS: 0 (no pain) to 10 (worst imaginable pain) usual pain (time frame not specified) VRS: 0 (none), 1 (mild), 2 (moderate) and 3 (severe pain) in the past week	**1 month T1/2** 2 months T2/2	pain severity score **usual pain** pain severity score usual pain	0.00 (-0.32/0.33) **-0.28 (-0.60/0.05)** -0.24 (-0.58/0.10) -0.10 (-0.44/0.23)
De Wit 1997[27,44]	face-to-face phone call	booklet audio tapes	patient	3 nurses trained as pain counselors	inter-action	structured and tailored	1 session: duration 30-60 minutes phone call 3 and 7 days post-discharge: duration 5-15 minutes each	Interactive, cognitive behavioral intervention session provided in the hospital at day before discharge. 2 phone calls to reinforce information of session.	average and current pain intensity in the past week NRS: 0 (no pain), 10 (pain as bad as you can imagine)	**8 weeks T3/3** 8 weeks T3/3 data from Bennett (T1 to T7 nr)	**average pain** current pain	**-0,25 (-0.51/0.01)** -0.20 (-0.46/0.05)
Chang 2002[56]	face-to-face	booklet	patient	research assistant	ques-tions	structured and tailored	1 session: duration 30-40 minutes	Interactive cognitive intervention session held at day of discharge in the patient's room in hospital.	pain intensity in past 24 hours NRS 0 (no pain) to 10 (worst imaginable pain)	**2 weeks T1/1**	**pain intensity not specified**	**-0.24 (-0.89/0.41)**
Wilkie 2010[42,53]	face to face phone call video	booklet lami-nated pain diary grease pencil note card	patient	4 research assistants with at least high school diploma, Bachelor, or Master degree, or one of the authors video: trained actress with white coat	inter-action	structured and tailored	video: duration 12 minutes 1 session week 2: duration 5-10 minutes 2 phone calls week 1 and 3: duration 5-10 minutes each	Interactive cognitive behavioral sessions and phone calls.	present pain intensity VAS: 0 mm (no pain) to 100 mm (worst imaginable pain)	**1 week T1/1**	**present pain**	**0.24 (-0.08;0.56)**
Ward 2000[45,49,15,54]	face-to-face phone call	booklet	patient	research nurse	inter-action	structured and tailored	1 session: duration ~25 minutes phone call 1 week post intervention: duration 5-10 minutes	Interactive cognitive intervention session; 10 minutes giving information, up to 15 minutes discussion about questions and concerns. Phone call was made so that the patient could clarify questions.	worst pain in the past week numeric rating scale 0 (no pain) to 10 (worst imaginable pain)	**1 month T1/2** 2 months T2/2	**worst pain** worst pain	**-0.19 (-0.89/0.51)** 0.06 (-0.69/0.82)

Auth. year[I]	Mode of delivery[II]	Material given to patient	Receiver of inter-vention	Provider of intervention	Inter-action provider/ receiver[III]	Structured and/or tailored[IV]	Intensity of intervention[V]	Brief description of intervention[VI]	Pain measurement method	Time points of measurement[VII]	Effect size G_u (95% CI)[VIII]	
Syrjala 2008[65]	face-to-face video phone call	booklet individualized cards paper and pencil	patient	research nurse video: cancer patients with pain	inter-action	structured and tailored	1 session: duration 30-45 minutes phone call after 3 days: duration 10 minutes video: duration 15 minutes	Interactive cognitive behavioral session at oncology clinic or patient's home after watching a video tape; a phone call was made to reinforce learning from session. Patients were given paper and pencil for questions they wanted to remember.	average and worst pain intensity (time frame not specified) NRS: 0 (no pain) to 10 (worst imaginable pain)	**6 months T3/3** (T1 and T2 nr) "significant at T1" data from Bennett	**average pain** worst pain	**-0.18 (-0.59/0.23)** 0.15 (-0.27/0.56)
Ward 2009a[67]	phone call	booklet	patient	43 Bachelor prepared nurses, health educators	no inter-action	structured and tailored	1 phone call: mean duration 7 minutes	Cognitive phone call by health educators of cancer information service call center.	Pain severity: average of worst, least pain intensity during past week, and pain now NRS 0 (no pain) to 10 (worst imaginable pain) pain duration during past week, VRS (never, sometimes, often, almost always, always)	**4 weeks T1/1**	pain severity intervention **pain severity Item assessment**	-0.05 (-0.20/0.11) **-0.07 (-0.22/0.08)**
Rimer 1987[29]	face-to-face	booklet wallet sized cards	patient	oncology nurse	inter-action	structured and tailored	1 session: duration 15 minutes	Interactive cognitive intervention session at clinic visit.	present pain intensity (timeframe not specified) VRS: 6-point (no, mild, discomforting, distressing, horrible, excruciating)	4 weeks T1/1	not calculated	not calculated
Anderson 2004[58]	face-to-face video phone call	booklet video	patient or patient and FC	session: research nurse video: cancer patients representing targeted minority group (male/female, Hispanic/African American)	ques-tions	structured	1 session: duration ~30 minutes video: duration 20 minutes phone call 48 to 72 hours after intervention: duration not specified	Interactive cognitive session after patients had been shown a video tape targeted at their specific minority group and gender at a scheduled clinic visit. Phone call to review patients' pain control.	worst pain intensity (time frame not specified) NRS 0 (no pain) to 10 (worst imaginable pain)	2-4 weeks T1/3 6-7 weeks T2/3 8-10 weeks T3/3	not calculated	not calculated
McMillan 2007[46,64]	face-to-face	booklet assessment tools symp-tom diary	FC	experienced registered nurse	inter-action	structured and tailored	3 sessions over nine-days: 1st session duration: 45 minutes 2nd and 3rd session: 30 minutes each	Interactive cognitive behavioral sessions for FCs at patients' homes.	present pain intensity NRS 0 (no pain) to 10 (worst pain)	2 weeks T1/2 4 weeks T2/2	not calculated	not calculated

Abbreviations Table 1

HCP	health care provider
FC	family caregiver
NRS	numeric rating scale
VRS	verbal rating scale
VAS	visual analogue scale
nr	not reported
T	Time point of measurement
vs.	versus

Explanatory Notes Table 1

I	first author of main study is named; publications of the main study as well as studies on the same intervention in which additional information was found are referenced, main publication is printed bold
II	face-to-face, phone calls, video presentation, slide-presentation, audiotapes
III	active participation in discussion was possible for patients during intervention (interaction), only questions could be asked by the patients (questions), or content was only presented to patients without any possibility for questions or discussion (no interaction)
IV	same for every patient (structured) and/or individualized for each patient (tailored)
V	number and duration of each session and phone call over which time period
VI	cognitive means information only, behavioral means also instructions how to do things (see Table 2)
VII	time points are indicated as T “number of actual time points of follow-up measurement”/”number of performed time points of follow-up measurement”; printed in bold are the time points at which the biggest effect size in each study occurred; “data from Bennett”: data were extracted from Bennett et al.[9] online information
VIII	the biggest effect sizes in each study are printed bold; statistically significant effect sizes ($p < 0.05$) are marked with *
a	quasi-experimental design with non-equivalent groups
b	one group pre-test post-test design for intervention, RCT evaluated only telephone follow-up of intervention

Table 2. Content Components of Interventions to Support Oncology Patients' Pain Self-Management

		Cognitive: Information and recommendations[I]									**Behavioral:** instructions how to perform desired behavior[II]					**Goalsetting**		**Contact**		
Author[III]	**Year**	**information on pain[IV]**	**pain treatment medication[V]**	**pain treatment alternative methods[VI]**	**cognitive barriers[VII]**	**side effects[VIII]**	**behavioral recommendations medication[IX]**	**behavioral recommendations communication[X]**	**behavioral recommendations miscellaneous[XI]**	**behavioral recommendations FCs[XII]**	**pain monitoring regularly[XIII]**	**managing pain[XIV]**	**applying alternative methods[XV]**	**managing side effects[XVI]**	**communication with clinicians[XVII]**	**set goals and plan strategies to reach goals[XVIII]**	**evaluate efficacy of strategies[XIX]**	**contact with clinicians by research staff[XX]**	**sum of components**	**effect sizes[XXI]**
Aubin[a,18]	**2006**		■		■			■			■				■			■	6	-1,87*
Yildirim[43]	**2009**	■	■	■	■	■	■	■											7	-1,56*
Lai[59]	**2004**	■	■	■	■	■		■											6	-0,94*
Oliver[47,55]	**2001**		■		■			■							■	■			5	-0,61*
Vallières[19]	**2006**		■		■			■			■				■				5	-0,59*
Lin[63]	**2006**		■		■														2	-0,53*
Miaskowski[50,60]	**2004**		■		■	■	■	■			■	■		■	■				9	-0,51*
Keefe[62]	**2005**	■	■	■	■	■	■	■				■	■						9	-0,49*
Ward[40,45,51]	**2009b**	■			■	■	■					■				■	■		7	-0,44*
Clotfelter[26,48]	**1999**	■	■	■	■	■	■	■	■				■	■					10	np*
Lovell[41,52]	**2010**	■	■	■	■	■	■	■	■	■				■					9	np*
Wells[b,57]	**2003**	■	■		■	■		■											5	-0,41
v.d. Peet[27,39,44]	**2009**	■	■	■	■	■	■	■			■		■		■			■	11	-0,40
Yates[61]	**2004**	■	■		■		■	■				■			■				7	-0,30
Ward[45,51,66]	**2008**	■			■	■													3	-0,28
deWit[27,44]	**1997**	■	■	■	■	■	■	■			■		■		■			■	11	-0,25
Chang[56]	**2002**		■		■														2	-0,24
Wilkie[42,53]	**2010**							■			■				■				3	-0.24
Ward[45,49,51,54]	**2000**		■		■	■													3	-0,19
Syrjala[65]	**2008**		■		■	■	■	■	■						■				7	-0,18
Ward[67]	**2009a**				■	■		■											3	-0,07
Rimer[29]	**1987**		■		■	■	■												4	np
Anderson[58]	**2004**		■		■			■											3	np
Mc Millan[46,64]	**2007**	■	■		■	■	■	■		■	■	■		■	■	■	■		11	np
Sum		**12**	**20**	**7**	**23**	**16**	**12**	**18**	**3**	**2**	**7**	**5**	**4**	**4**	**10**	**3**	**2**	**3**		

Abbreviations Table 2

np	not possible to calculate
FCs	family caregivers

Explanatory Notes Table 2

I	information and advice so that a lay person could improve their knowledge on pain management
II	behavioral instructions how to perform desired behavior means skill building via instructions so that a lay person could actually perform desired pain management
III	first author of main study is named; publications of the main study as well as studies on the same intervention in which additional information was found are referenced, main publication is printed bold
IV	includes pain definition, pain causes, pain timeline, pain consequences, pain cure/control, breakthrough pain, how medication works
V	includes name and kind of medication, routes of administration, around the clock/as needed, schedule, dosing
VI	includes physical (heat, cold, massage), cognitive (relaxation, distraction, imagery, deep breathing exercise, active pacing method) and other interventions (TENS, nerve block)
VII	includes concerns about tolerance, addiction, fatalism, religious fatalism, being a good patient, side effects of medication are inevitable and unmanageable, masking signs of disease progression, distracting the clinicians from treating the disease, harming the immune system, injections, respiratory depression
VIII	includes constipation, vomiting, nausea, sedation, drowsiness, confusion, urinary retention, pruritus, postural hypotension, and suggestions for side effect management
IX	includes information about compliance, medication intake, not stop medication abruptly
X	includes explanation of pain measurement such as Visual Analogue Scale, stressing the importance of communication with the clinicians
XI	includes information about not to drive a car, that occasional alcohol is OK with medication, that support groups and peer support can be helpful; support group addresses, recommendations on how to apply given information to one's own situation, that it may take more than one HCP to manage pain
XII	includes recommendations when and whom to call for help
XIII	includes assessment in a pain diary on pain (intensity, location, quality, pattern, number of hours per day in pain, notes of any differences in pain), pain treatment (name, intake of medication, and use of alternative methods), and other information (symptoms or problems, effect of pain on sleep, family life, relationship with others, hours of sleep, unusual activities or exercise)
XIV	includes skill building on tasks of pain management (such as an individualized pain management plan with specific instructions when and how to take medication)
XV	includes skill building on how to apply alternative pain control methods such as deep breathing exercise, relaxation, massage
XVI	includes skill building on how to manage side effects of pain medication such as constipation, nausea
XVII	includes skill building on when, how and with which wording and arguments to communicate with clinicians, feedback on observed behaviour during clinic visits
XVIII	such as: "I want to sleep one night without waking up from my pain."
XIX	evaluation during a follow-up contact with intervention staff whether goals were reached
XX	intervention staff giving advice on pain medication or reporting effectiveness of current regimen
XXI	effect sizes marked with * are statistically significant at a level of significance of 0.05
a	quasi-experimental design with non-equivalent groups
b	one group pre-test post-test design for intervention, RCT evaluated only telephone follow-up of intervention

Table 3: Example of the Method Used to Determine Pattern for Structure Component "FC Involvement"

Author	Year	ES	Patient Only	Patient and FC	Patient or Patient and FC
Aubin	2006	-1,87			X
Yildirim	2009	-1,56	X		
Lai	2004	-0,94	X		
Oliver	2001	-0,61	X		
Vallieres	2006	-0,59	X		
Lin	2006	-0,53		X	
Miaskowski	2004	-0,51			X
Keefe	2005	-0,49		X	
Ward	2009b	-0,44	X		

ES = effect size; FC = family caregiver

Study characteristics. Of the 24 studies, 23 were RCTs[19,26,27,29,39-43,54-67]. In one study[18], a quasi-experimental design was used. Four studies were pilot RCTs[54-56,62] in preparation for larger studies[40,63,66]. In two of these pilot studies[55,62], statistically significant effects were found.

Participants: A total of 4139 patients were included across the 24 studies and 1041 in the eleven statistically significant studies. Sample sizes ranged from 30 to 1256 (median = 109). In the four pilot studies, sample sizes ranged from 37 to 82. Studies with larger samples were not more likely to show statistically significant or larger effects than studies with smaller samples. In fact, statistically significant differences were found in three small studies (i.e., N = 30-40)[26,43,59]. In two of these studies, the ESs were large (i.e., -1.56 and -0.94)[43,59]. The effect in the non randomized study (N = 80) was even larger (i.e., -1.87)[18].

Across the 24 studies, the proportion of women (57%) was slightly higher than that of men (43%). Various cancer diagnoses were included (e.g., lung, breast, prostate, gastrointestinal, gynecological, hematological, head and neck, other cancers). The majority of studies (i.e., 14) was conducted in the United States[26,29,40,42,54,55,57,58,60,62,64-67], two were conducted in Canada[18,19], three in Taiwan[56,59,63], two in the Netherlands[27,39], two in Australia[41,61], and one in Turkey[43]. The mean age of participants ranged from 48 to 77 years. Attrition rates in the 17 studies that reported them ranged from 15% to 69%[18,27,29,39-41,54,55,57-62,64-67].

Time of follow-up: Time points from completion of the intervention to final evaluation (follow-up) ranged from one week[60,62] to six months[57] with one to six assessments. Mean

duration of follow-up, across the 24 studies, was 6.5 weeks and 3.5 weeks for the eleven statistically significant studies. Statistically significant effects were found within two weeks of follow-up in eight of the eleven studies[18,26,41,55,59,60,62,63] and within five weeks of follow-up in three studies[19,40,43]. The three largest ESs were found after two[18,59] and four weeks[43].

Pain measurement: In 21 of 24 studies, a 0 (no pain) to 10 (worst imaginable pain) NRS was used to measure pain. In the remaining three studies, a 0 (no pain) to 100 (worst imaginable pain) NRS[26,42] or a 4-point Likert scale were used[66]. Four different types of pain intensity measures were used within the studies while in one study the type of pain measurement was not specified[56]. Across all studies, average pain was used in 12 studies[18,19,27,41,55,57,59-62,65,66], worst pain in 12 studies[18,19,41,43,54,57-60,62,63,65], present pain in eight studies[26,27,29,39,42,43,59,64], and least pain in three studies[43,59,60]. Composite scores for pain intensity measures were used in three studies[40,66,67]. More than one pain intensity measure was used in eleven studies[18,19,27,41,43,57,59,60,62,65,66]. In seven of these studies, statistically significant effects were found[18,19,41,43,59,60,62]. In four studies, the largest effects were found for average pain intensity[19,55,60,62], in two studies for worst pain intensity[18,63], in one study for present pain intensity[43], in one study for least pain[59], and in one study for a composite score[40].

Calculation of ESs: ES calculations could not be done for five of the 24 studies[26,29,41,58,64]. According to the calculated Hedges' G_u, clinically meaningful effects (i. e., < -0.3) were found in nine studies with statistically significant results[18,19,40,43,55,59,60,62,63]. In two statistically significant studies[26,41], published information was insufficient to calculate an ES. Across all studies, one to nine ESs were calculated. The largest ESs within each study ranged from -1.87[18] to -0.07[67]. In all statistically significant studies, ESs were clinically meaningful and ranged from -1.87 to -0.44, with large ESs in three studies[18,43,59]; and medium ESs in six studies[19,40,55,60,62,63]. In Tables 1 and 2, studies are ordered from the largest to the smallest ES.

Structure components. "Structure" components of the intervention included how the intervention was delivered (i.e., "mode of delivery"); what materials were given to patients; receiver and provider of the intervention; whether interactions took place between providers and receivers; the level of individualization for each patient (i.e. "structured or tailored"); as well as contact time between clinicians and patients and/or FCs and timing of the intervention (i.e., "intensity of the intervention"; for details see Table 1). "Total dose of the intervention" was defined as the total contact time of the receivers with the intervention over all sessions and phone calls.

Mode of delivery of interventions: In 20 of the 24 studies, the intervention was delivered face to face[18,27,29,39,40,42,43,54-66] with or without the combination of phone calls, and/or slide, audio, or video presentations. In two studies[26,41], the mode of delivery was a video presentation and in one study, it was a single phone call[67]. The mode of delivery was not reported in one study[19]. In eight of the statistically significant studies, the intervention was delivered face to face[18,40,43,55,59,60,62,63], combined with phone calls in one study[60], and with video/audiotapes or slide presentations in three studies[18,43,62]. In both statistically significant studies in which the intervention was delivered via video presentation only[26,41], the information provided was not sufficient to calculate an ES. In terms of the optimal mode of delivery, no discernable pattern was found.

Materials provided to patients: In all but one study[40] written materials were given to patients and FCs. In addition, patients were given audiotapes of the intervention sessions[27,62] copies of prepared videotapes[41,58,62], a pill box[60], paper and pencil to write down things patients wanted to remember[65], or a laminated card with a grease pencil to mark pain intensity measures[42]. In the three statistically significant studies with large ESs[18,43,59] and in four of the statistically significant studies with medium ESs[19,26,55,63], patients were provided only with booklets. In two of the statistically significant studies with medium ESs, in addition to the booklet, patients were provided with a pillbox[60] or video and audio tapes[62]. In one of the statistically significant studies with a medium ES, the type of educational material was not reported[40]. In terms of the optimal material, no discernable pattern was found.

Receiver of the interventions: In one study, the intervention was directed at elderly patients[26] and in one study patients from minority groups were recruited[58]. In 13 studies, only patients participated[19,27,29,42,43,54-56,59,61,65-67], while in six studies FCs could participate[18,26,39,41,58,60]. In four studies, FCs were included as an integral part of the intervention[40,57,62,63]. In one nonsignificant study, the intervention was solely for FCs[64]. In five of the statistically significant studies[19,40,43,55,59], only patients were included, two of which yielded a large ES[43,59]. In two of the statistically significant studies with a medium ES[62,63], patients and FCs were included. In four of the statistically significant studies in which FCs had the option to participate with patients, one yielded a large ES[18], one yielded a medium ES[60], and in two studies the ESs could not be calculated[26,41]. In one study, that attempted to evaluate "FC involvement" specifically (i.e., patient alone, patient and FC, versus standard care)[40], no significant differences were found between the three groups. In terms of the optimal receiver of the intervention, no discernable pattern was found.

Provider of the intervention: Interventions were performed by specifically trained clinicians who had education at Master's or PhD level in four studies[40,43,59,66], Bachelor's

prepared nurses in eleven studies[18,27,29,39,54,58,60-62,64,67], research assistants whose educational level was not described in two studies[56,63], or a medical or a psychology student in one study[55]. In one study a trained actress in a white coat presented the information in the video[42]. In five studies, the provider of the intervention was not described[19,26,41,57,65]. In the three studies with large ESs, the intervention was provided by Masters or PhD prepared nurses[43,59] or by specially trained home care nurses[18]. In one study with a medium ES, the intervention was provided by a Masters prepared nurse[40]. In the other statistically significant studies, the providers were Bachelor prepared nurses[60,62], a medical or a psychology student[55], or the educational level of the provider was not reported[19,26,41,63]. In terms of the optimal educational level of the provider of the intervention, no discernable pattern was found.

Interaction between provider and receiver: Active participation of patients in the intervention session was reported in 13 studies[27,29,39,42,54,55,60-62,64-67]. In seven studies, patients were only allowed to ask questions[18,43,56-59,63], and no interaction took place in three studies[26,41,67]. Whether interaction was part of the intervention was not reported in one study[19]. In the three studies with large ESs[18,43,59] and in one study with medium ES[63], patients were allowed to ask questions. In four statistically significant studies, interactions were possible[40,55,60,62], while in two statistically significant studies no interaction was possible (ESs not reported)[26,41], and in one statistically significant study interaction was not reported[19]. A discernable pattern for the component “interaction” was not observed.

Structured versus tailored interventions: Four of the 24 interventions contained only structured components[19,26,41,58]. The remaining 20 interventions contained structured and tailored components. Tailored components included: questions during and after the intervention, individualized information and skill building. All but three of the statistically significant studies[19,26,41] used structured and tailored components including the statistically significant studies with large ESs[18,43,59]. A discernable pattern for the component “structured or tailored” was not seen.

Intensity of the interventions: Interventions consisted of single or multiple sessions (single or multiple exposures) with or without phone calls. The total dose across interventions, calculated as total contact time between patients and/or FCs and the provider of the intervention, in the 17 studies with sufficient details[26,27,29,39,40,42,43,54-56,58-62,65,67], ranged from 7 to 270 minutes. Doses of interventions with single sessions ranged from 14 to 40 minutes[18,19,26,29,55,56], the dose of the single phone call in one study was 7 minutes[67], while doses in those studies in which a combination of sessions and phone calls was used ranged from 30 to 270 minutes[27,39,40,42,43,54,57-62,64-66]. One of the three statistically

significant studies with a large ES had only a single session (dose not reported)[18], one consisted of three sessions (dose 50 to 75 minutes)[43], and one of five sessions (dose 40 to 70 minutes)[59]. The number of sessions in the other statistically significant interventions ranged from one to six, while doses ranged from 14 to 270 minutes[19,26,40,55,60,62,63]. The longest statistically significant intervention (i.e., 260 to 270 minutes)[60] had an ES of -0.51. In terms of the optimal timing or duration, no discernable pattern was observed.

Content components. The "content" components of the interventions were divided into four elements: cognitive, behavioral, goal setting, and direct contact between research staff and clinicians. "Cognitive" refers to addressing patients' and FCs' knowledge, beliefs, and attitudes about pain and its management. Auditory or visual information on desired behaviors was evaluated here. "Behavioral" refers to behavioral suggestions in combination with active skill building and skill rehearsal. Pain monitoring was included in "behavioral" whenever patients were taught how to perform it as a regular part of their self-management. "Goal setting" means that reachable individual aims were set as part of the intervention. "Contact" means that pain-related information or advice about pain management was given to patients' clinicians by research staff (for details see Table 2).

Single versus combined content components: Ten studies involved only cognitive components[29,40,54,56-59,63,66,67] while 14 studies included both cognitive and behavioral components[18,19,26,27,39-42,55,60-62,64,65]. Of these 14 studies, three contained goal setting[40,55,64] and in three studies research staff contacted the patients' clinicians[18,27,39]. None of the studies combined all four content components. Three of the statistically significant studies contained only cognitive components[43,59,63], with two yielding large ESs[43,59]. One of the statistically significant studies with a large ES included cognitive and behavioral components and "contact with clinicians by research staff"[18]. The other statistically significant studies contained cognitive and behavioral components[19,26,40,41,55,60,62], and two of these included goal setting[40,55].

Cognitive content components: Across all studies, the number of cognitive components ranged from two to nine. In all but one study, "cognitive barriers" were addressed[42]. Other frequently addressed components were information about "pain medications" (20 studies)[18,19,26,27,29,39,41,43,54-65], "behavioral suggestions about communication with clinicians" (18 studies)[18,19,26,27,39,41-43,55,57-62,64,65,67], and "side effects" (16 studies)[26,27,29,39-41,43,54,57,59,60,62,64-67]. In one of the statistically significant studies [41], the intervention contained all of the nine cognitive content components (ES calculation not possible). In one of the statistically significant studies with medium ES[63], only two cognitive components were included. Statistically significant

studies with large ESs contained three to seven cognitive components[18,43,59]. In terms of cognitive components, no discernable pattern was observed.

Behavioral content components: In 14 studies, behavioral components were included[18,19,26,27,39-42,55,60-62,64,65]. The most frequently included behavior was "communication with clinicians"[18,19,27,39,42,55,60,61,64,65]. Across these 14 studies, one to four behavioral components were included. No study included all five behavioral components. Eight studies that contained behavioral components yielded statistically significant results[18,19,26,40,41,55,60,62]. Across these eight statistically significant studies, the number of behavioral components ranged from one to four. The study with a large ES that contained behavioral components included both "communication with clinicians" and "pain monitoring"[18]. In terms of behavioral components, no discernable pattern was observed.

Goal setting: The first study to use goal setting was published in 2001[55]. This component was not integrated in any other intervention until 2007[64] and 2009[40], when it was added to an already existing program. Two of the statistically significant studies with medium ESs contained goal setting[40,55]. However, the three studies with large ESs did not contain goal setting[18,43,59]. The number of studies that contained "goal setting" was too small to detect any pattern.

Contact between research staff and patients' clinicians: Clinicians were contacted directly by research staff to report findings or give advice about medication regimens in three studies[18,39,44]. One study yielded statistically significant results with a large ES of -1.87[18]. The number of studies that contained "contact between research staff and patients' clinicians" was too small to detect any pattern.

Discussion

To our knowledge, this systematic review is the first to provide a detailed description of structure and content components of interventions aimed at improving patients' self-management of cancer pain, as well as an evaluation of the efficacy of various components of these interventions. Across the 24 studies, nine demonstrated not only statistically significant, but clinically meaningful ESs in the moderate[19,40,55,60,62,63] to large[18,43,59] range.

Patterns associated with structure and content components and ESs. Across the seven structure and 16 content components, no discernable patterns for any single component or for any combination of components was observed within studies that demonstrated statistically significant and clinically meaningful effects. The lack of discernable patterns may be related to the heterogeneity in study designs (e.g.,

heterogeneous patient populations or time of follow-up) as well as variability in the number of structure and content components included as part of the intervention. In addition, other factors may have influenced the interventions' efficacy such as empathy of the provider[68] or setting of the intervention (e.g., clinic or home)[69,70].

Dose of intervention and comparison of single versus multiple exposure interventions. The two longest interventions, while comparable in terms of total dose (180 to 270 minutes versus 263 to 272 minutes) and timing (three sessions over six weeks)[39,60], did not result in the largest ESs. This finding suggests that spending more time with patients does not automatically result in increased knowledge or changes in patients' behaviors. However, the smallest ES was found for the shortest intervention that was provided via telephone[67] which suggests that a minimum amount of time needs to be spent with the patient in order to increase patients' knowledge and change behavior. This hypothesis is strengthened by several studies of smoking cessation[71] and exercise promotion[72,73]. However, to date, the optimal dose and timing of an intervention to improve cancer pain management are not known. Considering the financial benefit of short versus long interventions, we agree with Bennett et al.[9] that the implementation of more cost effective interventions that use standardized material need to be explored in future clinical trials.

Consistent with Bennett's meta-analysis[9], multiple exposure interventions were not associated with larger ES than single exposure interventions. This finding is confirmed in a systematic review of 20 tailored interventions that were designed to change health behaviors related to nutrition, smoking cessation, obtaining mammograms, and exercise that were compared with structured interventions[74]. While Ryan and Lauver[74] did not give any explanation for this finding, we agree with Bennett et al.[9] who stated that this finding may be related to other factors that were not incorporated into the interventions.

Structured or tailored interventions. In this review, differences in the efficacy of tailored versus structured interventions were not observed. To date, findings on the benefits of tailored versus structured interventions in supporting self-management are inconsistent, e.g., one systematic review[74] did not show a benefit of tailored versus structured interventions while a second review in cancer patients[73] did. We agree with Ryan and Lauver[74] that these inconsistent findings may relate to moderating effects of sociodemographic or clinical characteristics of patients and providers.

Evaluating single components of interventions. Some authors investigated the effect of a single component within a complex intervention, such as telephone contact following the intervention[57], coaching patients to report their pain[42], or the effect of FC involvement[40]. None of these studies yielded a statistically significant effect for the single

intervention component. The explanation for this lack of effect remains unclear. It may be that the "whole" is greater than "the sum of the parts" (i.e., effects of interventions are based on the combination of components). Alternatively, the lack of statistically significant results may be due to insufficient power. Researchers who want to test single components within complex interventions need to base power calculations on potentially smaller ESs for the single components.

Comparison of the three studies with the largest ESs. The largest ES (-1.87) was found for worst pain intensity at four weeks after the intervention in a non-randomized trial (N = 80) in Canada[18]. The cognitive behavioral intervention for oncology pain patients and FCs was provided by home care nurses who had direct contact with patients' clinicians. The structured and tailored single exposure intervention of 15 minutes entailed a video and a booklet that was given to patients. Patients were allowed to ask questions.

The second largest ES (-1.56) was found for present pain intensity at four weeks after the intervention in a small RCT (N = 40) in Turkey[43]. The intervention contained only cognitive components and was delivered in three sessions of 5 to 40 minutes duration over seven days by PhD prepared nurses or a physician to oncology pain inpatients who were due to be discharged from the hospital. The structured and tailored intervention entailed a slide presentation and a booklet that was given to patients. Patients were allowed to ask questions.

The third largest ES of -0.94 was found for least pain intensity at two weeks after the intervention in a small RCT (N = 30) conducted in Taiwan[59]. This cognitive, structured and tailored intervention included five sessions of 10 to 15 minutes duration provided by Master's prepared clinicians to oncology inpatients who were to be discharged from hospital. A booklet was given to patients and patients were allowed to ask questions.

Findings from these three studies need to be interpreted with caution due to several methodological limitations. In the study of Aubin et al.[18], a non-randomized non-equivalent control group was used. In addition, patients in the intervention group showed a tendency to have higher baseline pain intensity scores and a shorter pain treatment history than patients in the standard care group. Subsequently, effects may have been over-estimated[10]. The other two studies[43,59] investigated relatively small, quite homogenous samples in Turkey and Taiwan, contained only cognitive components, and were both performed within an inpatient setting as part of the patients' preparation for pain self-management at home[43,59]. As health care systems and standard care approaches to pain management may differ substantially among countries, system factors may have contributed to the large ESs in these studies. Furthermore, the interventions in these small studies may have been tailored specifically to these patients' cultural backgrounds. For

example, previous research found that Taiwanese patients tend to think fatalistically about pain[18,75]. Finally, the fact that these studies were conducted with inpatients suggests that this transition (i.e., from hospital to home) may be an optimal time to begin an intervention.

Limitations. Four limitations of this review need to be acknowledged. First, it was based on published descriptions of the interventions. Therefore, unpublished details may have influenced the efficacy of the interventions. Second, a quantitative analysis of the intervention components' efficacy was not possible due to the number of studies in relation to the amount of intervention components. However, findings from this review provide specific details on ES associated with structure and content components of various interventions tested to date. Third, other factors (e.g., environmental and cultural factors) not included in publications may have influenced the efficacy of interventions. Finally, our analyses may represent an overestimation of ESs. Of note, in over half of the evaluated studies, more than one pain outcome was assessed at more than one time point while no corrections for multiple testing were reported in any of these studies.

Conclusions

We agree with Bennett et al.[9], that clinicians should integrate interventions to support oncology patients' and FCs' pain self-management into routine practice. This systematic review provides researchers and clinicians with a detailed overview of the various structural and content components as well as various combinations that were tested in intervention studies to improve cancer pain management. Because it was not possible to clearly discriminate the efficacy of various intervention components, only a limited number of recommendations can be made to clinicians and researchers. Based on the findings from this review, clinicians and researchers need to balance the costs with the benefits when designing an intervention to improve cancer pain management. Culturally appropriate interventions need to include, at a minimum, the provision of written material and a face-to-face educational session of not less than 15 minutes that includes three cognitive components: information on pain treatment, cognitive barriers towards pain management, and information on how to implement pain self-management strategies. Interventions may be implemented for inpatients as well as for outpatients. However, because of a variety of limitations the most efficacious intervention components or combination of components remain to be determined in future studies. Additional research is needed, that evaluates critical components, as well as the optimal intervention doses. Finally, patient, provider and system factors, such as variations between different health care systems or empathy between patients and providers, need to be evaluated in order to provide clinicians with the optimal approaches to improve the care of oncology patients with pain.

Disclosures and Acknowledgements

This research was supported by unrestricted grants of the Ebnet Foundation, Parrotia Foundation, Stiftung zur Krebsbekämpfung, and Hans-H. Hasbargen GmbH & Co.KG. The authors did not have any potential conflicts of interest in the research reported. Dr. Miaskowski is supported by grants from the National Cancer Institute, the National Institute of Nursing Research, and the American Cancer Society. In addition, we thank our statistician, Dr. Kris Denhaerynck.

References

1. Breivik H, Cherny N, Collett B, et al. Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. Ann Oncol 2009;20:1420-1433.
2. Mercadante S. Pain treatment and outcomes for patients with advanced cancer who receive follow-up care at home. Cancer 1999;85:1849-1858.
3. Jacox A, Carr DB, Payne R. Management of cancer pain. Clinical practice guideline No. 9 AHCPR Publication No. 94-0592: Agency for Health Care Policy and Research, US Department of Health and Human Services, Public Health Service. Rockeville, 1994.
4. Kirou-Mauro AM, Hird A, Wong J, et al. Has pain management in cancer patients with bone metastases improved? A seven-year review at an outpatient palliative radiotherapy clinic. J Pain Symptom Manage 2009;37:77-84.
5. World Health Organisation. Cancer pain relief: Geneva, 1986.
6. Ward SE, Goldberg N, Miller-McCauley V, et al. Patient-related barriers to management of cancer pain. Pain 1993;52:319-324.
7. Berry PE, Ward SE. Barriers to pain management in hospice: a study of family caregivers. Hosp J 1995;10:19-33.
8. Allard P, Maunsell E, Labbe J, Dorval M. Educational interventions to improve cancer pain control: a systematic review. J Palliat Med 2001;4:191-203.
9. Bennett MI, Bagnall AM, Jose Closs S. How effective are patient-based educational interventions in the management of cancer pain? Systematic review and meta-analysis. Pain 2009;143:192-199.
10. Devine EC. Meta-analysis of the effect of psychoeducational interventions on pain in adults with cancer. Oncol Nurs Forum 2003;30:75-89.
11. Spichiger E, Müller-Fröhlich C, Stoll H, Hantikainen V, Denhaerynck K. Spichiger E, Mueller-Froehlich C, Denhaerynck K, et al. Prevalence of symptoms, with a focus on fatigue, and changes of symptoms over three months in outpatients receiving cancer chemotherapy. Swiss Med Wkly. DOI: w13303.
12. Mercadante S. Why are our patients still suffering pain? Nat Clin Pract Oncol 2007;4:138-139.
13. Cleeland CS, Gonin R, Hatfield AK, et al. Pain and its treatment in outpatients with metastatic cancer. N Engl J Med 1994;330:592-596.

14. Glover J, Dibble SL, Dodd MJ, Miaskowski C. Mood states of oncology outpatients: does pain make a difference? J Pain Symptom Manage 1995;10:120-128.

15. Ferreira KA, Kimura M, Teixeira MJ, et al. Impact of cancer-related symptom synergisms on health-related quality of life and performance status. J Pain Symptom Manage 2008;35:604-616.

16. McCaffery M, Pasero C. Pain: Clinical Manual, ed 2. St.Louis, CV Mosby Co., 1999.

17. Miaskowski C, Dodd MJ, West C, et al. Lack of adherence with the analgesic regimen: a significant barrier to effective cancer pain management. J Clin Oncol 2001;19:4275-4279.

18. Aubin M, Vezina L, Parent R, et al. Impact of an educational program on pain management in patients with cancer living at home. Oncol Nurs Forum 2006;33:1183-1188.

19. Vallieres I, Aubin M, Blondeau L, Simard S, Giguere A. Effectiveness of a clinical intervention in improving pain control in outpatients with cancer treated by radiation therapy. Int J Radiat Oncol Biol Phys 2006;66:234-237.

20. Ferrell BR, Ferrell BA, Ahn C, Tran K. Pain management for elderly patients with cancer at home. Cancer 1994;74:2139-2146.

21. Jacobsen R, Liubarskiene Z, Moldrup C, et al. Barriers to cancer pain management: a review of empirical research. Medicina (Kaunas) 2009;45:427-433.

22. Schumacher KL, Koresawa S, West C, et al. Putting cancer pain management regimens into practice at home. J Pain Symptom Manage 2002;23:369-382.

23. Lorig K. Patient education: a practical approach, ed 3rd. Thousand Oaks, CA, Sage, 2001.

24. Lorig KR, Holman H. Self-management education: history, definition, outcomes, and mechanisms. Ann Behav Med 2003;26:1-7.

25. Glanz K, Rimer B, Lewis F, Jossey-Bass S. Health behavior and health education: Theory, research, and practice. Education for Health 2004;17:399-402.

26. Clotfelter CE. The effect of an educational intervention on decreasing pain intensity in elderly people with cancer. Oncol Nurs Forum 1999;26:27-33.

27. De Wit R, van Dam F, Zandbelt L, et al. A pain education program for chronic cancer pain patients: follow-up results from a randomized controlled trial. Pain 1997;73:55-69.

28. Ferrell BR, Grant M, Chan J, Ahn C, Ferrell BA. The impact of cancer pain education on family caregivers of elderly patients. Oncol Nurs Forum 1995;22:1211-1218.

29. Rimer B, Levy MH, Keintz MK, et al. Enhancing cancer pain control regimens through patient education. Patient Educ Couns 1987;10:267-277.

30. Walker JR. A study to develop and assess the value of a leaflet on pain control for patients taking MST in the comunity. Palliative Med 1992;6:65-73.

31. Dalton J. Education for pain management: a pilot study. Patient Education and Counselling 1987;9:155-165.

32. Barlesi F, Duffaud F, Doddoli C, et al. Impact d'un livret d'information sur la douleur destiné aux patients en oncologie thoracique [Impact of a brochure on pain destined for thoracic oncology patients]. Presse Med 2004;33:1313-1318.

33. Mayring P. Qualitative Inhaltsanalyse: Grundlagen und Techniken [Content Analysis: basics and techniques], ed 8th. Weinheim, Beltz, 2003.

34. Hedges L. Distribution theory for Glass's estimator of effect size and related estimators. Journal of Educational Statistics 1981;6:107-128.

35. Wang M, Bushman B. Integrating results through meta-analytic review using SAS software. Cary, North Carolina, SAS, 1999.

36. Guyatt GH, Osoba D, Wu AW, Wyrwich KW, Norman GR. Methods to explain the clinical significance of health status measures. Mayo Clin Proc 2002;77:371-383.

37. Osoba D, Rodrigues G, Myles J, Zee B, Pater J. Interpreting the significance of changes in health-related quality-of-life scores. J Clin Oncol 1998;16:139-144.

38. Cohen J. Statistical Power analysis for the behavioral sciences, ed 2nd. Hillsdale, Lawrence Erlbaum Associates, 1988.

39. Van der Peet EH, van den Beuken-van Everdingen MH, Patijn J, et al. Randomized clinical trial of an intensive nursing-based pain education program for cancer outpatients suffering from pain. Support Care Cancer 2008:Epub ahead of print.

40. Ward SE, Serlin RC, Donovan HS, et al. A randomized trial of a representational intervention for cancer pain: does targeting the dyad make a difference? Health Psychol 2009b;28:588-597.

41. Lovell MR, Forder PM, Stockler MR, et al. A randomized controlled trial of a standardized educational intervention for patients with cancer pain. J Pain Symptom Manage 2010;40:49-59.

42. Wilkie D, Berry D, Cain K, et al. Effects of coaching patients with lung cancer to report cancer pain. West J Nurs Res 2010;32:23-46.

43. Yildirim YK, Cicek F, Uyar M. Effects of pain education program on pain intensity, pain treatment satisfaction, and barriers in Turkish cancer patients. Pain Manag Nurs 2009;10:220-228.

44. De Wit R, van Dam F. From hospital to home care: a randomized controlled trial of a Pain Education Programme for cancer patients with chronic pain. J Adv Nurs 2001;36:742-754.

45. Donovan HS, Ward SE, Song MK, et al. An update on the representational approach to patient education. J Nurs Scholarsh 2007;39:259-265.

46. Houts P. The home care guide for advanced cancer: Atlanta, 1997.

47. Kalauokalani D, Franks P, Oliver JW, Meyers FJ, Kravitz RL. Can patient coaching reduce racial/ethnic disparities in cancer pain control? Secondary analysis of a randomized controlled trial. Pain Med 2007;8:17-24.

48. U. S. Department of Health and Human Services. Managing cancer pain (AHCPR publication No. 94-0595): Rockville, 1994.

49. Ward S, Hughes S, Donovan H, Serlin RC. Patient education in pain control. Support Care Cancer 2001;9:148-155.

50. West CM, Dodd MJ, Paul SM, et al. The PRO-SELF(c): Pain Control Program--an effective approach for cancer pain management. Oncol Nurs Forum 2003;30:65-73.

51. Donovan HS, Ward S. A representational approach to patient education. J Nurs Scholarsh 2001;33:211-216.

52. Lovell MR, Boyle FM. Overcoming Cancer Pain: A guide for people with cancer, their families and friends: Understanding Cancer. New South Wales, Cancer Council, 2009, retrieved December 8th, 2010, from http://www.cancercouncil.com.au/html/patientsfamiliesfriends/livingwithcancer/cancerpain/downloads/overcoming_cancer_pain.pdf.

53. Wilkie DJ, Williams AR, Grevstad P, Mekwa J. Coaching persons with lung cancer to report sensory pain. Literature review and pilot study findings. Cancer Nurs 1995;18:7-15.

54. Ward S, Donovan HS, Owen B, Grosen E, Serlin R. An individualized intervention to overcome patient-related barriers to pain management in women with gynecologic cancers. Res Nurs Health 2000;23:393-405.

55. Oliver JW, Kravitz RL, Kaplan SH, Meyers FJ. Individualized patient education and coaching to improve pain control among cancer outpatients. J Clin Oncol 2001;19:2206-2212.

56. Chang MC, Chang YC, Chiou JF, Tsou TS, Lin CC. Overcoming patient-related barriers to cancer pain management for home care patients. A pilot study. Cancer Nurs 2002;25:470-476.

57. Wells N, Hepworth JT, Murphy BA, Wujcik D, Johnson R. Improving cancer pain management through patient and family education. J Pain Symptom Manage 2003;25:344-356.

58. Anderson KO, Mendoza TR, Payne R, et al. Pain education for underserved minority cancer patients: a randomized controlled trial. J Clin Oncol 2004;22:4918-4925.

59. Lai YH, Guo SL, Keefe FJ, et al. Effects of brief pain education on hospitalized cancer patients with moderate to severe pain. Support Care Cancer 2004;12:645-652.

60. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.

61. Yates P, Edwards H, Nash R, et al. A randomized controlled trial of a nurse-administered educational intervention for improving cancer pain management in ambulatory settings. Patient Educ Couns 2004;53:227-237.

62. Keefe FJ, Ahles TA, Sutton L, et al. Partner-guided cancer pain management at the end of life: a preliminary study. J Pain Symptom Manage 2005;29:263-272.

63. Lin CC, Chou PL, Wu SL, Chang YC, Lai YL. Long-term effectiveness of a patient and family pain education program on overcoming barriers to management of cancer pain. Pain 2006;122:271-281.

64. McMillan SC, Small BJ. Using the COPE intervention for family caregivers to improve symptoms of hospice homecare patients: a clinical trial. Oncol Nurs Forum 2007;34:313-321.

65. Syrjala KL, Abrams JR, Polissar NL, et al. Patient training in cancer pain management using integrated print and video materials: a multisite randomized controlled trial. Pain 2008;135:175-186.

66. Ward S, Donovan H, Gunnarsdottir S, et al. A randomized trial of a representational intervention to decrease cancer pain (RIDcancerPain). Health Psychol 2008;27:59-67.

67. Ward SE, Wang KK, Serlin RC, Peterson SL, Murray ME. A randomized trial of a tailored barriers intervention for Cancer Information Service (CIS) callers in pain. Pain 2009a;144:49-56.

68. Neumann M, Wirtz M, Bollschweiler E, et al. Determinants and patient-reported long-term outcomes of physician empathy in oncology: a structural equation modelling approach. Patient Educ Couns 2007;69:63-75.

69. Krieger J, Takaro TK, Song L, Beaudet N, Edwards K. A randomized controlled trial of asthma self-management support comparing clinic-based nurses and in-home community health workers: the Seattle-King County Healthy Homes II Project. Arch Pediatr Adolesc Med 2009;163:141-149.

70. Ramsdell JW, Jackson JE, Guy HJ, Renvall MJ. Comparison of clinic-based home assessment to a home visit in demented elderly patients. Alzheimer Dis Assoc Disord 2004;18:145-153.

71. Lai DT, Cahill K, Qin Y, Tang JL. Motivational interviewing for smoking cessation. Cochrane Database Syst Rev 2010:CD006936.

72. Yeom HA, Keller C, Fleury J. Interventions for promoting mobility in community-dwelling older adults. J Am Acad Nurse Pract 2009;21:95-100.

73. McPherson CJ, Higginson IJ, Hearn J. Effective methods of giving information in cancer: a systematic literature review of randomized controlled trials. J Public Health Med 2001;23:227-234.

74. Ryan P, Lauver DR. The efficacy of tailored interventions. J Nurs Scholarsh 2002;34:331-337.

75. Lai YH, Keefe FJ, Sun WZ, et al. Relationship between pain-specific beliefs and adherence to analgesic regimens in Taiwanese cancer patients: a preliminary study. J Pain Symptom Manage 2002;24:415-423.

Chapter 4

Preparation, Translation, and Adaptation of Intervention and Study Materials for the Pilot RCT

During the preparation phase of this pilot randomized controlled trial (RCT), the German version of the PRO-SELF© Plus Pain Control Program (PCP) was developed in three steps. First, the principle investigator (AK) learned details about the PRO-SELF© Plus PCP from Miaskowski's research group during a study visit at the University of California in San Francisco (UCSF). Second, in close collaboration with the PRO-Self© PCP research group at the UCSF and the PhD committee of this thesis, research and intervention materials were translated, improved, and adapted for differences between the United States (U. S.) and German health care systems, resulting in the adapted German PRO-SELF© Plus PCP. Third, materials were tested for understanding and usability with two German patients.

Learning PRO-SELF© Study Procedures

The U. S. PRO-Self© PCP research team provided all of the study instruments and intervention materials that were used successfully in the previous and ongoing PRO-Self© PCP studies. These materials included self-report questionnaires that were to be completed by patients and family caregivers (FCs), written instructions for study nurses, and written information for patients. In addition, AK accompanied a PRO-Self© PCP intervention nurse on study visits over a three weeks period to gain insight into recruitment and to learn how to implement the intervention that was used in the ongoing U. S. PRO-Self© PCP study.

Translation and Adaptation of U. S. PRO-SELF© PCP Materials and Intervention

Detailed descriptions of study and intervention materials and procedures are provided in Chapters 1, 5 and 6 of this thesis. The U. S. PRO-Self© PCP study instruments were evaluated for use in the German pilot study. Of the self-report instruments that were planned to be used in this pilot study (see Table 1), some were available in German. Some questionnaires could be replaced with other self-report instruments that were available in German and measured similar concepts.

Table 1: Instruments Used in the U. S. and the German PRO-Self© PCP Study

Variable	English Version	Instrument Used in the Pilot Study
Cognition		DemTect[1,2] & Trail Making Test A and B[3,4]
Average and worst pain	Brief Pain Inventory[5]	Brief Pain Inventory[5,6]
Pain interference with function	Brief Pain Inventory[5]	Brief Pain Inventory[5,6]
Quality of life	Medical Outcomes Study-Short Form (SF-12)[7]	Medical Outcomes Study-Short Form (SF-36)[8-10]
Anxiety and depression	State-Trait Anxiety Inventory[11]; Center for Epidemiologic Studies Depression Scale[12,13]	Hospital Anxiety and Depression Scale[14,15]
Fatigue	Lee Fatigue Scale[16]	Fatigue Assessment Questionnaire[17]
Functional status	Karnofsky Performance Scale[18]	Eastern Cooperative Oncology Group Performance Status (ECOG-PS)[19-21]
Cancer-related symptoms	Memorial Symptom Assessment Scale[22]	Memorial Symptom Assessment Scale[21,22]
Backward-Forward Translation		
Self-efficacy	Self-Efficacy Questionnaire[23]	
Knowledge of cancer pain	Patient Pain Questionnaire[24]	
Translated by Study Group		
Demographics	Patient and FC Information Questionnaires	
Pain self care behavior	Pain Self Care Behavior Questionnaire	
As needed analgesics	Pain Management Diary	
Around the clock analgesics	Pain Management Diary	
Constipation	Pain Management Diary	

Two questionnaires, the Self-Efficacy Questionnaire[23,25] and the Patient Pain Questionnaire[26,27], were translated in a culturally sensitive way following a translation protocol[28-30]. Each instrument was independently translated by two bilingual translators, who then resolved disagreements to create one German version. It was back-translated by two other bilingual translators who again resolved discrepancies until agreement was achieved. Finally, all translators discussed and agreed on a final version of each instrument[28-30]. These instruments were tested with two German native speakers and only minor revisions were necessary.

In addition, the Program contained other materials such as written instructions for the study nurses, a script with information for patients on how to talk to a physician if pain was not alleviated sufficiently, and additional teaching materials. These materials were translated by AK and checked for plausibility and quality by ESp.

Some adaptations were made to the German PRO-SELF© Plus PCP. The schedule of the intervention visits and phone calls was adjusted. In the pilot RCT, 6 visits and 4 phone calls were done over a 10 week intervention period. Intervention protocols for the intervention and the control groups were adapted according to this schedule.

Further adjustments included a baseline cognitive assessment; personalized, reachable goal setting; and the stepwise engagement of FCs and home nurses if the patient was unable to implement the pain and side effect management plan. First, because cognitive deficits affect self-management, a baseline cognitive assessment was added and measured with the DemTect[1,2] and with the Trail Making Test A and B[3,4].

Second, individual goal setting was added to the intervention as a result of observations during the study visit at the UCSF and in accordance with social cognitive theory[31]. For goal setting, each patient was asked whether they had a specific goal they wanted to achieve over the next week with their pain and side effect management plan. Examples of possible goals were “Being able to walk in the woods for 30 minutes with tolerable pain,” or “Being able to vacuum clean the living room for ten minutes.” Strategies to achieve these goals were written down in the pain and side effect management plan, and were evaluated, and adapted if necessary, during subsequent visits. In accordance with Bandura[31], goals were intended to be highly individual and achievable in order to provide patients with mastery experience. Furthermore, goal setting allowed, pain self-management strategies to be directly linked with practical daily life objectives specific to patient’s environment and situation[31]. In order to assess whether individual goal setting was an effective approach within the intervention, the item “The pain hindered me to do the

things that I wanted to do today" was added. Patients could rate this item daily on a scale from 0 (not at all) to 10 (completely) to the pain diary.

Because daily function of patients with cancer pain can be impaired enough to hinder their ability to perform optimal pain management activities themselves, a staged plan was developed for practical support. The staged plan was intended for patients who were repeatedly found to be unable to follow the pain medication and side effect management plan and continued to experience high pain levels. If not already included, FCs were to be asked to take part in the teaching sessions whenever possible and to provide support to the patient. If improvement in pain and side effects did not occur, visiting nurses were to be recommended. A physician prescription is required for medication management by visiting nurses. Consequently, teaching patients how to communicate their need for visiting nurses to their treating physician was included in the intervention for these patients.

Testing Understanding and Usability of the First Version of the German PRO-SELF© Plus PCP

As the last step in the preparation phase, after the written materials were translated and adapted, they were tested with two German patients, one chronic pain patient and one patient with pain related to bone metastasis. Questionnaires for the FCs were quite similar to the materials for the patients. Therefore, they were not tested separately. The first session of the PRO-SELF© Plus PCP was performed with both patients and was regarded as feasible and helpful by both of them. In addition, both patients completed the questionnaires and rated them as feasible and comprehensible. As a result, only a few orthographic adaptations were made to the materials. After the conclusion of the preparation phase, a German version of the PRO-SELF© Plus PCP was available for testing in a pilot RCT which was conducted during the second phase of this thesis.

References

1. Kalbe E, Kessler J, Calabrese P, et al. DemTect: a new, sensitive cognitive screening test to support the diagnosis of mild cognitive impairment and early dementia. Int J Geriatr Psychiatry 2004;19:136-143.
2. Kessler J, Calabrese P, Kalbe E, Berger F. DemTect: A new screening method to support diagnosis of dementia. Psycho 2000;26:343-347.
3. Heun R, Papassotiropoulos A, Jennssen F. The validity of psychometric instruments for detection of dementia in the elderly general population. Int J Geriatr Psychiatry 1998;13:368-380.
4. Oswald WD. Psychometric procedures and questionnaires in geronto-psychological research. Z Gerontol 1979;12:341-350.
5. Jensen MP. The validity and reliability of pain measures in adults with cancer. J Pain 2003;4:2-21.
6. Radbruch L, Loick G, Kiencke P, et al. Validation of the German version of the Brief Pain Inventory. J Pain Symptom Manage 1999;18:180-187.
7. Ware J, Jr., Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care 1996;34:220-233.
8. Baker F, Haffer SC, Denniston M. Health-related quality of life of cancer and noncancer patients in Medicare managed care. Cancer 2003;97:674-681.
9. Bullinger M. German translation and psychometric testing of the SF-36 Health Survey: preliminary results from the IQOLA Project. International Quality of Life Assessment. Soc Sci Med 1995;41:1359-1366.
10. Matthews BA, Baker F, Hann DM, Denniston M, Smith TG. Health status and life satisfaction among breast cancer survivor peer support volunteers. Psychooncology 2002;11:199-211.
11. Spielberger CD, Gorsuch RL, R.E. aL. Manual for the State-Trait Anxiety Inventory. Palo Alto, CA, Consulting Psychologists Press, 1970.
12. Radloff LS. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. Applied Psychological Measurement 1977;1:385-401.

13. Schroevers M, Sanderman R, van Sonderen E, Ranchor A. The evaluation of the Center for Epidemiologic Studies Depression (CES-D) scale: Depressed and Positive Affect in cancer patients and healthy reference subjects. Qual Life Res 2000;9:1015-1029.

14. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67:361-370.

15. Härter M, Reuter K, Schretzmann B, et al. Komorbide psychische Störungen bei Krebspatienten in der stationären Akutbehandlung und medizinischen Rehabilitation [Co-morbid disorders in cancer patients during acute in-patient treatment and medical rehabilitation] . Rehabilitation (Stuttgart) 2000;39:317-323.

16. Lee KA, Hicks G, Nino-Murcia G. Validity and reliability of a scale to assess fatigue. Psychiatry Res 1991;36:291-298.

17. Glaus A, Muller S. Messung der Müdigkeit bei Krebskranken im Deutschen Sprachraum: Die Entwicklung des Fatigue Assessment Questionnaires [Measuring fatigue of cancer patients in the German-speaking region: development of the Fatigue Assessment Questionnaire]. Pflege: Die wissenschaftliche Zeitschrift für Pflegeberufe 2001;14:161-170.

18. Karnofsky D. Performance scale. In Kennealey GT, Mitchell MS (eds): Factors That Influence the Therapeutic Response in Cancer. New York, Plenum Press, 1977

19. Oken MM, Creech RH, Tormey DC, et al. Toxicity and response criteria of the Eastern Cooperative Oncology Group. Am J Clin Oncol 1982;5:649-655.

20. Zubrod CG, Schneiderman M, Frei E, Brindley, C., et al. Appraisal of methods for the study of chemotherapy of cancer in man: Comparative therapeutic trial of nitrogen mustard and triethylene thiophosphora-mide. J Chronic Dis 1960;11:7-33.

21. Spichiger E, Muller-Frohlich C, Denhaerynck K, et al. Symptom prevalence and changes of symptoms over ten days in hospitalized patients with advanced cancer: a descriptive study. Eur J Oncol Nurs 2011;15:95-102.

22. Portenoy RK, Thaler HT, Kornblith AB, et al. The Memorial Symptom Assessment Scale: an instrument for the evaluation of symptom prevalence, characteristics and distress. Eur J Cancer 1994;30A:1326-1336.

23. Keefe FJ, Ahles TA, Porter LS, et al. The self-efficacy of family caregivers for helping cancer patients manage pain at end-of-life. Pain 2003;103:157-162.

24. Ferrell BR, Rhiner M, Ferrell BA. Development and evaluation of the family pain questionnaire. J Psychosoc Oncol 1993;10:21-35.

25. Lorig K, Chastain RL, Ung E, Shoor S, Holman HR. Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. Arthritis Rheum 1989;32:37-44.

26. Ferrell BR, Rhiner M, Ferrell BA. Development and implementation of a pain education program. Cancer 1993;72:3426-3432.

27. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.

28. Corless IB, Nicholas PK, Nokes KM. Issues in cross-cultural quality-of-life research. J Nurs Scholarsh 2001;33:15-20.

29. Flaherty JA, Gaviria FM, Pathak D, et al. Developing instruments for cross-cultural psychiatric research. J Nerv Ment Dis 1988;176:257-263.

30. Jones PS, Lee JW, Phillips LR, Zhang XE, Jaceldo KB. An adaptation of Brislin's translation model for cross-cultural research. Nurs Res 2001;50:300-304.

31. Bandura A. Self-efficacy mechanisms in psychological activation and health promoting behavior. In Madden J, Matthysse S, Barchas (eds): Adaptation, learning and affect. New York, Raven Press, 1989, pp 1-51.

Chapter 5

Supporting Self-Management of Pain in Cancer Patients: Methods and Lessons Learned from a Randomized Controlled Pilot Study

Antje Koller, MNS[1]; Christine Miaskowski, PhD, RN, FAAN[2];
Sabina De Geest, PhD, RN, FAAN, FRCN[1]; Oliver Opitz, MD[3]; Elisabeth Spichiger, PhD, RN[1,4]

[1] Institute of Nursing Science, Faculty of Medicine, University of Basel, Switzerland
[2] Department of Physiological Nursing, School of Nursing, University of California, San Francisco, USA
[3] Tumorzentrum Ludwig Heilmeyer - Comprehensive Cancer Center Freiburg, Faculty of Medicine, University of Freiburg, Germany
[4] Inselspital Bern University Hospital, Switzerland

Accepted for publication by the European Journal of Oncology Nursing

Abstract

Purpose of the research: The purposes of this paper are to describe the methods used and the knowledge gained during a pilot study that evaluated the effects of a self-management intervention for cancer pain, as well as the adaptations that were made for a larger clinical trial.

Methods and sample: In a randomized controlled pilot trial (pilot RCT), the adapted German version of the PRO-SELF© Plus Pain Control Program, a 10-week intervention to support self-management of pain in adult oncology outpatients and their family caregivers, was compared to attention control. Primary endpoints were average and worst pain measured at 6, 10, 14, and 22 weeks after enrollment.

Key results: A total of 39 patients (19 intervention, 20 control) were recruited over 18 months. During the study, inclusion criteria were expanded. Furthermore, the structured timing of the intervention visits was too static for a dynamic symptom like cancer pain. The intervention was expanded to include symptoms that severely impacted pain self-management including chemotherapy-induced nausea and vomiting.

Conclusions: Apart from the provision of information and skills building, coaching cancer patients across a complex treatment is an important function of an intervention to support pain self-management. The pilot study proved to be highly useful in order to adapt planned study procedures, to balance burden and benefit for participants, and to customize the intervention to patients' needs and abilities in order to enhance feasibility and effectiveness. Findings from this pilot study will be fully integrated in a larger RCT.

Introduction

Testing interventions that support pain self-management in cancer patients is important. Even though effective treatment options exist, more than 40% of cancer patients do not achieve adequate pain control[1-3]. Lack of knowledge and misconceptions about pain self-management and difficulties putting pain management strategies into practice hinder the efficacy of pharmacologic and nonpharmacologic interventions in cancer patients[4-6].

While studies that address this issue are needed, researchers are confronted with many challenges, not the least of which is the impact that cancer and pain have on a patient's functional abilities, which can limit their ability to participate in clinical trials[7,8]. Furthermore, interventions that support self-management in this population are complex. They are not only the "sum of their parts" but also consist of individually interacting components[9,10].

While theoretical knowledge can be gained from the literature, specific knowledge of settings and samples must be derived from the researcher's direct involvement[11,12]. Pilot studies are important to determine feasibility, adequacy, methodology, and costs of clinical trials[11,13]. First, methodological questions, such as the effect size of an outcome measure, can be answered. Second, procedural questions including sampling, study design, appropriate methods, and conceptual questions about the intervention can be addressed[14-16]. Despite the potential information that can be gained from pilot studies, in the four pilot studies of self-management of cancer pain published to date[17-20] few feasibility issues were described even though high attrition rates (2 to 22 patients per week) and the mean recruitment rate (53%) suggested some procedural concerns. In only one randomized controlled trial (RCT)[15] of a psychoeducational stress management intervention, low recruitment (5.5%) and high attrition rates (38.9% over the 12-week study period) were analyzed. The authors concluded that patients needed to be recruited from a broad patient base and that study burden needed to be limited. No papers were identified that critically analyzed the results of a pilot study of a self-management intervention for cancer pain and reported "lessons learned" from the pilot study.

The PRO-SELF© Plus Pain Control Program (PCP) is an intervention that was developed in the United States[21] to support self-management of pain in cancer outpatients and their family caregivers (FCs). The pilot study reported in this paper was designed to

test a German version of the PRO-SELF© Plus PCP in cancer outpatients in terms of its effect size to reduce pain and related symptoms as well as to test its feasibility in a German speaking context. The purposes of this paper are to describe the methods used and the knowledge gained during a pilot study that evaluated the effects of this self-management intervention for cancer pain, as well as the adaptations that were made for the implementation of a subsequent sufficiently powered RCT.

Methods

Design, sample, and setting. In this single center pilot RCT, the German version of the PRO-SELF© Plus PCP, a 10-week intervention designed to support self-management of cancer pain in patients and FCs, was compared to an "attention control intervention". A convenience sample of 60 patients with breast, lung, and prostate cancer and their FCs were to be recruited from a large Comprehensive Cancer Center (CCC) in Freiburg, Germany. This number of participants was calculated in order to have 40 patients with complete data at all measurement points assuming an attrition rate of 35% over the study period of 22 weeks[21]. Based on oncologists' estimates of eligible patients, a one year recruitment period was planned (July 2009 to June 2010).

Inclusion and exclusion criteria. Inclusion criteria included: adult outpatients with lung, breast, or prostate cancer with a pain intensity rating ≥ 3 on a 0 (no pain) to 10 (worst imaginable pain) numeric rating scale (NRS) related to bone metastasis during the last two weeks; an estimated life expectancy of > 6 months as assessed by the physician; who were able to understand, read, and write German; had access to a telephone; lived within 30 kilometer (km) from the CCC; were willing to participate; and provided written informed consent. Patients were asked whether they had an FC who was actively involved in their pain self-management. Patients with a named FC who was not willing to participate in the study were excluded. Patients without a named FC could participate as individuals. If a patient was hospitalized for > 2 weeks during the 10-week intervention period, the patient was excluded from the study.

Recruitment procedures. The intervention nurse in charge of the study took part in weekly tumor boards for the respective tumor types to identify potential participants. In addition, oncologists in the specialized clinics of the CCC referred patients. The intervention nurse contacted potentially eligible patients before or after their next scheduled clinic visit. Patients who consented to participate were asked whether a FC was actively involved in their pain self-management. If a FC was involved, they were asked to participate in the study. Patients and FCs who agreed to participate provided written

informed consent. Patients were randomly assigned 1:1 stratified by tumor diagnosis (lung, breast, or prostate) to the intervention or control group using a computer generated permuted blocks procedure. The allocation sequence was concealed from the nurse who enrolled the patients. The study was approved by the local ethics committee.

Description of the intervention. The PRO-SELF© Plus PCP was designed to support self-management of pain in cancer patients. The German version of the 10-week Program consisted of six visits and four phone calls. All patients in the intervention group were visited and called by the same intervention nurse (AK) who was trained to do the intervention and followed a detailed intervention protocol.

Patients were seen in their homes or in the clinic. Visits were planned to last no more than an hour while phone calls were designed to last 5 to 10 minutes. Patients completed a pain and symptom diary each evening before bedtime. This diary was used as an integral part of the intervention to monitor and evaluate pain and side effect self-management. The diary contained questions about worst and average pain intensity, pain relief, duration of pain episodes, the use of around the clock (ATC) and as needed (PRN) analgesics, as well as constipation and other side effects.

The Program contained structured and tailored components and was based on three key strategies: provision of information, skills building, and ongoing nurse coaching. Information regarding patient-related barriers was provided using academic detailing, an educational approach that was used effectively to change physician prescribing behaviors[22]. The Patient Pain Questionnaire[23] was used to determine knowledge and attitudes of patients and FCs about nine common barriers regarding pain self-management. Knowledge deficits identified using the Patient Pain Questionnaire were used as the basis for the academic detailing session. To reinforce the education, patients and FCs received a teaching booklet with the correct information. In addition, each patient received individualized information (e.g., dose ranges, side effects, and combinations of analgesics with other medications).

Skills building was based on individual assessments and goal setting that were discussed and documented in a pain and side effect management plan. During the first intervention visit, an evaluation of pain and side effect self-management was done. Symptom intensity and errors in the intake of ATC and PRN medications served as indicators of whether changes were necessary. The feasibility of changes in the pain and symptom management plan (such as: “I will take …mg of … [name of prescribed ATC medication] at 8 am and at 8 pm each day”) was evaluated with the patient and written down in a pain and side effect management plan. If essential changes were not agreed to by patients in the first discussion, the intervention nurse resumed discussions during the

next visit but did not document them until the patient agreed to the changes. In addition, if patients had any personal goals they wanted to achieve through more effective pain management (i.e., “I want to be able to go for a walk with tolerable pain twice a week”), these goals were included in the written pain and side effect management plan, such as “Twenty minutes before I go for a walk, I will take one dose of … (name of prescribed PRN medication)”. Patients were given a script with suggestions about how to communicate with their clinicians about unrelieved pain and the need for changes in their analgesic prescriptions. Patients were given a weekly pillbox and instructed on how to use it.

Nurse coaching was performed throughout the 10-week intervention period. Patients were coached on how to adapt and implement strategies according to their pain and symptom scores and their pain and side effect management plan was evaluated and adapted, if necessary. At each visit, patients were assessed for any new or unusual pain. If FCs were included, they were asked to take part in all sessions and were explicitly addressed as participants in the discussions and as resources if problems occurred.

The intervention nurse kept field notes of each visit. To ensure protocol fidelity, visits and phone calls were tape recorded. A PhD prepared nurse (ESp) listened to the tapes and gave feedback if the intervention protocol was not followed correctly. She continued with this procedure until an agreeable adherence rate with the intervention protocol was achieved[21] and then listened to randomly selected tapes until the study ended in order to ensure that protocol adherence was maintained.

Control group. In the control group, “friendly visits” were made by the same intervention nurse with the same frequency and of approximately the same duration as in the intervention group (attention control). During the six visits and four phone calls, patients and FCs were asked about their general health but were referred to their clinician if they complained of a problem. Patients in the control group received standard medical treatment that did not include any standardized support for pain self-management.

Variables and measurement. Table 1 provides an overview of variables, questionnaires for patients and FCs, time needed to complete questionnaires, and assessment times. Questionnaires included in this study have established validity and reliability. The main outcomes were average and worst pain intensity scores during the last 24 hours which were reported by the patients each evening before bedtime using 11-point NRS. Secondary outcomes were knowledge and attitudes of the patients and their FCs about pain management, analgesic intake, pain interference with daily function, and quality of life. In addition, demographic and clinical data, constipation and other cancer-related

symptoms, depression and anxiety, fatigue, functional status, self-efficacy, and cognitive function were measured as covariates.

Table 1. Overview of Questionnaires Used to Measure Outcomes and Covariates in Patients and FCs, Approximate Time Needed to Fill in Questionnaires, and Measurement Time Points

Variable	Measurement	Min.	Time points of measurement
Demographics	Patient and FC Information Questionnaires*	6	Baseline
Cognition	DemTect[31,32] & Trail Making Test A and B[33,34]	15	Baseline
Average pain and worst pain	Brief Pain Inventory[35,36]	3	Daily at baseline and at weeks 6, 10, 14 and 22
ATC analgesic prescribed and taken	Pain Management Diary		
PRN analgesic prescribed and taken	Pain Management Diary		
Constipation	Constipation Assessment Scale[37]	2	Baseline and at weeks 6, 10, 14 and 22
Pain interference with function	Brief Pain Inventory[35,36]	3	Baseline and at weeks 6, 10, 14 and 22
Pain location	Brief Pain inventory[35,36]	2	Baseline and at weeks 6, 10, 14 and 22
Knowledge of cancer pain	Patient Pain Questionnaire[38]*	10	Baseline and at weeks 6, 10, 14 and 22
Quality of life	Medical Outcomes Study-Short Form (SF-36)[39-41]*	10	Baseline and at weeks 6, 10, 14 and 22
Anxiety and depression	Hospital Anxiety and Depression Scale[42]	4	Baseline and at weeks 6, 10, 14 and 22
Fatigue	Fatigue Assessment Questionnaire[43]	8	Baseline and at weeks 6, 10, 14 and 22
Functional status	Eastern Cooperative Oncology Group Performance Status (ECOG-PS)[1,44,45]	3	Baseline and at weeks 6, 10, 14 and 22
Cancer-related symptoms	Memorial Symptom Assessment Scale[1,46]	10	Baseline and at weeks 6, 10, 14 and 22
Self-efficacy	Self-Efficacy Questionnaire[47]	5	Baseline and at weeks 6, 10, 14 and 22
Pain self care behavior	Pain Self Care Behavior Questionnaire	4	Baseline and at weeks 6, 10, 14 and 22

Min. = Minutes approximately needed to fill out questionnaires; ACT = around the clock; PRN = as needed
*also assessed in FCs

Data collection. Data collection was done concurrently in both groups at enrollment, at weeks 6 and 10 (intervention period), and at weeks 14 and 22 (sustainability). At enrollment, cognitive screening was performed and all questionnaires were explained to patients and FCs. Current analgesic medication prescriptions were noted in the daily pain diary. If changes were made to the analgesic prescription, patients were instructed how to write these changes in their diary. Questionnaires were collected and checked for missing data at the following visit. Questionnaires for week 6 were distributed during the intervention visit and collected and checked for missing data at the subsequent visit. At the last visit (week 10), the intervention nurse provided the patient with the study questionnaires and a pre-stamped addressed envelope. Outcome assessors who performed the follow-up data collection at weeks 14 and 22 were blinded to the patient's group assignment. At weeks 13 and 21, patients were called in order to ask for and to write down their current analgesic medication in the questionnaires which were then sent with an extra pre-stamped addressed envelope to the patient and FC. Patients received a reminder call on the first day of weeks 14 and 22, respectively. After the questionnaires were returned, they were checked for completeness. A few patients were called by the same outcome assessor to complete any missing data.

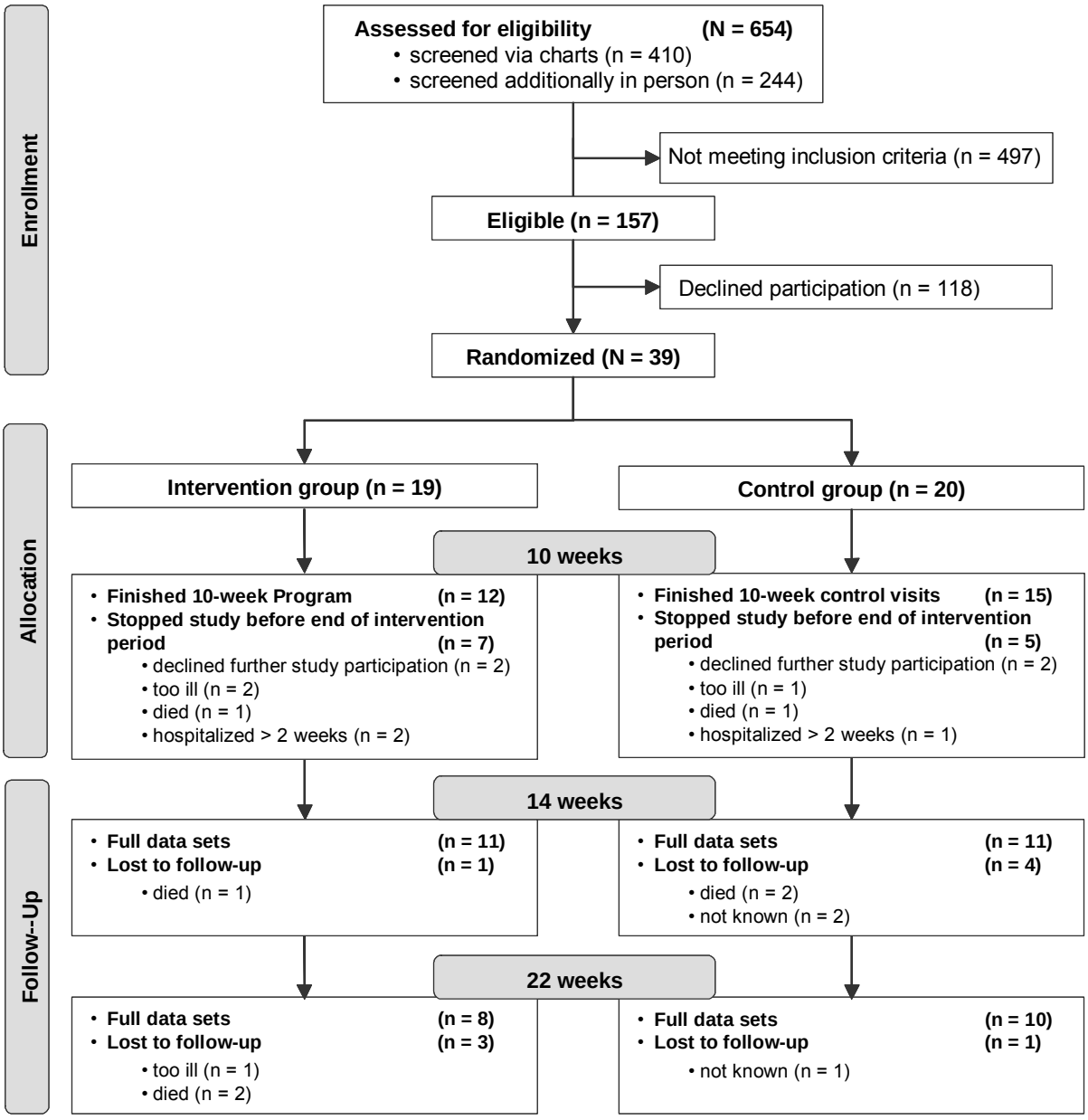
Analysis of study and intervention procedures. The evaluation of sampling and research procedures, study design, and conceptual questions regarding the intervention is based on field notes. In the field notes, the intervention nurse recorded the content of each visit and phone call including topics that were covered in the discussions with the patients and needed resources. In addition, general observations regarding study procedures, such as successful and unsuccessful strategies to recruit patients, or observations such as common side effects that influenced pain self-management, were recorded. Descriptive statistics were used as appropriate for the analysis.

"Lessons Learned"

The pilot study provided an opportunity for learning from the procedural issues that were evaluated and addressed during the course of the study. These issues included sampling procedures, study design, research procedures, and conceptual questions regarding the intervention. Recruitment procedures required adaptation during the pilot study while other procedures will be adapted for the larger RCT.

Sampling procedures. After five months, only five patients were recruited, about 20% of the anticipated recruitment rate. Challenges occurred on three levels. First, a low number of patients were eligible due to the restrictive inclusion criteria. Second, screening patients during tumor boards was limited because specific eligibility criteria could not be determined during the presentations. We learned that in order to confirm eligibility criteria, a large number of patients needed to be approached by the recruitment nurse directly in the clinic before or after their routine appointments which exceeded anticipated resources. Third, a low number of eligible patients (recruitment rate = 25%) agreed to participate in the study (Figure 1).

Figure 1: Flow of Participants During the Course of the Study



Changes were implemented in order to enhance recruitment. Inclusion criteria were expanded to include all types of cancer pain rated ≥ 3 (on a 0 [no pain] to 10 [worst imaginable pain] NRS) except neuropathic pain as defined by the treating physician. Neuropathic pain was excluded because its treatment strategies differ substantially from that of nociceptive pain. The distance to the home of the patient was expanded from 30 km to the duration of a car ride of one hour or less. In addition, recruitment was intensified. Additional research assistants were hired which resulted in an increased presence at the recruitment sites during different times of the day. At the same time, the Department of Radiation Therapy, as well as four inpatient units, and two interdisciplinary centers of the CCC were added as recruitment sites. Recruitment at tumor boards was stopped. Third, the duration of the recruitment period was expanded to 18 months. Using these strategies, a recruitment rate of approximately 3 patients per month was achieved, which resulted in a sample of 39 patients (19 intervention, 20 control).

Based on verbal reports of the study nurses, the main reasons for declining participation (n = 118) included: a strong belief that the cancer treatment would reduce the pain very soon; that the involvement of yet another person in the treatment team was not helpful; not knowing how a “pain Program” could help; not feeling comfortable in dealing with questionnaires; or no interest in taking part in clinical studies in general. Reasons for participation, on the other hand, included the appreciation of specialized support and attention; not feeling well understood by clinicians about one’s pain and daily concerns; a desire to try everything that was seen as helpful; or curiosity about the novel consultation service.

The attrition rate was high in this longitudinal study. Of the 39 patients who consented to participate in the study, 27 (12 intervention, 15 control) finished the 10-week intervention while 18 (8 intervention, 10 control) provided full data sets after 22 weeks. The attrition rate was 31% at 10 weeks, 44% at 14 weeks, and 54% at 22 weeks (Figure 1).

Study design: ***Randomization.*** In general, randomization worked well and resulted in an even distribution of patients in the intervention and the control groups in terms of demographic and clinical characteristics. However, during the course of the study, an uneven distribution of pain exacerbations (e.g., acute rib fracture) was seen (n = 4 intervention, n = 1 control). In addition, two patients with curative treatment goals were assigned to the control group while none were assigned to the intervention group. This uneven distribution was most probably due to the small number of participants but still needs to be considered as a stratification criterion in the larger RCT.

Second, even though patients were aware of the 50% chance of being assigned to the control group, some were disappointed about their assignment. This feeling was true mostly for those patients who had wished for a specialist to become involved in their treatment to help them get their pain under control. However, “assignment to control group” was not given as reason for withdrawal by any patient.

Research procedures. Patient burden with data collection: Patients with complete data sets spent approximately 10.7 hours completing questionnaires over the 22-week study period. The quantity of questionnaires was given as reason for withdrawal from the study by one patient in the control group. Cognitive screening procedures at baseline were declined by 18 patients (46%).

Resources needed for travel. Most patients preferred home visits. Only one patient who lived close to the study site preferred to meet at the clinic for all visits. At inclusion, patients frequently stated that additional study appointments at the clinic would be a reason for declining study participation. However, a combination of routine appointments and home visits at the clinic during the course of the study was acceptable to most patients. A total of 198 (93 intervention group, 105 control group) home visits were made. The mean distance from the patients’ homes to the clinic was 34.7 km (31 km intervention, 38 km control; range 1 to 90 km). The total distance travelled for all home visits was 6768 km (2897 km intervention, 3871 km control).

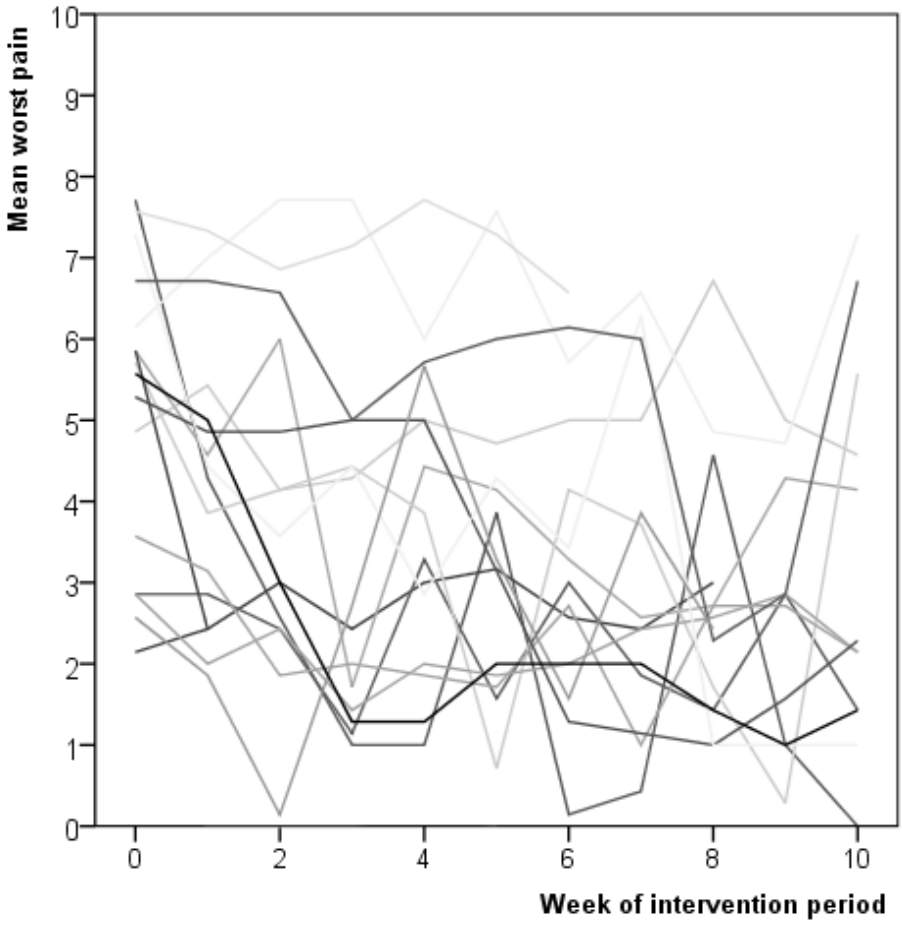
Twenty-five additional home visits were completed for 19 patients for recruitment and data collection procedures. The total distance travelled for these additional visits was 690 km (140 km intervention, 550 km control).

Conceptual questions regarding the intervention: ***Duration of the intervention.*** The duration of the intervention sessions ranged from 15 to 90 minutes with a median duration of 49 minutes (25/75 percentile = 37/62 minutes) overall and 65 minutes (25/75 percentile = 60/80 minutes) for the first visit. The duration of the intervention sessions seemed appropriate and a limit of approximately one hour per intervention session was feasible for 89% of the intervention visits. The median duration of the intervention phone calls was 8 minutes (25/75 percentile = 6/10 minutes; range 1 to 20 minutes). The median total time of exposure to the intervention nurse was 283 minutes [25/75 percentile = 229/372 minutes] in the intervention group and 305 minutes [25/75 percentile = 230/390 minutes] in the control group.

Timing of the intervention. The 10-week time frame of the intervention and the timing of the six intervention sessions and four phone calls were fixed factors for every participant in the study. However, cancer pain is a dynamic process that consists of chronic, acute, and pain-free episodes that are highly individual and unpredictable as can be seen in the individual pain trajectories of those patients who finished the 10-week Program (Figure 2). At week 6, nine patients (60%) in the intervention group were not or were only slightly distressed by their pain indicating that their pain was under control and that they no longer needed support for their pain self-management. On the other hand, at the last visit, four patients (33%) in the intervention group continued to experience severe pain.

In addition, weekly intervals between contacts delayed progress in patients who experienced acute pain episodes and needed to implement significant changes such as stepwise titration of analgesic medications in their self-management plan. In these cases, evaluation of the patient's pain self-management and nurse coaching in shorter intervals may have accelerated the patient's progress.

Figure 2: Individual Trajectories of Weekly Means of Worst Pain in Intervention Patients Over the Intervention Period of 10 Weeks



Setting of the intervention. If intervention visits were done outside the patients' homes, the evaluation of patients' and FCs' experiences with pain management (e.g., names of previous medication) or issues regarding the practical implementation of pain self-management at home (e.g., placing the pill box in the bathroom) was hindered.

Content of the intervention. The intervention was planned to support self-management of pain and common side effects of pain medication, such as constipation. However, most patients who participated in the study were undergoing active treatment (chemotherapy or radiation therapy) and had treatment-related symptoms that could severely impact pain self-management. In particular, moderate to severe nausea was prevalent at enrollment in 11 (58%) and vomiting in 7 (37%) patients in the intervention group. As a result, the intervention nurse had to include information about antiemetic treatment which decreased the prevalence of nausea to 4 (33%) of the 12 patients and the prevalence of vomiting to 3 (25%) of the 12 patients at the end of the 10-week intervention period.

The intervention did not include contact between the intervention nurse and treating physicians. When planning the trial, the complexity of the treatment team involved in pain management was not anticipated. Most cancer patients with pain had a treatment team that involved an oncologist, surgeon, or radiation therapist, and the family doctor. In addition, other consultants such as orthopedists or neurologists were involved in the patient's pain management. As a result, some patients received prescriptions for different pain medications from different physicians over the course of their treatment. Furthermore, patients seemed reluctant to contact their oncologists for problems that they thought were not directly related to their cancer treatment such as pain or nausea. However, primary care physicians tended to have limited specialized knowledge of cancer pain management.

Regarding knowledge of pain self-management strategies, academic detailing was a suitable way to efficiently assess and discuss misconceptions and individual questions. In addition, discussions and written instructions about changes in the pain and side effect management plan were perceived as useful strategies.

Ethical questions regarding the control group. The control group schedule proved to be feasible. However, when conducting home visits with patients in the control group, the intervention nurse was confronted with ethical dilemmas as soon as patients experienced severe difficulties with their pain self-management. She was limited by the study protocol in the information that she could provide to these patients.

Discussion

During the course of the pilot study, several challenges occurred. Some of the challenges were addressed immediately while others will be considered in the design and implementation of the larger RCT.

The low recruitment rate in this pilot study was comparable to previous reports of intervention trials for cancer pain management[19,24,25]. The recruitment rate was improved using the strategies described previously[15]. In future research, recruitment procedures need to be linked with or formally integrated into the clinical environment to ensure optimal collaboration between clinicians and research staff. Likewise, it is important that sufficient resources are allocated to achieve the number of participants needed for the larger trial.

To improve recruitment rates, several strategies have been recommended that can be used in future trials[15]. Furthermore, in this pilot study, we think that the balance between benefit and burden was not apparent to patients when they were approached for study participation. In many non-European and European countries nurse-led interventions to support pain self-management are well established. However, even though home nursing is well established in Germany for outpatients who need support with activities of daily living, nurse-led interventions that support pain self-management from an early point in the patient's treatment are extremely novel. Therefore, the benefits of involving nurses in outpatient self-management might not be well known to patients with cancer and their FCs or to clinicians who are involved in the care of these patients. The provision of information about the intervention and its potential benefits to patients and clinicians might increase enrollment rates[26].

Second, patient burden needs to be kept at a minimum by reducing the amount of self report data. Third, in our study, the number and duration of intervention sessions and phone calls followed a specific structure regardless of the patient's clinical and functional status. However, the challenge of reducing respondent burden in terms of both, outcome measures and study visits needs to be evaluated within the context of maintaining the scientific integrity of the study. Researchers need to consider the number and length of the questionnaires that need to be completed to answer the study aims. In addition, a balance needs to be achieved in terms of the structured and tailored components of the intervention to be able to ensure that the attention control group receives a similar number and duration of visits. An advantage of tailoring interventions is to save costs by limiting the use of resources. Furthermore, tailored interventions can be implemented more easily into clinical settings because they account for each patient's clinical status[27]. However, in research, tailoring of the intervention needs to be balanced with study quality, always assuring its trialability and reproducibility[27].

Besides tailoring the duration of the intervention, the sessions need to meet the patient's needs. At least one home visit needs to be included as an integral part of the intervention because the patient's previous experiences with pain self-management and the integration of pain self-management tasks into daily life was easier to assess in the patient's home. Moreover, if study visits cannot be synchronized with routine clinic appointments, home visits are an appropriate way to reduce patient burden[26].

Losing approximately three participants per week during the course of this pilot RCT resulted in a relatively high attrition rate. However, the overall attrition rate of 31% over the 10-week intervention period was comparable to two studies that were conducted over 8 weeks in cancer patients with pain[20,28]. In the previous PRO-SELF© study[21], the attrition rate was 18% over the six week study period. Due to disease progression, attrition in longitudinal studies of patients with cancer may not be avoidable. Reducing respondent burden may be an effective strategy to retain participants. Alternatively, this attrition rate needs to be included into sample size calculations. Finally, newer methods of longitudinal data analysis, that include all participants, regardless of the number of assessments completed, will facilitate the evaluation of the efficacy of cancer pain self-management interventions.

Another consideration identified in the pilot study was that not only side effects of pain management but symptoms that severely impacted pain self-management (e.g., nausea or vomiting associated with cancer treatment) should be included as an integral part of interventions that support cancer pain self-management. The complexity of the treatment team is another challenge. Many patients and their FCs needed to acquire skills to structure and manage multiple consultations and prescriptions during the course of treatment. Interventions that support self-management of cancer pain can become an essential component of chronic illness management[29]. As a first step, patients benefit from guidance about who to contact about unrelieved pain and for changes in analgesic prescriptions. This guidance across the complex treatment team is an important component of self-management interventions. While patients and their FCs are the key persons in interventions that support pain self-management, the efficacy of having the intervention nurses contact clinicians directly needs to be evaluated in future RCTs. For example, future RCTs could include the coordination between the patient, the FC, the intervention nurse, and the physician about changes in the patient's pain management plan as part of the intervention. In addition, having the intervention nurse provide direct feedback to clinicians on patient's progress might improve the efficacy of the intervention. However, in order to control for individualized contacts of intervention staff with clinicians in a RCT, a well structured intervention protocol must define clear criteria, for this type of contact.

Furthermore, “contact with the clinician” needs to be included as a covariate in subsequent analysis.

Even though the “attention control intervention” proved to be a feasible approach for the control group, ethical questions were raised about withholding the potential benefits of the intervention[30]. In Germany, usual care generally does not entail standardized support of cancer pain self-management. In future studies, once the efficacy of the intervention is established, different doses of the intervention or modes of delivery of the intervention could be tested without the use of a control group.

Conclusions

Apart from the provision of information and skills building, coaching cancer patients within a complex treatment team is an important function of an intervention to support pain self-management. This pilot study proved to be highly useful in order to adapt planned study procedures, to balance burden and benefit for participants, and to customize the intervention to patients’ needs and abilities in order to enhance feasibility and effectiveness. Findings from this pilot study will be fully integrated in a future RCT.

Acknowledgements

We express our deepest gratitude to all of the patients and FCs who participated in this pilot study. Furthermore, we greatly thank all of the clinicians who assisted with and supported this pilot study. In addition, we thank the study nurses and our statistician, Dr. Kris Denhaerynck.

Conflict of interest statement

The authors did not have any potential conflicts of interest in the research reported.

Funding source

This research was supported by unrestricted grants of the Ebnet Foundation, Parrotia Foundation, Stiftung zur Krebsbekämpfung, and Hans-H. Hasbargen GmbH & Co.KG. Dr. Miaskowski is supported by grants from the National Cancer Institute, the National Institute of Nursing Research, and the American Cancer Society.

References

1. Spichiger E, Mueller-Froehlich C, Denhaerynck K, et al. Prevalence of symptoms, with a focus on fatigue, and changes of symptoms over three months in outpatients receiving cancer chemotherapy. Swiss Med Wkly. DOI: w13303.
2. Breivik H, Cherny N, Collett B, et al. Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. Ann Oncol 2009;20:1420-1433.
3. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. A systematic evaluation of content, structure, and efficacy of interventions to improve patients' self-management of cancer pain. J Pain Symptom Manage, in press.
4. Miaskowski C, Dodd MJ, West C, et al. Lack of adherence with the analgesic regimen: a significant barrier to effective cancer pain management. J Clin Oncol 2001;19:4275-4279.
5. Schumacher KL, Koresawa S, West C, et al. Putting cancer pain management regimens into practice at home. J Pain Symptom Manage 2002;23:369-382.
6. Ward SE, Goldberg N, Miller-McCauley V, et al. Patient-related barriers to management of cancer pain. Pain 1993;52:319-324.
7. Portenoy RK, Thaler HT, Kornblith AB, et al. Symptom prevalence, characteristics and distress in a cancer population. Qual Life Res 1994;3:183-189.
8. Glover J, Dibble SL, Dodd MJ, Miaskowski C. Mood states of oncology outpatients: does pain make a difference? J Pain Symptom Manage 1995;10:120-128.
9. Craig P, Dieppe P, Macintyre S, et al. Developing and evaluating complex interventions: the new Medical Research Council guidance. BMJ 2008;337:a1655.
10. Lorig K. Self-management education: more than a nice extra. Med Care 2003;41:699-701.
11. Prescott PA, Soeken KL. The potential uses of pilot work. Nurs Res 1989;38:60-62.
12. Van Teijlingen ER, Rennie AM, Hundley V, Graham W. The importance of conducting and reporting pilot studies: the example of the Scottish Births Survey. J Adv Nurs 2001;34:289-295.
13. Beebe LH. What can we learn from pilot studies? Perspect Psychiatr Care 2007;43:213-218.

14. Puts MT, Monette J, Girre V, et al. Participation of older newly-diagnosed cancer patients in an observational prospective pilot study: an example of recruitment and retention. BMC Cancer 2009;9:277.

15. Ransom S, Azzarello LM, McMillan SC. Methodological issues in the recruitment of cancer pain patients and their caregivers. Res Nurs Health 2006;29:190-198.

16. Jacobsen S, Wood FG. Lessons learned from a very small pilot study. Online Journal of Rural Nursing and Health Care 2006;6:18-28.

17. Chang MC, Chang YC, Chiou JF, Tsou TS, Lin CC. Overcoming patient-related barriers to cancer pain management for home care patients. A pilot study. Cancer Nurs 2002;25:470-476.

18. Keefe FJ, Ahles TA, Sutton L, et al. Partner-guided cancer pain management at the end of life: a preliminary study. J Pain Symptom Manage 2005;29:263-272.

19. Oliver JW, Kravitz RL, Kaplan SH, Meyers FJ. Individualized patient education and coaching to improve pain control among cancer outpatients. J Clin Oncol 2001;19:2206-2212.

20. Ward S, Donovan HS, Owen B, Grosen E, Serlin R. An individualized intervention to overcome patient-related barriers to pain management in women with gynecologic cancers. Res Nurs Health 2000;23:393-405.

21. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.

22. Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. JAMA 1990;263:549-556.

23. Ferrell BR, Rhiner M, Ferrell BA. Development and implementation of a pain education program. Cancer 1993;72:3426-3432.

24. Anderson KO, Mendoza TR, Payne R, et al. Pain education for underserved minority cancer patients: a randomized controlled trial. J Clin Oncol 2004;22:4918-4925.

25. Yildirim YK, Cicek F, Uyar M. Effects of pain education program on pain intensity, pain treatment satisfaction, and barriers in Turkish cancer patients. Pain Manag Nurs 2009;10:220-228.

26. Berger AM, Neumark DE, Chamberlain J. Enhancing recruitment and retention in randomized clinical trials of cancer symptom management. Oncol Nurs Forum 2007;34:E17-22.

27. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci 2009;4:50.

28. Van der Peet EH, van den Beuken-van Everdingen MH, Patijn J, et al. Randomized clinical trial of an intensive nursing-based pain education program for cancer outpatients suffering from pain. Support Care Cancer 2008:Epub ahead of print.

29. Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. JAMA 2002;288:2469-2475.

30. Thompson BT, Schoenfeld D. Usual care as the control group in clinical trials of nonpharmacologic interventions. Proc Am Thorac Soc 2007;4:577-582.

31. Kalbe E, Kessler J, Calabrese P, et al. DemTect: A new, sensitive cognitive screening test to support the diagnosis of mild cognitive impairment and early dementia. Int J Geriatr Psychiatry 2004;19:136-143.

32. Kessler J, Calabrese P, Kalbe E, Berger F. DemTect: A new screening method to support diagnosis of dementia. Psycho 2000;26:343-347.

33. Heun R, Papassotiropoulos A, Jennssen F. The validity of psychometric instruments for detection of dementia in the elderly general population. Int J Geriatr Psychiatry 1998;13:368-380.

34. Oswald WD. Psychometric procedures and questionnaires in geronto-psychological research. Z Gerontol 1979;12:341-350.

35. Jensen MP. The validity and reliability of pain measures in adults with cancer. J Pain 2003;4:2-21.

36. Radbruch L, Loick G, Kiencke P, et al. Validation of the German version of the Brief Pain Inventory. J Pain Symptom Manage 1999;18:180-187.

37. McMillan SC. Assessing and managing opiate-induced constipation in adults with cancer. Cancer Control 2004;11:3-9.

38. Ferrell BR, Rhiner M, Ferrell BA. Development and evaluation of the family pain questionnaire. J Psychosoc Oncol 1993;10:21-35.

39. Baker F, Haffer SC, Denniston M. Health-related quality of life of cancer and noncancer patients in Medicare managed care. Cancer 2003;97:674-681.

40. Bullinger M. German translation and psychometric testing of the SF-36 Health Survey: preliminary results from the IQOLA Project. International Quality of Life Assessment. Soc Sci Med 1995;41:1359-1366.

41. Matthews BA, Baker F, Hann DM, Denniston M, Smith TG. Health status and life satisfaction among breast cancer survivor peer support volunteers. Psychooncology 2002;11:199-211.

42. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67:361-370.

43. Glaus A, Muller S. Messung der Müdigkeit bei Krebskranken im Deutschen Sprachraum: Die Entwicklung des Fatigue Assessment Questionnaires [Measuring fatigue of cancer patients in the German-speaking region: development of the Fatigue Assessment Questionnaire]. Pflege: Die wissenschaftliche Zeitschrift für Pflegeberufe 2001;14:161-170.

44. Oken MM, Creech RH, Tormey DC, et al. Toxicity and response criteria of the Eastern Cooperative Oncology Group. Am J Clin Oncol 1982;5:649-655.

45. Zubrod CG, Schneiderman M, Frei E, Brindley, C., et al. Appraisal of methods for the study of chemotherapy of cancer in man: Comparative therapeutic trial of nitrogen mustard and triethylene thiophosphora-mide. J Chronic Dis 1960;11:7-33.

46. Portenoy RK, Thaler HT, Kornblith AB, et al. The Memorial Symptom Assessment Scale: an instrument for the evaluation of symptom prevalence, characteristics and distress. Eur J Cancer 1994;30A:1326-1336.

47. Keefe FJ, Ahles TA, Porter LS, et al. The self-efficacy of family caregivers for helping cancer patients manage pain at end-of-life. Pain 2003;103:157-162.

Chapter 6

Results of a Randomized Controlled Pilot Study of a Self-Management Intervention for Cancer Pain

Antje Koller, MNS[1]; Christine Miaskowski, PhD, RN, FAAN[2];
Sabina De Geest, PhD, RN, FAAN, FRCN[1]; Oliver Opitz, MD[3]; Elisabeth Spichiger, PhD, RN[1,4]

[1] Institute of Nursing Science, Faculty of Medicine, University of Basel, Switzerland
[2] Department of Physiological Nursing, School of Nursing, University of California, San Francisco, USA
[3] Tumorzentrum Ludwig Heilmeyer - Comprehensive Cancer Center Freiburg, Faculty of Medicine, University of Freiburg, Germany
[4] Inselspital Bern University Hospital, Switzerland

Submitted to European Journal of Oncology Nursing

Abstract

Purpose of the research: This paper reports findings from a randomized controlled pilot study (pilot RCT) that evaluated feasibility and effect sizes for a cancer pain self-management intervention.

Methods and sample: Thirty-nine oncology outpatients were randomized to the intervention (n = 19) or control (n = 20) groups. Patients in the intervention group received the PRO-SELF© Plus Pain Control Program in 6 visits and 4 phone calls over 10 weeks. The intervention was based on three key strategies: provision of information, skills building, and ongoing nurse coaching. Primary outcomes were average and worst pain intensity. Secondary outcomes included pain-related knowledge, opioid intake, and self-efficacy. Data were collected at enrollment, weeks 6, 10, 14, and 22 after randomization.

Key results: The group by time effect was statistically significant for knowledge scores (week 10: $p = 0.04$; week 22: $p < 0.01$), but not for pain, opioid intake, or self-efficacy. The mean difference at week 10 between the intervention and the control groups was -0.55 (Cohen's d = -0.26) for average pain and -0.73 (d = -0.29) for worst pain. At week 22, it was -0.51 (d = -0.35) for average pain and -0.47 (d = -0.20) for worst pain.

Conclusions: This study is the first to evaluate and demonstrate the feasibility of a cancer pain self-management intervention developed in the United States in Germany. Pain self-management related knowledge improved significantly and effect sizes associated with pain reduction were determined. Findings from this pilot RCT provide the basis for planning a larger RCT.

Introduction

Even though effective treatment options exist, over 40% of cancer pain patients do not receive adequate pain management[1-3]. In addition to inadequate assessment and undertreatment, several patient-related barriers interfere with optimal pain management. First, oncology patients' lack of knowledge and misconceptions regarding analgesic medications (e.g., fear of addiction, tolerance, fatalism) are associated with undertreatment[4-6]. Second, because the implementation of pain self-management strategies into daily practice at home is a complex process, patients may experience inadequate pain relief. Oncology patients and their family caregivers (FCs) must acquire knowledge and skills on how to obtain, take, and titrate analgesic regimens; deal with side effects; and know what to do if pain is not relieved[7]. Third, patients' lack of adherence with the analgesic regimen contributes to inadequate pain control[8].

In a recent meta-analysis of 21 experimental studies, educational interventions to support pain self-management by oncology patients were found to result in significant albeit modest benefits[9]. In this meta-analysis, a weighted mean difference of -1.1 (95% confidence interval [CI]: -1.8/-0.41) on a 0 (no pain) to 10 (worst imaginable pain) numeric rating scale (NRS) was found for average pain, and a difference of -0.78 (95% CI: -1.21/ -0.35) was found for worst pain intensity. Bennett et al.[9] concluded that additional studies were warranted due to the magnitude of the problem and the paucity of intervention studies.

The pilot study described in this paper is based on the PRO-SELF© Pain Control Program (PCP) that demonstrated efficacy in patients with pain from bone metastasis[10,11]. In this randomized controlled trial (RCT) with 174 patients (n = 81 control group [CG]; n = 93 intervention group [IG]), patients participated either alone (55%) or with a FC (45%). In the IG, specially trained nurses conducted three home visits and three phone calls with patients and FCs over 6 weeks. The PRO-SELF© PCP was based on three key strategies: provision of information using academic detailing[12], skills building, and ongoing nurse coaching, and consisted of structured and tailored components.

While average (weighted mean difference = -0.98 [95% CI: -1.56/-0.40]) and worst (weighted mean difference = -1.1 [95% CI: -1.81/-0.39]) pain intensity scores decreased significantly[9,10], a more detailed evaluation revealed that only 50% of patients in the IG had a

complete response (decrease in pain intensity scores ≥ 30%), 25% had a partial response (decrease in pain intensity scores between 1% and 29%), and 25% did not respond to the educational intervention[13]. These three groups did not differ on any demographic or clinical characteristics. A qualitative analysis of audio-taped interactions between patients, FCs and intervention nurses revealed numerous difficulties with putting pain management regimens into practice at home. In fact, the majority of the patients were still actively involved in problem-solving to achieve better pain control at the final home visit[7].

Both, the quantitative and qualitative analyses provided the foundation for refinements that resulted in the PRO-SELF© Plus PCP. For example, it was noted that patients needed additional time in the coaching/problem-solving process to achieve optimal pain control. Hence, the PRO-SELF© Plus PCP was extended to 10 weeks. To assess sustainability of effects, the follow-up period was extended to 22 weeks after enrollment. This “second generation” PRO-SELF© Plus PCP is being tested in a RCT in the United States (U. S.).

To our knowledge, in the German speaking population, no intervention that supported oncology patients’ pain self-management has been tested to date. The PRO-SELF© Plus PCP served as the foundation for this pilot study that was conducted in Germany. The overall framework for both the U. S. and the German studies was the symptom management theory developed at the University of California in San Francisco[14,15]. Symptom management theory places the patient’s experience of symptom management within the context of the person, health and illness, and the environment. In addition, Bandura’s social cognitive theory[16], an adult learning theory that establishes that human behavior is reciprocally influenced and affected by the individual, behavior, and environment, provides the underlying theoretical foundation for the intervention. As part of social cognitive theory, the concept of self-efficacy was introduced which is defined as one's belief in one's ability to succeed in specific situations[16].

The purpose of this paper is to report findings from this pilot RCT that was designed to pilot test the adapted German PRO-SELF© Plus PCP in oncology outpatients and their FCs, in terms of feasibility and effect sizes for the main outcome variables (i.e., worst and average pain intensity) for subsequent power calculations. Furthermore, findings for secondary outcomes (i.e., pain management related knowledge, opioid intake) are reported.

Methods

Design. In this single-center pilot RCT, the PRO-SELF© Plus PCP was adapted for the German speaking population. Study instruments and the intervention were translated and adapted for the German healthcare system. Improvements to the intervention included setting of individual, achievable goals and the stepwise engagement of FCs and home nurses if the patient was not able to manage the pain by themselves. Details of the study and intervention procedures will be reported elsewhere.

Sample and setting. In brief, a convenience sample of oncology outpatients was recruited from a large Comprehensive Cancer Center in Freiburg, Germany. Patients were included if they had cancer pain ≥ 3 on a 0 (no pain) to 10 (worst pain imaginable) NRS; were ≥ 18 years; able to read, write and understand German; had an estimated life expectancy of more than 6 months; access to a telephone; and lived within a one hour car ride from the clinics. Patients with a FC who was involved substantially in their pain self-management and who was not willing to participate in the study were excluded. Patients who did not have a FC who was involved substantially in their pain self-management could participate as individuals. If a patient was hospitalized for > 2 weeks during the 10-week intervention period, the patient was excluded from the study. The study was approved by the local ethics committee.

Study procedures. Patients were approached during a routine visit at the clinic. If according to the patient a FC was involved, they were asked to participate in the study. If interested, patients and FCs provided written informed consent, were stratified by cancer diagnosis (i.e., breast, lung, or other), and randomized 1:1 to the PRO-SELF© Plus IG or the CG. A permuted blocks procedure was used to create a computer generated randomization list. Sequentially numbered opaque envelopes concealed the allocation sequence from the recruitment nurse. Clinicians were blinded to the patients' assignment. At enrollment, medical records were reviewed, and both groups of patients completed a demographic questionnaire and a brief cognitive screening test. For one week prior to the first intervention visit and at 6, 10, 14, and 22 weeks, patients completed a daily pain diary and a set of questionnaires. Data collection was performed as an integral part of the visits in both groups until week 10. At weeks 14 and 22 (i.e., sustainability period), questionnaires were sent to the patient's home with pre-stamped and self-addressed envelopes by outcome assessors who were blinded to the patient's group allocation.

Interventions. All participants received 6 visits and 4 phone calls over 10 weeks by the intervention nurse (AK), who was specifically trained for the study, and who followed a detailed intervention protocol. The CG received visits and phone calls of approximately the same duration as the IG (attention intervention). During these visits, patients were asked about their general health but were referred to their physician if any problems with pain self-management were reported. Apart from this attention intervention, the CG received standard care by their treating clinicians without any standardized pain self-management support.

Visits in the IG were designed to last for no more than one hour. Phone calls lasted 5 to 10 minutes. The German PRO-SELF© Plus PCP consists of a structured and a tailored part and is based on three key strategies: provision of information, skills building, and ongoing nurse coaching. Provision of information began at the first visit using academic detailing[12] which allowed the intervention nurse to focus the education on a patient's individual knowledge deficits. Skills building (e.g., titration of analgesic medications) was based on individual needs and achievable goals. Nurse coaching was performed during subsequent visits and phone calls. Individual information was reinforced and the effectiveness of the pain and side effect management plan was evaluated with the patient and FC. Patients and FCs were given written information about pain self-management, a weekly pill-box, and a script on how to communicate with their physician about unrelieved pain and the need for changes in their analgesic prescription. Sessions and phone calls were tape recorded and checked by the last author in order to ensure that protocol adherence was maintained[11].

Variables and measurement. To obtain primary outcome measures, patients rated their average and worst pain on 11-point NRSs (0 = no pain to 10 = worst imaginable pain) in the last 24 hours each evening before bedtime. Secondary outcomes were knowledge and attitudes towards pain management and opioid intake.

The Patient Pain Questionnaire (PPQ) was used to evaluate patients' knowledge of cancer pain management[4]. The mean of this 9 item instrument yields scores from 0 to 10 with higher scores representing better knowledge. The scale underwent extensive psychometric testing and the Cronbach's α from the previous PRO-SELF© PCP study was 0.91[10]. It was translated for our pilot study in a culturally sensitive backward forward procedure[17]. In our study, Cronbach's α for the German version of the PPQ was 0.59.

Patients noted the amount and timing of their analgesic intake (around-the-clock and as needed medication) each day in a pre-written pain diary. All opioid analgesics were converted to morphine equivalent doses[18] as was done in the previous PRO-SELF©

study[10]. Total daily doses were calculated for around the clock and as needed daily opioid intake separately and then averaged for each week.

In addition, to evaluate whether individual goal setting was an effective approach to help patients to focus more on their preferred activities, the item “The pain has hindered me to do the things I wanted to do today” was added to the pain diary. Patients rated this item daily on a 0 (not at all) to 10 (completely) NRS.

Demographic data included age, gender, FC inclusion, marital status. Clinical data included type of cancer diagnosis, months since diagnosis, and current cancer treatments. Additional covariates were: depression and anxiety, measured with the German version of the Hospital Anxiety and Depression Scale[19,20]; number of cancer-related symptoms, evaluated using the German Memorial Symptom Assessment Scale[1,21]; fatigue assessed with the Fatigue Assessment Questionnaire[22]; cognitive function, measured with the DemTect[23,24]; and functional status, measured with the Eastern Cooperative Oncology Group Performance Status (ECOG-PS)[25]. Finally, self-efficacy was evaluated with the Self-Efficacy Questionnaire, which is a self-report 15-item instrument[26]. Patients rate each item regarding their perceived ability to manage various aspects of their pain on a scale of 10 (very uncertain) to 100 (very certain). A composite score is obtained by calculating the mean of the 15 items. In a previous study[27], Cronbach’s α for this scale was 0.95, in our study, it was 0.92.

Data analysis. For the demographic and clinical characteristics of the patients, measures of central tendency and variability as well as frequency distributions were calculated as appropriate based on the measurement level and distribution. All daily ratings were averaged on a weekly basis. Eleven weekly means of pain scores were imputed if one or two pain scores were missing within a week. If more than two pain scores were missing, this week was not included in the analysis. Student’s t-tests, X^2 statistics, or Mann-Whitney-U-tests were used as appropriate to evaluate for baseline differences between the IG and CG. Patients who dropped out of the IG and the CG were assessed for differences in pain scores and demographic and clinical variables. Furthermore, those patients who dropped out of the study were compared to those who finished the study for baseline differences.

An intent-to-treat approach was used for all analyses. We quantified the effect of the intervention by calculating the difference between average and worst pain intensity scores between initiation and end of the intervention (week 10) and the end of the study period (week 22) for both study groups, and then subtracted the values of the study groups from each other. In addition, we calculated Cohen’s d by using the groups’ means and pooled standard deviations. We applied a linear mixed model approach in order to determine

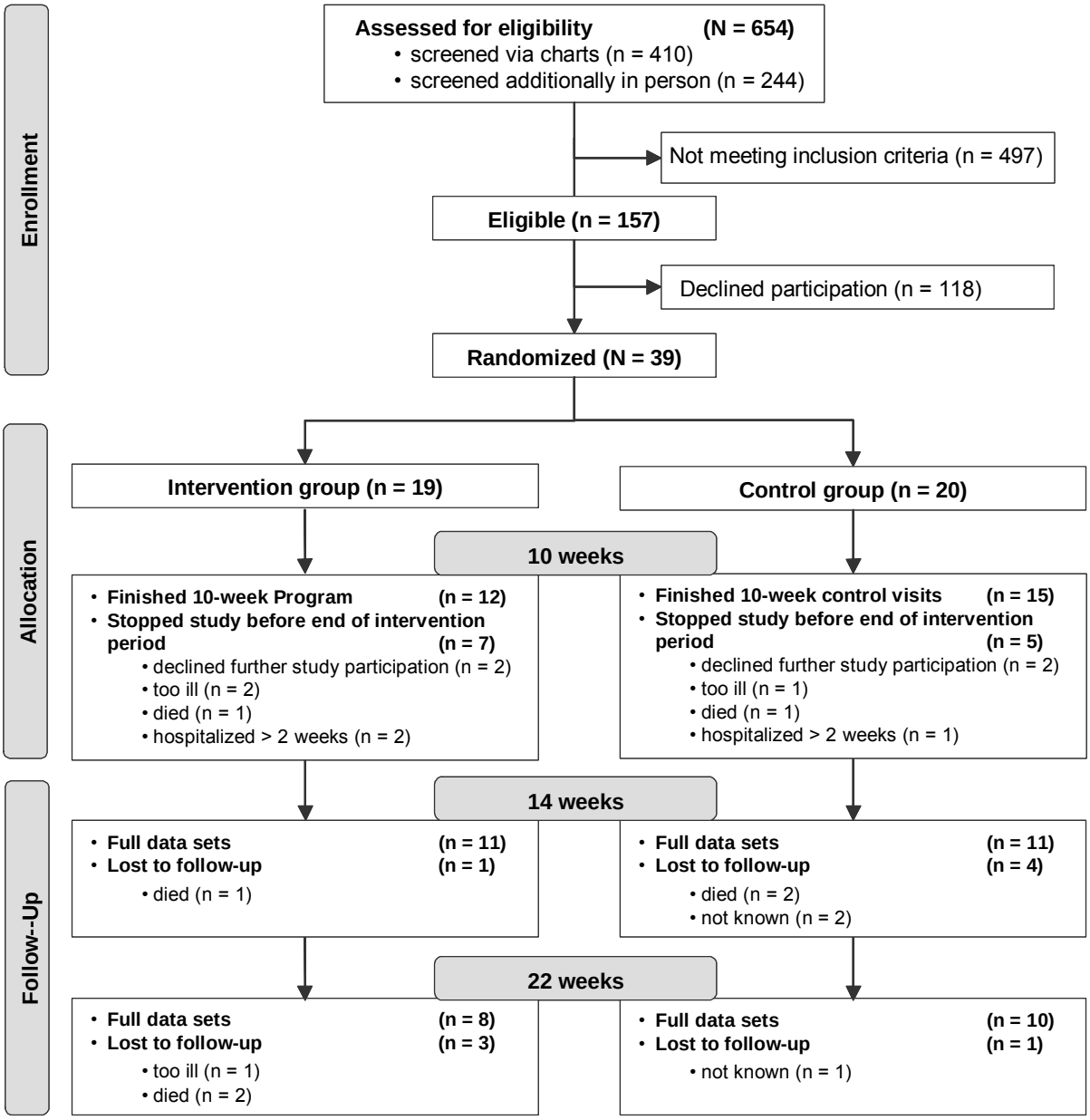
whether changes in pain, knowledge, opioid intake, and the item “The pain has hindered me to do the things I wanted to do today” that occurred over time differed between the two groups by adding a group by time interaction term into the equation. Anxiety, depression, fatigue, functional status, number of symptoms, and self-efficacy scores were controlled for in these analyses.

In order to gain further insights on specific aspects of some outcomes, changes in ratings of single items of the PPQ were explored descriptively. In addition, self-efficacy was investigated as outcome variable, using a linear mixed model approach that controlled for anxiety, depression, fatigue, functional status, and number of symptoms.

Results

Of the thirty-nine patients (n = 19 in the IG, n = 20 in the CG) who were included in the study from July 2009 until December 2010 (recruitment rate = 25%), 27 patients completed the 10-week intervention and 18 patients completed the 22-week study period (Figure 1). Twenty-one patients (n = 11 in the IG, n = 10 in the CG) did not complete the entire study for a variety of reasons, including increased severity of illness or hospitalization. Patients who did not complete the study were more likely to have lung cancer ($p = 0.02$); were receiving fewer chemotherapeutic regimens ($p = 0.003$); and had a lower baseline functional status ($p = 0.04$) than those who finished the 22-week study period. The percentage of patients who did not complete the entire study did not differ significantly by treatment group (i.e., 44% for the IG and 55% for the CG; $p = 0.43$). Baseline demographic and clinical characteristics of the patients in the IG and CG are summarized in Table 1. No significant differences were found in any of the demographic or clinical characteristics between patients in the two groups or between the patients who dropped out of the IG and CG.

Figure 1: Flow of Participants During Course of the Study[a]



[a] Figure derived from: Koller A, Miaskowski C, de Geest S, Opitz O, Spichiger E. Supporting oncology patients' pain self-management: Methods and lessons learned from a randomized controlled pilot study. Eur J Oncol Nurs, in press.

Table 1: Demographic and Clinical Characteristics of Patients in the Intervention and Control Groups

Demographic and clinical characteristics	PRO-SELF Plus© (n = 19)	Control (n = 20)	p
Age in years; mean (SD)	60.5 (11.1)	58.5 (10.8)	0.65
Men / women; n	9 / 10	11 / 9	0.44
Living alone; n	5	3	0.32
Participation of family caregiver; n	6	3	0.15
Highest school education; n			
Elementary school (≈ 9 years)	10	11	
High school (≈ 10 years)	2	1	0.97
University entrance diploma (≈ 12-13 years)	7	8	
Highest professional education; n			
None	2	0	
Vocational training	11	12	
University	5	5	0.37
Other	1	2	
Missing	0	1	
Cancer diagnosis; n			
Lung	6	6	0.92
Breast	3	5	0.48
Other	10	9	0.58
Months since diagnosis; mean (SD) Median (25/75 percentiles, range)	43.1 (44.6) 29 (9/71, 1-151)	54.85 (91.0) 18(6/52,1-313)	0.47
Therapeutic goal; n; curative / palliative	0 / 19	2 / 18	0.26
Current anticancer therapy; n[a]			
Chemotherapy	6	8	0.42
Radiotherapy	11	11	0.56
Steroids	3	8	0.09
Bisphosphonates	11	11	0.64
Functional status[b]; mean (SD)	1.74 (0.8)	1.85 (0.9)	0.71
Cognition; n			
Age appropriate cognition	10	6	
Slight cognitive impairment	2	2	0.26
Dementia suspected	1	0	
Declined test	6	12	0.08
Number of cancer-related symptoms; mean (SD)	14.21 (6.4)	14.17 (6.2)	0.73
Fatigue[c]**;** median (25/75 percentile)	35.5 (20.8/47.3)	37.0 (30.0/44.0)	0.71
HADS anxiety score[d]**;** mean (SD)	6.6 (3.5)	6.7 (4.5)	0.91
HADS depression score[e]**;** mean (SD)	7.9 (3.3)	7.8 (3.4)	0.88

SD = standard deviation; p = p-value; HADS = Hospital Anxiety and Depression Scale;

[a] Not all patients received anticancer treatment

[b] Scores can range from 0 = fully active to 4 = completely disabled

[c] Scores can range from 0 to 60 with higher scores representing more fatigue

[d] Scores can range from 0 to 21 with higher scores representing more anxiety

[e] Scores can range from 0 to 21; patients scoring > 10 on the depression scale are considered to suffer from a depressed mood

Pain scores. Effect size calculations showed that on the 0 to 10 NRS at week 10, the mean difference of change between the IG and the CG was -0.55 (95% CI: -2.31/1.20; Cohen's d = -0.26) for average pain and -0.73 (95% CI: -2.74/1.28; Cohen's d = -0.29) for worst pain. At week 22, the mean difference of change between the IG and the CG was -0.51 (95% CI: -1.95/0.94; Cohen's d = -0.35) for average pain and -0.47 (95% CI: -2.81/1.87; Cohen's d = -0.20) for worst pain. Weekly mean pain scores are shown in Table 2. Neither average nor worst pain scores demonstrated statistically significant group by time interaction effects between the IG and the CG over the 10-week intervention period (p = 0.48 / p = 0.60) or over the 22-week study period (p = 0.89 / p = 0.90).

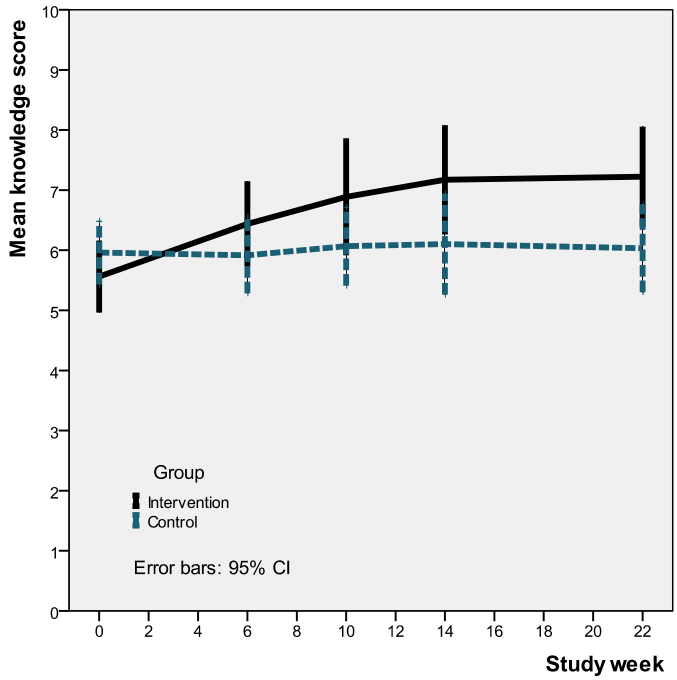
Table 2: Weekly Mean Scores of Average and Worst Pain Intensity, Pain-Related Knowledge, Analgesic Intake, and Self-Efficacy in the Intervention and Control Groups

Week		Baseline	6	10	14	22
N	IG CG	19 / 20	15 / 17	12 / 15	11 / 11	8 / 10
Mean average pain (SD)	IG	3.80 (2.01)	2.58 (1.73)	2.54 (1.87)	2.74 (1.59)	2.60 (2.21)
	CG	4.18 (1.79)	2.66 (1.89)	2.98 (2.31)	2.42 (1.84)	2.81 (2.07)
Mean worst pain (SD)	IG	5.07 (2.48)	3.31 (2.04)	3.23 (2.37)	3.51 (2.18)	3.56 (3.14)
	CG	5.75 (2.00)	3.49 (2.26)	4.09 (2.66)	3.44 (2.25)	4.20 (2.67)
Mean pain-related knowledge (SD)	IG	5.56 (1.24)	6.44 (1.34)	6.89 (1.53)	7.17 (1.35)	7.22 (1.00)
	CG	5.96 (1.13)	5.91 (1.19)	6.07 (1.19)	6.10 (1.25)	6.03 (1.02)
Total ME (25/75 Percentile)	IG	13.0 (10.0/30.0)	10.0 (5.4/75.0)	6.7 (3.3/60.0)	20.0 (5.0/46.7)	20.0 (1.7/26.7)
	CG	20 (3.8/46.7)	20.0 (3.3/30.0)	16.7 (5.0/30.0)	26.7 (7.9/70.0)	33.3 (6.7/70.0)
Median ATC ME (25/75 Percentile)	IG	20 (10.0/60.0)	10.0 (6.7/60.0)	20.0 (5.0/106.0)	20.0 (5.0/40.0)	20.0 (1.7/26.6)
	CG	23.3 (7.5/69.6)	20.0 (13.3/40)	26.6 (10.0/70.0)	30.0 (20.0/70.0)	51.7 (13.3/107.5)
Median PRN ME (25/75 Percentile)	IG	0.0 (0.0/13.3)	1.7 (0.0/26.7)	5.0 (0.8/41.7)	6.7 (0.0/160.0)	0
	CG	3.5 (0/6.7)	1.3 (0.0/5.0)	3.3 (0.0/5.0)	1.7 (1.25/3.3)	1.7 (0.4/1.7)
Median SEQ[a] (25/75 Percentile)	IG	57.7 (46.7/66.3)	69.3 (56.0/86.7)	68.3 (58.5/82.7)	67.3 (59.3/75.3)	70.0 (59.2/85)
	CG	59.3 (52.0/64.7)	63.3 (52.0/73.0)	70.0 (61.3/77.3)	68.7 (53.3/75.5)	64.3 (54.2/78.7)

IG = Intervention group; CG = control group; SD = standard deviation; ATC = around the clock;
ME = daily intake morphine equivalence in mg / day; PRN = as needed; SEQ = Self-Efficacy Questionnaire
[a] Scores can range from 10 to 100

Secondary outcomes. As shown in Figure 2, the group by time interaction effect of knowledge scores was statistically significant at 10 weeks ($p = 0.04$) and at 22 weeks ($p < 0.01$). In the IG knowledge scores improved by approximately 24% at week 10 and approximately 30% at week 22 (mean improvement CG: 2% at week 10 and 1% at week 22). Even though inferential statistics could not be performed to evaluate each item separately because of the small sample size, a detailed descriptive evaluation of the nine items of the PPQ revealed that the significant effect was most probably due to three items: fear of addiction (week 10 IG: 17% improvement, CG: 0% improvement; week 22 IG: 26% improvement, CG: 40% reduction); patients' awareness that analgesic medication should be taken on a regular basis (week 10 IG: 69% improvement, CG: 13% reduction; week 22 IG: 57% improvement, CG: 1% improvement); and the belief that patients are often given too much pain medication (week 10 IG: 8% improvement, CG: 4% improvement; week 22 IG: 24% improvement, CG: 4% reduction).

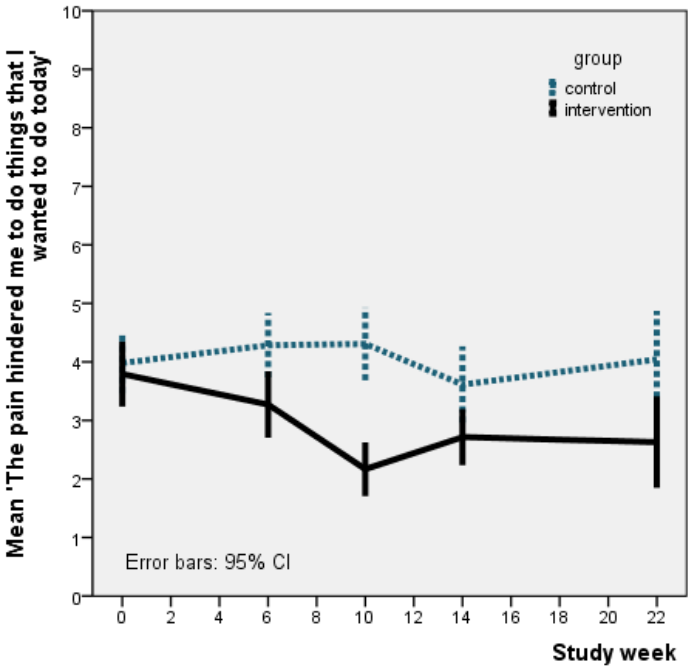
Figure 2: Changes Over Time in Mean Knowledge Scores in the Intervention and Control Groups. Values Are Plotted as Means and 95% Confidence Intervals.



Scores of the other secondary outcomes are shown in Table 2. No significant group by time interaction effect was found in the total daily dose of opioid analgesic between patients in the IG and the CG at week 10 ($p = 0.13$) and week 22 ($p = 0.87$). The item "The pain hindered me to do the things that I wanted to do today" showed a significant group by time interaction effect between the IG and the CG until week 10 ($p = 0.02$) but the effect was

not sustained until week 22 (p = 0.19; Figure 3). No significant group by time interaction effect was found in self-efficacy scores between patients in the IG and the CG at week 10 (p = 0.21) and week 22 (p = 0.21).

Figure 3: Changes Over Time in Mean Scores for the Intervention and Control Groups of the Item: "The Pain Hindered Me to Do the Things That I Wanted to Do". Values Are Plotted as Means and 95% Confidence Intervals.



Discussion

This pilot RCT is the first study in which a cancer pain self-management intervention developed in the U. S. was transferred and tested in a German population. Effect sizes for average and worst pain were slightly lower in this pilot RCT than those found in the previous PRO-SELF© RCT[10] and a recent meta-analysis on cancer pain self-management interventions[9]. However, all effect sizes in this pilot RCT must be interpreted with caution because of the small sample size.

To further explore the intervention's effect, secondary outcomes were evaluated in this pilot RCT. For patients' pain management related knowledge, the group by time interaction effect was a statistically significant improvement of approximately 20% at week 10 and nearly 30% at week 22. Compared with findings from the previous PRO-SELF© RCT in the U. S., initial knowledge scores were slightly lower in the German sample (total PPQ score at enrollment: 6.83 [SD ≈ 1.5] versus 5.76 [SD ≈ 1.19])[28]. In accordance with the previous PRO-SELF© RCT, patients' knowledge increased regarding the need to take their

analgesics on a fixed schedule. This item requires a change in the patients' behavior[6] and was the focus of the nurse coaching in the IG. Furthermore, in both studies, patients' general fear of taking too much analgesic medication decreased which suggests that this topic was addressed adequately in the IG. Patients' belief in the efficacy of alternative treatments (e.g., heat, relaxation) did not improve in both studies indicating that more emphasis may have been put on analgesics within both interventions. In this pilot RCT, fear of addiction improved greatly, while it did not improve in the U. S. study. In contrast, in the U. S. study, scores for fear of tolerance, physical dependence, and that analgesics can often interfere with breathing were improved, while they were not in this pilot RCT. These differences may indicate a need to focus more intensely on these barriers in the German PRO-SELF© Plus PCP. For example, according to social cognitive theory[16], fear of tolerance might be improved by addressing it more often in the day-to-day context of the patients' analgesic regimen. On the other hand, German patients may be more reluctant to take analgesic medications compared to the U. S. population[29].

The PPQ's low Cronbach's α in this study may be due to the small sample. However, it may reflect that patients' knowledge increased in only three of the items while it was unchanged in the others. Further confirmatory statistical testing was not performed because of the small sample size. However, in a larger German study, psychometric properties of the German PPQ need to be re-evaluated.

The median daily opioid dose for patients with cancer pain was 60 mg[30]. Patients in the IG of this pilot study took lower daily doses of opioids across the entire study (i.e., median doses ranged from 6.7 to 20 mg across the study period). Consistent with previous reports[30,31], a wide range of 0 to 666 mg daily opioid intake was found and a strong right skewness of the data indicated that a few patients were taking very high doses while most patients were taking relatively low doses of opioid analgesics for their cancer pain.

Baseline daily opioid intake in this study was comparable to the previous PRO-SELF© study[10]. In contrast to the previous PRO-SELF© study in the U. S., daily opioid intake did not increase over time for patients in the IG despite high pain intensity scores. It is not entirely clear why patients in the IG did not increase their daily analgesic intake. In the larger RCT, the nurse coaching component about patients' communication with the physicians about their analgesic regimen needs to be reinforced to assist patients to obtain and take a dose of analgesic medication that will provide improved pain relief.

Surprisingly, the group by time interaction effect for the item “The pain hindered me to do the things I wanted to do today” was significant during the intervention period. One possible explanation is that with the item, two aspects of individual goal setting were evaluated. First, in accordance with Bandura[16], patients seemed to be coached effectively by the intervention nurse to set meaningful, achievable goals. This coaching may have helped them set realistic priorities for what was really important for them to achieve during the next week. Second, patients were coached to use feasible strategies to achieve these goals. This approach warrants additional testing in the larger RCT.

Changes in patients’ self-efficacy may be one potential mediator to reduce pain with self-management interventions[32]. In this study, self-efficacy scores at enrollment were comparable to scores reported by patients with lung and prostate cancer[27,33,34]. While self-efficacy scores did not change in this pilot RCT, this concept warrants evaluation in larger studies because improvements in self-efficacy were found in another study of cancer pain self-management[35]. In a larger RCT, the potential to provide patients with a positive sense of mastery of their pain, (e.g., verbal persuasion)[16] should be reinforced during the intervention. During coaching sessions, the intervention nurse could target barriers to effective pain management more intensely.

This pilot RCT has several limitations. Most importantly, findings need to be interpreted with caution given the small sample size. In addition, in this study, recruitment and retention was challenging. A low number of eligible patients (25%) agreed to participate in the study (Figure 1) which suggests that recruitment procedures need to be modified. Furthermore, even though the planned sample size for this pilot study included an attrition rate of 30% based on findings from previous studies[10,36], the attrition rate was higher than expected (31% at 10 weeks, 54% at 22 weeks [Figure 1]). An analysis of drop-outs showed that patients who did not finish the study were more ill than those who were retained. However, these patients and their FCs might benefit most from an intervention that is designed to reduce cancer pain. Measures to retain fragile patients in a study need to focus on the reduction in respondent burden[37]. This approach may help to balance attrition because of deterioration with the retention of patients who are most in need of self-management support.

Furthermore, in this pilot study, one could not evaluate whether the low opioid intake was due to patients' lack of adherence with the intervention or because physicians did not adapt the analgesic prescription. In future studies, two additional outcome measures warrant consideration, assessment of patients' adherence with the intervention as recommended in a recent exploratory review[38] and an assessment of the appropriateness of the patient's analgesic regimen as suggested in a previous study[39].

Conclusions

This pilot RCT is the first to adapt and demonstrate the feasibility of an intervention that supports cancer pain self-management that was developed in the U. S. for a German health care system. Pain self-management related knowledge was significantly improved and effect sizes for pain intensity scores were established. Findings from this pilot RCT provide the basis for the planning and execution of a larger RCT.

Acknowledgements

We thank all patients and FCs who participated in this pilot study. Furthermore, we thank all clinicians who were involved in this pilot study. In addition, we thank the study nurses and our statistician, Dr. Kris Denhaerynck.

Conflict of interest statement

The authors do not have any conflicts of interest to report.

Funding source

This research was supported by unrestricted grants of the Ebnet Foundation, Parrotia Foundation, Stiftung zur Krebsbekämpfung, and Hans-H. Hasbargen GmbH & Co.KG. Dr. Miaskowski is supported by grants from the National Cancer Institute, the National Institute of Nursing Research, and the American Cancer Society.

References

1. Spichiger E, Mueller-Froehlich C, Denhaerynck K, et al. Prevalence of symptoms, with a focus on fatigue, and changes of symptoms over three months in outpatients receiving cancer chemotherapy. Swiss Med Wkly, DOI: w13303.
2. Breivik H, Cherny N, Collett B, et al. Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. Ann Oncol 2009;20:1420-1433.
3. Mercadante S. Why are our patients still suffering pain? Nat Clin Pract Oncol 2007;4:138-139.
4. Ferrell BR, Rhiner M, Ferrell BA. Development and evaluation of the family pain questionnaire. J Psychosoc Oncol 1993;10:21-35.
5. Ward SE, Goldberg N, Miller-McCauley V, et al. Patient-related barriers to management of cancer pain. Pain 1993;52:319-324.
6. Valeberg BT, Hanestad BR, Klepstad P, et al. Cancer patients' barriers to pain management and psychometric properties of the Norwegian version of the Barriers Questionnaire II. Scand J Caring Sci 2008;epub ahead of print
7. Schumacher KL, Koresawa S, West C, et al. Putting cancer pain management regimens into practice at home. J Pain Symptom Manage 2002;23:369-382.
8. Valeberg BT, Miaskowski C, Hanestad BR, et al. Prevalence rates for and predictors of self-reported adherence of oncology outpatients with analgesic medications. Clin J Pain 2008;24:627-636.
9. Bennett MI, Bagnall AM, Jose Closs S. How effective are patient-based educational interventions in the management of cancer pain? Systematic review and meta-analysis. Pain 2009;143:192-199.
10. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.
11. West CM, Dodd MJ, Paul SM, et al. The PRO-SELF(c): Pain Control Program--an effective approach for cancer pain management. Oncol Nurs Forum 2003;30:65-73.
12. Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. JAMA 1990;263:549-556.

13. Miaskowski C, Dodd M, West C, et al. The use of a responder analysis to identify differences in patient outcomes following a self-care intervention to improve cancer pain management. Pain 2007;129:55-63.

14. Dodd M, Janson S, Facione N, et al. Advancing the science of symptom management. J Adv Nurs 2001;33:668-676.

15. Humphreys J, Lee KA, Carrieri-Kohlmann V, et al. Theory of symptom management. In Smith MJ, Liehr PR (eds): Middle Range Theory for Nursing. New York, Springer, 2008, pp 145-158.

16. Bandura A. Self-efficacy mechanisms in psychological activation and health promoting behavior. In Madden J, Matthysse S, Barchas (eds): Adaptation, learning and affect. New York, Raven Press, 1989, pp 1-51.

17. Jones PS, Lee JW, Phillips LR, Zhang XE, Jaceldo KB. An adaptation of Brislin's translation model for cross-cultural research. Nurs Res 2001;50:300-304.

18. Quigley C. Opioid switching to improve pain relief and drug tolerability. Cochrane Database Syst Rev 2004:CD004847.

19. Herrmann C, Buss U, Snaith RP. HADS-D Hospital Anxiety and Depression Scale - Deutsche Version. Ein Fragebogen zur Erfassung von Angst und Depressivität in der somatischen Medizin. Testdokumentation und Handanweisung [HADS-D Hospital Anxiety and Depression Scale - German Version. A questionnaire to assess anxiety and depression in somatic medicine. Test documentation and manual]. Bern, Huber., 1995.

20. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand 1983;67:361-370.

21. Portenoy RK, Thaler HT, Kornblith AB, et al. The Memorial Symptom Assessment Scale: an instrument for the evaluation of symptom prevalence, characteristics and distress. Eur J Cancer 1994;30A:1326-1336.

22. Glaus A, Muller S. Messung der Müdigkeit bei Krebskranken im Deutschen Sprachraum: Die Entwicklung des Fatigue Assessment Questionnaires [Measuring fatigue of cancer patients in the German-speaking region: development of the Fatigue Assessment Questionnaire]. Pflege: Die wissenschaftliche Zeitschrift für Pflegeberufe 2001;14:161-170.

23. Kalbe E, Kessler J, Calabrese P, et al. DemTect: A new, sensitive cognitive screening test to support the diagnosis of mild cognitive impairment and early dementia. Int J Geriatr Psychiatry 2004;19:136-143.

24. Kessler J, Calabrese P, Kalbe E, Berger F. DemTect: A new screening method to support diagnosis of dementia. Psycho 2000;26:343-347.

25. Eastern Cooperative Oncology Group. ECOG Performance Status, 1998, retrieved August 22nd, 2011, from http://ecog.dfci.harvard.edu/general/perf_stat.html.

26. Keefe FJ, Ahles TA, Porter LS, et al. The self-efficacy of family caregivers for helping cancer patients manage pain at end-of-life. Pain 2003;103:157-162.

27. Porter LS, Keefe FJ, Garst J, McBride CM, Baucom D. Self-efficacy for managing pain, symptoms, and function in patients with lung cancer and their informal caregivers: associations with symptoms and distress. Pain 2008;137:306-315.

28. Kim JE, Dodd M, West C, et al. The PRO-SELF pain control program improves patients' knowledge of cancer pain management. Oncol Nurs Forum 2004;31:1137-1143.

29. Larsen J, Stovring H, Kragstrup J, Hansen DG. Can differences in medical drug compliance between European countries be explained by social factors: analyses based on data from the European Social Survey, round 2. BMC Public Health 2009;9:145.

30. Zech DF, Grond S, Lynch J, Hertel D, Lehmann KA. Validation of World Health Organization guidelines for cancer pain relief: a 10-year prospective study. Pain 1995;63:65-76.

31. Knudsen AK, Brunelli C, Kaasa S, et al. Which variables are associated with pain intensity and treatment response in advanced cancer patients?--Implications for a future classification system for cancer pain. Eur J Pain 2011;15:320-327.

32. Bandura A, O'Leary A, Taylor CB, Gauthier J, Gossard D. Perceived self-efficacy and pain control: opioid and nonopioid mechanisms. J Pers Soc Psychol 1987;53:563-571.

33. Campbell LC, Keefe FJ, McKee DC, et al. Prostate cancer in African Americans: relationship of patient and partner self-efficacy to quality of life. J Pain Symptom Manage 2004;28:433-444.

34. Porter LS, Keefe FJ, McBride CM, et al. Perceptions of patients' self-efficacy for managing pain and lung cancer symptoms: correspondence between patients and family caregivers. Pain 2002;98:169-178.

35. Keefe FJ, Ahles TA, Sutton L, et al. Partner-guided cancer pain management at the end of life: a preliminary study. J Pain Symptom Manage 2005;29:263-272.

36. Berger AM, Neumark DE, Chamberlain J. Enhancing recruitment and retention in randomized clinical trials of cancer symptom management. Oncol Nurs Forum 2007;34:E17-22.

37. Puts MT, Monette J, Girre V, et al. Participation of older newly-diagnosed cancer patients in an observational prospective pilot study: an example of recruitment and retention. BMC Cancer 2009;9:277.

38. Jacobsen R, Moldrup C, Christrup L, Sjogren P. Patient-related barriers to cancer pain management: a systematic exploratory review. Scand J Caring Sci 2009;23:190-208.

39. de Wit R, van Dam F, Loonstra S, et al. The Amsterdam Pain Management Index compared to eight frequently used outcome measures to evaluate the adequacy of pain treatment in cancer patients with chronic pain. Pain 2001;91:339-349.

Chapter 7

A Qualitative Substudy of Patients‘ Experiences of a Self-Management Intervention for Cancer Pain and Participation in a Randomized Controlled Pilot Study

Introduction

In spite of effective treatment options, more than 40% of cancer patients do not receive adequate pain management[1-3]. Besides system- and clinician-related barriers, patient-related barriers impede effective pain management[4]. These patient-related barriers include several components[5,6]: Cognitive barriers refer to oncology patients' concerns about analgesic use, communication with treating clinicians, and pessimistic beliefs about the possibility of adequate pain control. Affective barriers relate to patients' emotional changes, such as depression, anxiety, or stress. Sensory barriers refer to distressing side effects of analgesic treatment (e.g., constipation)[5]. Finally, practical barriers can hinder effective pain management because patients and their family caregivers (FCs) need to acquire and process a complex array of knowledge and skills (i.e., how to obtain, take, and titrate various analgesic medications, deal with side effects, and what to do if pain is not relieved)[6].

While several interventions designed to support cancer pain self-management have shown potential to reduce pain intensity, the effects were moderate. Heterogeneity in study and intervention procedures may have weakened the results[7]. Until now, it remains unclear which components of pain self-management interventions for oncology patients are effective[7-10]. Furthermore, only two studies were found in which the patients' perspectives regarding interventions that support pain self-management were evaluated[6,11]. In both qualitative studies, patients and their FCs had difficulties dealing with the complex processes involved in pain self-management. In addition, patients reported that problem solving is a process that takes place over time and needs support from clinicians. However, these studies did not explore how patients and FCs experienced support from clinicians.

The German PRO-SELF© Plus pilot randomized controlled trial (RCT)[12,13] provides an opportunity to close this gap. Furthermore, the patients' perspective is an essential component to assess feasibility of study and intervention procedures which was one of the aims of the German PRO-Self© Plus pilot study.

With the pilot study, the German PRO-SELF© Plus Pain Control Program (PCP), an intervention that was designed to support cancer pain self-management was tested for the first time in a German population. The PRO-SELF© PCP demonstrated efficacy for pain reduction in a large RCT in the United States with 174 oncology outpatients and their FCs[14]. The refined version of the Program, the PRO-SELF© Plus PCP[6,15,16] was translated and adapted for the German health care context and then tested for effect sizes and feasibility in a Comprehensive Cancer Center in Southern Germany.

For the German PRO-SELF© Plus PCP pilot RCT, a convenience sample of 39 (n = 19 intervention, n = 20 control) adult oncology outpatients with pain ≥ 3 on a 0 (no pain) to 10 (worst pain imaginable) numeric rating scale, and 8 FCs (n = 4 intervention, n = 4 control) was recruited from July 2009 until December 2010. Patients were recruited if they had an estimated life expectancy of > 6 months, were reachable by phone and within a one hour car ride, were able to read and write German, and provided written informed consent. FCs were included if they were actively involved in the patient's pain self-management. Patients were excluded if they had an actively involved FC who did not want to participate in the study. Furthermore, patients were excluded if they had neuropathic pain or were hospitalized > 2 weeks during the study. The study was approved by the local ethics committee. All patients provided written informed consent.

The German PRO-SELF© Plus PCP consisted of 6 visits and 4 phone calls over ten weeks. These visits were performed by AK who was specially trained to provide the intervention. The Program was based on three key strategies (i.e., provision of information, skills building, and nurse coaching) and consisted of structured and tailored components. For data collection, patients needed to complete a set of questionnaires in addition to the daily pain diary one week prior to the first intervention visit and at 6, 10, 14, and 22 weeks.

Because patients and their FCs are essential partners in pain management and patient-related barriers can hinder optimal pain control, it is vital to assess patients' views of and experiences with the implementation of a study designed to test a self-management intervention in oncology outpatients and their FCs. The purpose of this qualitative substudy was to explore patients' and FCs' experiences with their pain management, with the educational intervention, and their view of burden and benefit from study participation.

Methods

Design. In this study, a qualitative approach was used because it allows for the exploration of subjective views and experiences. The rule-governed method of content analysis according to Mayring[17] was used in this substudy to systematically summarize and structure the data.

Sample and recruitment. Twelve patients and 4 FCs finished the intervention. The first five of these patients were asked at the last visit whether they would agree to take part in a debriefing interview. Subsequently, five additional patients were selected purposefully to achieve a heterogeneous sample regarding age, living conditions, and pain situation. Additional informed consent was obtained from those patients and FCs who agreed to take part in the interview.

One of the 10 patients who were asked to participate did not participate in the debriefing interview because she went on vacation for the two weeks after the intervention. Therefore, debriefing interviews were conducted with 9 patients and 4 FCs. The mean age of the patients was 52 (SD = 8.4) years and median time since diagnosis was 37 months (25/75 percentile = 18.5/100.5 months). Five patients were male, 2 patients lived alone, and 7 were married. Two patients had lung cancer, three breast cancer, one colon cancer, one renal cell cancer, one bladder cancer, and one had a malignant melanoma. Patients were employed in a variety of professions (e.g., truck driver, pastry chef, teacher, engineer). Mean average pain at enrollment was 4.2 (SD = 1.96) on a scale from 0 (no pain) to 10 (worst pain imaginable). Mean average pain at the end of the intervention was 2.3 (SD = 1.59). However, two patients had average pain levels above 4 at week 10. Mean worst pain at enrollment was 5.8 (SD = 2.0). At 10 weeks, it had decreased to 3.1 (SD = 2.26). At inclusion, 7 patients had an ECOG performance status[18] score of 1 (i.e., only slight restrictions in functional status). One patient had an ECOG score of 2 (i.e., able of self-care but not able to work, confined to bed < 50% of daytime) while one patient had a score of 3 (confined to bed > 50% of daytime). After the intervention, the ECOG score was 1 for four patients and 2 for five patients.

Of the FCs, three were female, one was male. All FCs were married to and lived together with the patient. Mean age of the FCs was 50.8 years (SD = 13.4). All FCs had nine to ten years of education and vocational training.

Data collection. Interviews were conducted in the patients' homes by two trained nurses who were not the intervention nurse within two weeks after the completion of the intervention. The nurses followed a semi-structured interview guide with open-ended

questions about the patients' and FC's experiences with the study and intervention procedures. Participants were invited to talk freely. While all patients and one FC actively took part in the discussion, 3 FCs remained relatively silent or affirmed information given by the patient. The interviews lasted between 10 and 55 minutes. Interviews were recorded and transcribed verbatim. During the study, ESp read transcribed interviews, discussed content and technique with the nurses, and added new topics to the interview guide for subsequent interviews. Demographic and clinical data were collected as part of the pilot RCT.

Data analysis. Interviews were analyzed using content analysis as described by Mayring[17]. The analysis included several steps. First, original data were paraphrased to a homogeneous linguistic level. Second, in two steps, passages were generalized and reduced to obtain short phrases that reflected the original texts as authentically as possible and identical phrases were summarized. Third, data were grouped systematically so that emerging topics were reflected. Finally, these themes were checked against the original data. The analysis was mainly performed by AK; in order to improve the rigor of the analysis each step was critically reviewed by ESp and discussed with AK until consensus was reached.

Results

Asked about their experiences with the intervention and study procedures, patients and FCs reflected on their prior experience with pain self-management and how the intervention and procedures had influenced their pain self-management. Patients' attached great importance to the atmosphere created and the trust in a patient-clinician relationship as well as to the intervention's focus on their pain self-management. Furthermore, patients reflected on their view of burden and benefit that came with taking part in the study and how cancer pain self-management support may be realized for themselves after the study and for other patients in the future.

Previous experiences with pain and its treatment. During the interviews, several patients reflected on their pain and pain self-management. Both positive and negative experiences were compared to experiences during the intervention. All patients had experienced pain for some time prior to enrollment. For some patients, pain was controlled before the study. However, most patients experienced inadequate pain managements. Patients remembered that pain had interfered with their daily life, sleep, emotional well-being, and quality of life. "For weeks, I ran around with the pain, could barely walk. … It wears you down." For some patients, pain was occasionally so bad that they did not want to live anymore. "Pain can sometimes make you say: 'Now I actually don't want to live anymore'."

Regarding previous experience with pain self-management, only one patient expressed that years of experience with cancer pain had made him proficient in the effective use of analgesics and other methods of pain management. "After so many years, I knew what painkillers can do for me." However, several patients described that they felt very insecure about pain self-management and were unable to get their pain under control. "You can neither get a grip on it by yourself… and so it (the pain) goes up and down."

In this context, patients contemplated their previous experiences with pain management by their physicians. Despite the latter's advice to take the prescribed analgesics or increase the dose of their analgesics, patients did not change their behaviors. "From the beginning, the dosage of my medication was adjusted too low. The physician told me to take more, but I did not do so." Only one patient said that adherence to her physicians' analgesic prescriptions had worked well for her. "I took the pills as they had prescribed them and that worked out perfectly." On the other hand, questions regarding this patient's pain medication were not answered adequately by another physician who was involved in her pain treatment. "When I got radiation therapy in X, I once asked this doctor about these pills and she said: 'All of them are painkillers, you have to do this by yourself'."

Experiences with the intervention. When patients were asked how they had experienced the intervention, they reflected whether their expectations were met by taking part in the study; what they learned during the intervention; who else was involved in their pain self-management during the intervention; the adequacy of the visits' and phone-calls' form; and the value of print materials.

Were patients' expectations met? Pain reduction and a gain in knowledge about pain management were stated as patients' primary expectations for the intervention. All but one patient said that they had experienced a significant reduction in pain during the intervention while two patients experienced new pain episodes immediately after the intervention.

All of the patients, even the one who did not experience adequate pain control, expressed high satisfaction with the Program. "The Program was ingenious." Furthermore, all patients and FCs stated that they benefited greatly from the study because they had learned so much about pain and its treatment. "It was very useful for me because I learned a lot out of it."

What did patients learn? According to the patients, the intervention addressed their analgesic medications and side effects; their concerns and attitudes towards pain self-management; and how to apply strategies in daily life. Patients said that in the beginning,

the intervention seemed intense, complex, and challenging. "In the beginning, it was all Greek to me." "I found it (the Program) very intense." At the end of the intervention, patients felt well informed and more secure with their pain self-management. "It provides a sense of security if you can discuss or experience it (pain self-management)."

Patients particularly appreciated that the intervention was tailored to their current situation, needs, and concerns. "It is tailored for each patient individually depending on his disease and his pain." Furthermore, the intervention nurse was present and answered every question that arose until no further questions remained. "You're not left to your own." "Everything that I wanted to know was explained."

Patients recalled information about their analgesics. All patients had internalized taking analgesics according to a fixed schedule in order to obtain adequate blood levels of the medication. "I learned for example that you actually build up a level … I have developed a routine now to take pills regularly." In addition, patients and FCs felt comfortable that they had learned how to titrate their medications to meet individual needs and circadian pain patterns. "It gives you a certain latitude." Patients felt secure enough to increase their pain medication in line with their prescription during acute pain episodes. With little pain, patients had learned to taper their analgesics slowly while self-monitoring pain. "That you (if analgesics are reduced) do not omit too much at once; if you slowly taper and test if pain becomes worse or not."

Patients mentioned that they needed repeated encouragement by the intervention nurse to take their prescribed analgesics and that the coaching helped them to overcome concerns like fear of addiction or tolerance. "This is where Mrs. K. has always supported me and said that I can really take it and that it's no problem … and that was good to hear because sometimes I was afraid of it."

Although several patients had not experienced side effects from their analgesics, they felt very well informed about side effects such as fatigue, gastric disorders, or constipation. "We always discussed the side effects and she has given several pieces of advice." Some patients mentioned opioid-induced constipation as debilitating but that the Program had helped to alleviate this side effect. "Because the hard stools were attributable to the medications, I actually had an additional alleviation of my pain when I had a bowel movement … And that was what she had recommended."

Patients particularly valued support to implement pain self-management in daily life. They appreciated that the intervention nurse discussed options about the "how-to" application of self-monitoring and analgesic intake in specific situations during daily life. "It

is good if someone tells you how it is done." In this context, the weekly pillbox organizer was mentioned as a helpful tool.

Who was involved and how? Patients and FCs mentioned the role of the intervention nurse in effective self-management support; the need for physician involvement; and compared the physician's and the intervention nurse's roles in pain management. Furthermore, they reflected on their own contribution to their pain management, and that of their FCs.

Patients and FCs emphasized important skills and attitudes of the intervention nurse. First, the intervention nurse embodied and demonstrated profound knowledge and expertise regarding pain self-management "It is an advantage to know that someone is sitting in front of you who is knowledgeable about what she says. Someone who can also give tips and tricks." Second, the intervention nurse focused in detail on self-management topics directly related to their daily life. "Then I was glad that Mrs. K. said: ‚OK, we are doing it this way, … and I would do this like that'." "I had the feeling that she is knowledgeable about the situation, that she very well understands the patient's and family's current disease-related situation." Third, the intervention nurse created an atmosphere of trust by showing a pleasant, understanding, and caring attitude and that she had enough time and patience to answer all questions. "I know that she fully supports it. You could really sense that. Time was also never a problem. Thus I received so much help. That really did me good." Participants frequently missed these three aspects in routine treatment by physicians.

During the intervention, patients and FCs appreciated if their analgesic treatment was coordinated between both their physicians and the intervention nurse. "It was good that we adjusted the pills and drops again with the doctor." It was particularly reassuring for patients if the information that they had gained from their treating physician was repeated and confirmed by the intervention nurse. "Mrs. K. said that I really may take it (analgesic medication) and that it is no problem and that was the same what the doctors had told me, but it was a relief that she could give me additional support to that."

Regarding their own contribution, patients stated that participation in the intervention required openness and the willingness as well as the ability to learn new things. "If you start something new or hear something new, it is a new learning process each time in which you really have to engage." Furthermore, FCs and patients agreed that cancer pain affected the family as a whole, that it was important for the FC to understand the patient's situation, and that FCs greatly influenced decisions about the patient's pain self-management. However, patients took care of their pain self-management themselves for as long as they could while FCs carried out "back-up" tasks such as reminding patients to take their around the clock medication. On

the other hand, FCs required up to date information about the patient's pain management in case the patient's health status deteriorated. FC: "I need to know somehow what I have to do if he is not feeling well or something like that. That provides a sense of security."

Was the form of visits and phone calls adequate? Participants specifically commented on additional aspects of the intervention, that is, on the duration of the intervention, the setting of the visits, and the meaning of the phone calls.

Duration of the intervention. The intervention consisted of 6 visits and 4 phone calls alternating over ten weeks. The median duration of the visits was 49 minutes and ranged from 15 to 90 minutes depending on the patient's pain situation and individual questions of the patients and FCs. Phone calls were short with a median duration of 8 minutes and a range of 1 to 20 minutes. The duration of the intervention as a whole and of the single visits was evaluated by the patients during the interviews.

Patients appreciated that the intervention went on for ten weeks for two reasons. First, it allowed them to gain a sense of trust in the intervention nurse. "Because it (building up a relationship) does not happen so quickly. First you need a basis. Then you can give away more of yourself and this is how it increased each week and with each phone call." Second, the period of ten weeks gave patients the opportunity to get support for problems that occurred over time. For example, questions that occurred during the implementation of new self-management strategies into daily life or during new pain episodes could be answered and strategies revised, if necessary. Patients appreciated that visits and phone calls lasted as long as needed to discuss problems in detail and think of all questions they had. "Of course, if you can sit together like this and, let's say, can talk without time pressure then you can bring up more things than in a consultation with the physician."

However, some patients experienced a point at which they thought it would have been appropriate to stop the intervention. For example, patients who had gained some experience in their pain self-management and achieved good pain control during the study stated that the intensive dose of weekly contacts was more of a burden than benefit. "For me this is a point (when pain self-management stabilized) at which I actually do not want to continue anymore. At which I thought that nothing new was added anymore."

Setting of visits. Most intervention visits took place in the patients' homes. At times, patients met with the intervention nurse during routine appointments at the clinic (e.g., during chemotherapy treatment in the infusion center). Some patients said that they preferred intervention visits in their homes for several reasons. One reason was that they felt more relaxed in the home environment. An FC stated that meeting in her familiar home

environment contributed to the fact that the relationship with the intervention nurse was more at ease than the relationship with the physician. FC: "This somewhat more relaxed relationship… the reason could well be that she comes over here." Furthermore, a patient remarked that driving to the clinic for intervention visits would not have been possible for him unless they were combined with routine appointments. On the other hand, one patient first needed to get used to someone external coming to his home but he got accustomed to it quickly.

Meaning of the phone calls. Regarding the phone calls, one patient said that they were not really necessary. For others, the phone calls provided them with the support needed to maintain strategies over time which was particularly helpful in the beginning of the intervention. "It was a good check, if you were slightly ‚sloppy' in the beginning and thought about taking less painkillers and she said: ‚Well, you need to take some more to be free of pain', that was actually ideal. Especially during the first three to four weeks it was very good, afterwards it worked out by itself." Furthermore, phone calls were perceived as a considerate gesture of the intervention nurse and increased the sense of trust. Phone calls were described as an additional opportunity to ask questions that had arisen over the previous week.

How useful were print materials? The written information included the PRO-SELF© booklet that entailed written information about nine common barriers that were addressed during the academic detailing session, short leaflets about common side effects of analgesic medication (e.g., constipation), and a script how to communicate with the physician if pain control was not adequate. In addition, patients were asked to complete a pain diary, a booklet that was printed in A4 size, which took about two minutes to be completed each evening before bedtime and five minutes at the end of each week.

When asked about written information material in the interviews, it became clear that the PRO-SELF© booklet was not an important source of information for the patients although it was considered informative and understandable. Patients and FCs appreciated verbal information by the intervention nurse more than the written information. "Information materials were not so important, I think, I got most information from her personally." Most patients did not refer to the PRO-SELF© booklet but commented they appreciated the daily pain diary as a tool that supported self-monitoring of pain. "'How was it today', something like recapping shortly. What you probably would not do otherwise. I liked that."

Only one patient had kept a weekly pain diary before the study. Patients needed to develop a routine to fit the completion of the pain diary into their daily schedule. "In the beginning, I thought it was tough to get used to keeping a pain diary. Have never done that

before. … It worked out in the end, yes, then something like a mechanism developed." Once the pain was under control, the diary was not considered necessary anymore. "If nothing changes at large over a period of time, I think, I would not do it anymore." For most patients, the diary was understandable. However, in the beginning repeated instructions were necessary in order to help patients to correctly apply some items to their individual situation. Two patients reflected on how the pain diary could be improved by including a section about nighttime sleep and a rubric for special situations (e.g., operations), as well as printing it in a handier size than A4.

Experiences with study participation. In addition to the burden due to the intervention, further efforts of the participants were necessary to provide data for the scientific evaluation of the Program. For data collection in the pilot RCT, patients needed to complete a set of questionnaires three times during the intervention period of 10 weeks. The completion of one set of questionnaires took approximately 90 minutes and patients were advised to complete the questionnaires over several days, not all at once.

How patients anticipated the burden benefit ratio of the study, contributed to their decision-making process regarding study participation. Some patients described initial skepticism that was finally outweighed by the expected gain. "I simply took my time in the beginning when Mrs. K. approached me and I thought about whether I actually wanted to do it." Factors that increased study participation included prevailing questions about pain management, unrelieved pain, the hope that benefits would outbalance the burden, and openness to learning and new situations. Furthermore, it was crucial for patients to experience that they were not only part of "yet another study" but that their individual situation was the main focus.

Regarding their experience of study burden, patients said that they needed to get used to the amount of questionnaires they were asked to complete over the course of the study and that their ability to complete the questionnaires depended largely on their functional status. "If I had to do it now, it would be strenuous for me. I am not feeling like it at the moment. At that time I was feeling relatively well and it was not strenuous for me." The option to complete questionnaires over one week rather than at once helped patients to get adjusted to the amount. "I have divided it in three little bits." In the end, study burden was well balanced with the benefit for the participants. "The effort was OK each time. Because it is good if someone comes and tells you how to actually do it…. If it is important for you, you just do it." FCs did not mention any problems with data collection.

Patients and FCs were aware that the intervention would not continue after study completion. The participants' positive experiences with the burden benefit ratio triggered a

reflection on how the Program could be continued on two levels. First, how continuing support of pain self-management may be realized for themselves right now and for other patients in the future. Regarding their own situation, patients and FCs were aware that their pain episodes were not over when the study ended and reflected about sustainability of the Program. "The study is finished now; one must wait and see if it is working." One patient and their FC stated that they now would consult their primary physician if questions arose. Regarding the continuation of the Program, some patients said that the Program should become part of routine care for oncology patients with pain. "One should do this pain study more frequently because many people are walking around in pain." In order to implement the Program in routine care, patients suggested a routine referral to an intervention nurse as soon as pain management was necessary, a reevaluation of pain management every 3 to 4 weeks, and the availability of an intervention nurse for patients if any questions about pain self-management arose. "If you have something like this, like me now, you should right away 'slide' into such a (Program) so that you get your pain under control immediately, not only after two or three months." "Then I would like …that it (the Program) continues regularly, that you meet every three or every four weeks… or get in touch with the clinic and discuss the pain or what could be changed. That you stay under supervision." All six patients who were asked whether they would recommend the intervention to a close friend or family member said that they would do so.

Discussion

Findings from this qualitative substudy of participants' experiences with study and intervention procedures showed that a trustful relationship with the intervention nurse was of utmost importance. The focus of the intervention on self-management, expert knowledge, and the caring attitude of the intervention nurse, as well as sufficient time to discuss problems resulted in high satisfaction and significant pain reduction for patients. Furthermore, participants considered the study burden acceptable as long as they had good functional status, and they experienced continuing improvement of their pain and knowledge gain about pain self-management.

Consistent with the literature[1,2], patients in this study experienced inadequate pain control prior to enrollment. With the intervention, most patients achieved a considerable improvement in their pain and reported a substantial increase of knowledge and skills about pain monitoring, correct intake and titration of analgesics, as well as side effect management. The intervention focused on the main components of effective pain self-management[6,19].

In accordance with previous research[20,21], one of the most supportive factors for patients' pain self-management was a trusting and credible relationship with the intervention nurse. As in previous studies[20,22], participants in this study particularly valued repeated consultations with ample time to discuss questions in combination with the intervention nurse's expert knowledge and a caring attitude. Furthermore, findings from this study suggest that clinician driven phone calls could contribute to patients' trust because they may see them as a sign of the clinician's consideration for their wellbeing. This finding contrasts somewhat with findings from our systematic review[8], in which phone calls did not add considerably to the efficacy of cancer pain self-management interventions. In future research as well as clinical practice, emphasis needs to be placed on the development of a trustful relationship between patients and clinicians. The benefit of phone calls in cancer pain self-management interventions needs to be explored in future research.

For participants in this study, the intervention's focus on cancer pain self-management was quite novel and filled a gap that they had experienced during episodes of uncontrolled pain under routine care. After the intervention, patients felt more in control of their pain self-management. This effect was shown to be positively related with quality of life and pain control in previous research[23]. As suggested by patients during the interviews, clinicians are encouraged to integrate self-management support in their routine care.

Findings from this study confirmed that the coordination of cancer pain management between relevant clinicians is essential to improve the congruence of both analgesic prescriptions and provision of information. The coordination of cancer pain treatment was recommended in international guidelines[19]. Moreover, patients in this study described that matching information by the intervention nurse with their clinicians proved to be a strongly supportive factor to overcome patient-related barriers towards pain management.

Several patient-related barriers towards pain self-management that were addressed as part of the intervention did not play a major role for patients according to the interviews. Issues that were repeatedly discussed and practiced as part of the nurse coaching component of the intervention were very well internalized by patients and their FCs (e.g., taking the prescribed medication according to a fixed schedule) while other issues (e.g., fear of tolerance) were not mentioned by the patients. This finding may explain why, in this study, the information leaflet was irrelevant for the participants. Information is better processed by participants if it is repeated[24] which holds true for information in print material[25]. As Abrams et al.[25] stated, patients may most likely read and adhere to print materials which are periodically reinforced in consultations with clinicians. In addition,

information may best be put into a meaningful context for patients and their FCs[26]. While all of the topics in the information leaflet in the German PRO-Self© Plus PCP were discussed once during the academic detailing session[27], only those immediately related to the patient's pain problem were reinforced repeatedly in subsequent coaching sessions. In future research and practice, additional barriers to pain self-management such as fear of tolerance may be addressed effectively by using this method of repetition and practice.

Furthermore, the use of alternative methods to reduce pain (e.g., the use of relaxation or distraction) was not mentioned by participants even though alternative methods were used by the patients as was noted in the second qualitative substudy of this thesis[28]. One possible explanation may be that the use of alternative methods was self-evident for patients and did not need to be mentioned. Another explanation may be that this topic was not evaluated during the interviews. Further exploration of the participants' use of alternative methods may be integrated in a future RCT.

This qualitative substudy had several limitations. Only patients who finished the intervention were included in the interviews. Patients who did not finish the intervention because of deterioration of their health status or for other reasons were excluded. It is possible that these patients may have added different perspectives with a somewhat more critical view on study burden and benefit. Furthermore, the recruitment rate for the pilot RCT was low (25%)[13]. Patients who took part in the study may have been more open and willing to integrate changes in their daily routine than those who declined study participation. Finally, the number of participants in this substudy was quite small, and interviews were rather short, so that some issues may not have been explored comprehensively.

Conclusions

In this qualitative substudy, patient satisfaction with the German PRO-SELF© Plus PCP was high. The Program helped the participants' to "get a grip" on their pain self-management while the study burden was considered tolerable. The participants particularly valued a trustful relationship with the intervention nurse. Furthermore, the focus on pain self-management was a novel and appreciated approach for the patients and their FCs. Clinicians are encouraged to integrate active building of a trustful relationship with patients and FCs and to focus on the implementation of treatment recommendations in routine care. The participants' views in this qualitative substudy provide additional information on how the German PRO-SELF© Plus PCP may be adapted for a larger RCT including repetition of the information in the PRO-SELF© booklet as part of the nurse coaching component.

References

1. Spichiger E, Mueller-Froehlich C, Denhaerynck K, et al. Prevalence of symptoms, with a focus on fatigue, and changes of symptoms over three months in outpatients receiving cancer chemotherapy. Swiss Med Wkly. DOI: w13303.
2. Breivik H, Cherny N, Collett B, et al. Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. Ann Oncol 2009;20:1420-1433.
3. Mercadante S. Why are our patients still suffering pain? Nat Clin Pract Oncol 2007;4:138-139.
4. Jacobsen R, Liubarskiene Z, Moldrup C, et al. Barriers to cancer pain management: a review of empirical research. Medicina (Kaunas) 2009;45:427-433.
5. Jacobsen R, Moldrup C, Christrup L, Sjogren P. Patient-related barriers to cancer pain management: a systematic exploratory review. Scand J Caring Sci 2009;23:190-208.
6. Schumacher KL, Koresawa S, West C, et al. Putting cancer pain management regimens into practice at home. J Pain Symptom Manage 2002;23:369-382.
7. Bennett MI, Bagnall AM, Jose Closs S. How effective are patient-based educational interventions in the management of cancer pain? Systematic review and meta-analysis. Pain 2009;143:192-199.
8. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. A systematic evaluation of content, structure, and efficacy of interventions to improve patients' self-management of cancer pain. J Pain Symptom Manage, in press.
9. Allard P, Maunsell E, Labbe J, Dorval M. Educational interventions to improve cancer pain control: a systematic review. J Palliat Med 2001;4:191-203.
10. Devine EC. Meta-analysis of the effect of psychoeducational interventions on pain in adults with cancer. Oncol Nurs Forum 2003;30:75-89.
11. Ferrell BR, Cohen MZ, Rhiner M, Rozek A. Pain as a metaphor for illness. Part II: Family caregivers' management of pain. Oncol Nurs Forum 1991;18:1315-1321.
12. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. Supporting oncology patients' pain self-management: Methods and lessons learned from a randomized controlled pilot study. Eur J Oncol Nurs, in press.
13. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. Results of a randomized controlled pilot study of a self-management intervention for cancer pain. Eur J Oncol Nurs, submitted.

14. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.

15. Miaskowski C, Dodd M, West C, et al. The use of a responder analysis to identify differences in patient outcomes following a self-care intervention to improve cancer pain management. Pain 2007;129:55-63.

16. West CM, Dodd MJ, Paul SM, et al. The PRO-SELF(c): Pain Control Program--an effective approach for cancer pain management. Oncol Nurs Forum 2003;30:65-73.

17. Mayring P. Qualitative Inhaltsanalyse: Grundlagen und Techniken [Content Analysis: basics and techniques], ed 11th. Weinheim, Beltz, 2010.

18. Eastern Cooperative Oncology Group. ECOG Performance Status, 1998, Retrieved Aug 22, 2011, from http://ecog.dfci.harvard.edu/general/perf_stat.html

19. National Comprehensive Cancer Network. NCCN Clinical Practice GuidelinesTM: Adult cancer pain, Retrieved Jan 14, 2012, from http://www.nccn.org/professionals/physician_gls/PDF/pain.pdf.

20. Rodin G, Mackay JA, Zimmermann C, et al. Clinician-patient communication: a systematic review. Support Care Cancer 2009;17:627-644.

21. Bostrom B, Sandh M, Lundberg D, Fridlund B. Cancer-related pain in palliative care: patients' perceptions of pain management. J Adv Nurs 2004;45:410-419.

22. Kimberlin C, Brushwood D, Allen W, Radson E, Wilson D. Cancer patient and caregiver experiences: communication and pain management issues. J Pain Symptom Manage 2004;28:566-578.

23. Byma EA, Given BA, Given CW, You M. The effects of mastery on pain and fatigue resolution. Oncol Nurs Forum 2009;36:544-552.

24. Greene RL. Repetition and spacing effects. In Roediger HL (ed) Learning and memory: A comprehensive reference repetition and spacing effects. Oxford, Elsevier, 2008 vol 2: Cognitive Psychology of Memory, pp 65-78.

25. Abrams DB, Mills S, Bulger D. Challenges and future directions for tailored communication research. Ann Behav Med 1999;21:299-306.

26. Spitzer M. Lernen. Gehirnforschung und die Schule des Lebens [Learning. Brain research and the school of life]. Heidelberg, Berlin, Spektrum, 2006.

27. Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. JAMA 1990;263:549-556.

28. Luescher C, Koller A, Schaefer I, Spichiger E. Entscheidungswege von onkologischen Patienten im Umgang mit Schmerzmedikamenten im häuslichen Umfeld: eine qualitative Sekundäranalyse [Oncological patients' decision-making processes concerning their pain medication at home: a qualitative secondary analysis]. Pflege: Die wissenschaftliche Zeitschrift für Pflegeberufe, in press.

Chapter 8

Entscheidungswege von onkologischen Patienten im Umgang mit Schmerzmedikamenten im häuslichen Umfeld: eine qualitative Sekundäranalyse

[Oncological Patients' Decision-Making Processes Concerning Their Pain Medication at Home: a Qualitative Secondary Analysis]

Claudine Lüscher-Buffet, MScN, RN[1,2], Antje Koller, MNS[1], Iris Schaefer, PhD, RN[3], Elisabeth Spichiger, PhD, RN[1,4]

[1] Institut für Pflegewissenschaft Universität Basel, Schweiz
[2] Kantonsspital Uri, Altdorf, Schweiz
[3] Berner Fachhochschule, Fachbereich Gesundheit, Bern, Schweiz
[4] Inselspital Universitätsspital Bern, Schweiz

Accepted for publication by Pflege: Die wissenschaftliche Zeitschrift für Pflegeberufe

Summary

Unrelieved pain affects up to 75% of cancer patients. Possible reasons for the undertreatment of pain are, amongst others, patient-related barriers towards cancer pain management. However, the way patients decide on the use of analgesics remains unclear. The purpose of this qualitative study was to explore decision-making processes of four women and four men with diverse cancers concerning their pain medications. Audiotaped protocols of the 10-week intervention and interviews of the PEINCA-pilot study provided data for a secondary analysis. This pilot study was conducted at a comprehensive cancer center in Germany to test for the first time the German version of a cancer pain self-management intervention to support oncology patients' pain self-management. The data of purposively selected patients were analyzed using content analysis. The results showed that cancer patients were very ambivalent about their analgesic use. The need to relieve severe pain conflicted with the desire to avoid opioids at any price. Decisions were reconsidered and overturned even after good experiences with analgesics. This study seems to provide a first look into decision-making processes over a longer time period. Individually tailored counseling by a professional within the cancer pain self-management intervention helped the patients adopt new attitudes towards analgesics and gradually reduce their pain levels. Previous experiences and attitudes of cancer patients should be considered in planning a pain therapy, and even after starting a pain therapy patients should be followed by professionals.

Zusammenfassung

Bis zu 75% der onkologischen Patienten leiden trotz wirksamer Therapiemöglichkeiten unter Schmerzen. Gründe dafür sind unter anderem Barrieren auf Patientenseite. Unklar bleiben jedoch die Entscheidungsprozesse von Patienten bezüglich ihrer Schmerzmitteleinnahme. In dieser qualitativen Arbeit wurden Wege von vier Frauen und vier Männern mit verschiedenen Krebserkrankungen erkundet, die zu Entscheidungen bezüglich der Schmerzmedikamente führten. Dazu boten die Protokolle der zehnwöchigen Intervention und Interviews aus der PEINCA-Pilotstudie Daten für eine Sekundäranalyse. Mit dieser Pilotstudie wurde ein Edukationsprogramm zur Unterstützung onkologischer Patienten in ihrem Schmerzmanagement erstmals in der deutschen Version an einem Tumorzentrum in Deutschland getestet. Die Daten von zielgerichtet ausgewählten Patienten wurden mittels Inhaltsanalyse ausgewertet. Ergebnisse zeigten, dass Patienten in ihren Entscheidungen bezüglich der Schmerzmittel zwischen dem Wunsch nach Schmerzlinderung und dem Vermeiden von Medikamenten zerrissen waren. Zweifel liessen sie getroffene Entscheidungen trotz guter Erfahrungen mit Schmerzmitteln immer wieder umstossen. Nach unserem Wissen beschreibt diese Studie erstmals solche Prozesse über einen längeren Zeitraum. Dank individuell angepasster Intervention verhalf das Edukationsprogramm den meisten Patienten zum Umdenken und zu einer verbesserten Schmerzsituation. Persönliche Ansichten und Erfahrungen onkologischer Patienten sollten in die Therapieplanung einbezogen und die Betreuung auch nach Beginn einer Schmerztherapie fortgesetzt werden.

Einleitung

Die Zahl der jährlichen Neuerkrankungen an Krebs in Deutschland wird vom Robert-Koch-Institut[1] auf ca. 436‘000 Personen geschätzt. Während sich diese Inzidenzrate in den letzten Jahren stabilisiert hat, konnten verbesserte Diagnoseverfahren und Therapien die 5-Jahres-Überlebenschance kontinuierlich erhöhen[1]. Diese eigentlich erfreuliche Entwicklung bedeutet jedoch auch, dass die Anzahl der Personen, die mit chronischen Krebsleiden und den damit verbundenen Einschränkungen, Belastungen und Schmerzen leben, stetig zunimmt. Laut Marcus[2] leidet über die Hälfte der Betroffenen im Verlauf ihrer Krankheit unter erheblichen Schmerzen, welche die Bewältigung des Alltags und die Lebensqualität einschränken.

Zur Behandlung von Tumorschmerzen stehen wirksame Medikamente und mit dem Stufenplan der World Health Organisation (WHO) auch ein effizientes Behandlungsschema zur Verfügung. Eine Schmerztherapie gemäss Stufenplan sollte bei 80-90% der Betroffenen Schmerzfreiheit erzielen[3,4]. Trotzdem leiden 30-50% der Patienten[a] während der Therapie und über 75% der Patienten mit fortgeschrittener Krankheit unter Schmerzen[5].

Als Gründe für diese oft ungenügende Schmerztherapie wurden neben anderen Ursachen Barrieren bei den Patienten festgestellt. In ihrer Literaturreview beschreiben Jacobsen et al.[6] folgende Hindernisse: Ungenügende Schmerzäusserung dem Arzt gegenüber, aus Angst, diesen von der Krankheitsbehandlung abzulenken, oder um als „guter“ (nicht klagender) Patient angesehen zu werden; die Ansicht, dass Schmerzen bei Krebs unumgänglich sind; Verbindung von Opiateinsatz mit nahem Tod; Angst vor Sucht, Abhängigkeit und Nebenwirkungen; Angst, dass die Medikamente bei stärker werdenden Schmerzen keine Wirkung mehr haben; Angst, dass neue Schmerzen unentdeckt bleiben; Angst, dass zunehmende Schmerzmitteldosierung Krankheitsprogression bedeutet, sowie Angst vor Spritzen. Resultate aus qualitativen Studien zeigen zudem, dass Schmerzmittel abgelehnt werden aufgrund früherer Erfahrungen der Patienten oder ihrer Angehörigen, aus Angst vor Stigmatisierung als Drogensüchtige, wegen Erziehung zu Tapferkeit oder aus Überzeugung, für begangene Schuld im Leben sühnen zu müssen[7-9].

[a] Die maskuline Form steht jeweils stellvertretend für beide Geschlechter.

Viele der patientenbezogenen Barrieren beziehen sich auf die Einnahme von Opiaten. Als mögliche Faktoren, die den Einsatz von Opiaten begünstigen, identifizierten Reid et al.[10] das Drängen von Angehörigen und die intensive Schmerzerfahrung der Patienten. Ein weiterer Grund zum Einnehmen von Opiaten war das Bedürfnis der Patienten, Aufgaben im Alltag erfüllen zu können[7].

Querschnittstudien, welche Jacobsen et al.[6] in ihrer explorativen Review zusammenfassten und qualitative Untersuchungen beschreiben Gründe gegen oder für eine Opiateinnahme zu einem bestimmten Zeitpunkt. Unklar bleibt jedoch, wie Entscheidungsprozesse im Zeitverlauf aussehen. Eine Literatursuche ergab nur wenige Hinweise darauf, welchen Einflüssen die Patienten in ihren Entscheidungen im Zeitverlauf ausgesetzt waren. Donovan[11] stellte in einer Langzeitstudie fest, dass Patienten mit rheumatologischen Erkrankungen mit vorgefassten Ansichten und Theorien über die Krankheit den Arzt aufsuchten und sich bezüglich ihrer Medikamenteneinnahmen aktiv und wohlüberlegt entschieden. Sie erwähnt, dass Ansichten der Patienten nicht statisch seien, sondern aufgrund von Erfahrungen oder glaubwürdigen Informationen wechseln könnten, beschreibt jedoch den Verlauf solcher Haltungsänderungen nicht. In einer Literaturreview betont Donovan[12] weiterhin, dass vorangegangene Erfahrungen der Patienten mit Medikamentenwirkungen und ihre Fähigkeit, Verordnungen und ärztliche Informationen mit ihrer Haltung in Einklang zu bringen, die Medikamenteneinnahme wesentlich beeinflussten. Weitere Autoren bestätigen die Bedeutung persönlicher Ansichten und früherer Erfahrungen bezüglich der Medikamenteneinnahme bei onkologischen Patienten[8,13,14].

Zusammenfassend lässt sich sagen, dass Gründe ungenügender Schmerzbehandlung bei onkologischen Patienten in zahlreichen Studien untersucht wurden. Dabei lag der Fokus darauf, welche patientenbezogenen Barrieren vorkommen. Einige Untersuchungen betrafen die Motivation für eine Medikamenteneinnahme. Es liessen sich keine Studien finden, die den Verlauf der Entscheidungsfindung über einen längeren Zeitabschnitt erforschten. Deshalb werden mit der vorliegenden Studie jene Prozesse untersucht, die aus der Sicht onkologischer Patienten zur Entscheidung bezüglich ihrer Schmerztherapie führten.

Um diese Entscheidungsprozesse im zeitlichen Verlauf zu explorieren, standen aus den Interventionsprotokollen und Abschluss-Interviews der kürzlich durchgeführten PEINCA-Pilotstudie[15] umfangreiche Daten für eine Sekundäranalyse zur Verfügung. Mit der PEINCA-Pilotstudie kam das PRO-SELF© Plus Pain Control Program (PCP) erstmals im deutschsprachigen Raum zum Einsatz. Dieses wurde als Edukationsprogramm durch eine von Prof. C. Miaskowski geleitete Forschungsgruppe in den USA entwickelt, um Patienten mit einer Krebserkrankung beim Optimieren ihrer Schmerztherapie zu unterstützen[16]. Die

Wirksamkeit der ersten Programmversion wurde in einer randomisiert kontrollierten Studie überprüft, wobei sich eine statistisch signifikante Abnahme der Schmerzen in der Interventionsgruppe nachweisen liess[17]. Die weiterentwickelte Version des PRO-SELF© PLUS PCP wurde im Rahmen der PEINCA-Pilotstudie in die deutsche Sprache übersetzt und an den deutschsprachigen Kontext angepasst. Ziel war es, Machbarkeit und Effektstärke der deutschen Version in einer randomisiert kontrollierten Studie zu überprüfen. Dies erfolgte an einem Tumorzentrum einer Universitätsklinik in Süddeutschland.

In die PEINCA-Pilotstudie eingeschlossen wurden 39 ambulante Patienten mit Krebs, die in den vorausgehenden zwei Wochen Schmerzen von ≥ 3 auf einer numerischen Rangskala (NRS; 0 = kein Schmerz bis 10 = stärkster vorstellbarer Schmerz) angaben. Die Patienten mussten mindestens 18 Jahre alt sein, gemäss ärztlicher Einschätzung eine voraussichtliche Lebenserwartung von > 6 Monaten haben und telefonisch sowie in weniger als einer Stunde Autofahrt erreichbar sein. Pflegende Angehörige wurden einbezogen, wenn sie massgeblich am Schmerzselbstmanagement beteiligt waren. Wollten diese Angehörigen nicht teilnehmen, wurde auch der jeweilige Patient von der Studienteilnahme ausgeschlossen. Ausgeschlossen wurden auch Patienten, die unter neuropathischen Schmerzen litten, die Diagnose einer psychischen Erkrankung aufwiesen oder kognitive oder kommunikative Einschränkungen hatten, die das Verstehen der Einverständniserklärung unmöglich machten. Die Rekrutierung der Patienten erfolgte durch die Studienleiterin der PEINCA-Pilotstudie. Die zuständige Ethikkommission bewilligte sowohl die PEINCA-Pilotstudie als auch die sekundäre Datenanalyse. Alle Patienten gaben ihre schriftliche Einwilligung.

Das Programm beruhte auf drei Schlüsselstrategien: 1. Informationsvermittlung; 2. Aufbau von Fertigkeiten in Schmerzerhebung und Planung einer individuellen Schmerztherapie; 3. fortlaufende Unterstützung, um Nebenwirkungen der Schmerztherapie und der Krankheit zu verhindern oder zu behandeln. Die Informationsvermittlung basierte wesentlich auf dem Besprechen der PRO-SELF©-Broschüre[16], in der neun häufige patientenbezogene Barrieren in der Schmerztherapie thematisiert wurden. Die Intervention umfasste mit 6 Hausbesuchen und 4 Telefonanrufen einen Zeitraum von 10 Wochen und wurde durch eine speziell geschulte Pflegende mit Masterabschluss und klinischer Erfahrung in onkologischer Pflege durchgeführt (AK). Bei 9 der 12 Patienten der Interventionsgruppe, welche das Programm abschlossen, folgte innerhalb von zwei Wochen nach dem letzten Besuch ein Abschluss-Interview, um zu erfahren, wie sie Nutzen und Aufwand des PRO-SELF© PLUS PCP und die PEINCA-Pilotstudie erlebt hatten.

Die Interventionsgespräche bei Hausbesuchen und Telefonanrufen wurden während der Pilotstudie zur Qualitätskontrolle auf Tonband festgehalten. Diese Daten und die Abschluss-Interviews bildeten die Basis für die Sekundäranalyse. Konkret wurde folgender Frage nachgegangen: Wie beschreiben ambulante onkologische Patienten den Prozess der Entscheidungsfindung bezüglich ihrer Schmerzmedikamente im Rahmen der PEINCA-Pilotstudie?

Methodisches Vorgehen

Zur Beantwortung der Forschungsfrage im Rahmen einer Sekundäranalyse wurde ein qualitativer Forschungsansatz gewählt. Aus den 19 Studienteilnehmern der Interventionsgruppe der PEINCA-Pilotstudie wurden in Absprache mit der Studienleiterin zielgerichtet 8 Teilnehmer gewählt, deren Interventionsgespräche Angaben zum Umgang mit Schmerzmedikamenten und zum Entscheidungsprozess bezüglich Schmerztherapie aufwiesen. Dabei handelte es sich um 4 Frauen und 4 Männer im Alter von 44 bis 74 Jahren (Durchschnitt 56.5 Jahre). Bis auf eine Patientin, die verwitwet war, lebten alle mit ihren Ehepartnern zusammen. Bei 4 Patienten wohnten auch Kinder im gleichen Haushalt, bei 3 waren die Kinder ausgezogen, und ein Ehepaar war kinderlos. Die Schulbildung der Teilnehmer reichte von Hauptschul- bis Fachhochschulabschluss. Sie hatten Berufsausbildungen als Konditorin, Sekretärin, Sicherheitsfachmann, Heizungsmonteur, Lehrerin und Projektleiter Anlagebau. Während der PEINCA-Pilotstudie arbeiteten 2 Teilnehmer in Teilzeit, 4 waren krankgeschrieben und 2 Rentner. Die Diagnosen umfassten Bronchus-, Mamma-, Nieren- und Pleura-Karzinome und malignes Melanom. Zu Beginn der Intervention gaben 7 Teilnehmer ihre höchsten Schmerzen mit Werten zwischen 7 und 9 auf der NRS (0 = keine Schmerzen; 10 = schlimmste vorstellbare Schmerzen) an, und einer nannte den Wert von 5. Eine Patientin hatte zu diesem Zeitpunkt noch nie Schmerzmittel eingenommen, 5 Patienten nahmen nicht-opiathaltige Schmerzmedikamente und 2 nahmen Opiate[b]. Drei Patienten nahmen mit einem Angehörigen teil, 5 alleine. Die Aussagen der 3 Angehörigen ergaben eine zu geringe Datenmenge und wurden nicht in die Resultate einbezogen.

Aus den aufgezeichneten Interventionsgesprächen wurden alle Sequenzen transkribiert, welche Schmerzmedikation, den dazugehörigen Entscheidungsprozess und patientenbezogene Barrieren thematisierten. Diese transkribierten Sequenzen aus den Interventionsgesprächen und Transkripten der Abschluss-Interviews dienten als Datenquellen für die vorliegende Sekundäranalyse.

[b] Im Text wird der Begriff Opiat verwendet. Darin eingeschlossen werden auch Opioide, sowie halb- oder vollsynthetisch hergestellte Alkaloide aus dem Opium (Herdegen, 2008).

Die Auswertung der Daten erfolgte in Form einer qualitativen Inhaltsanalyse in Anlehnung an Mayring[18]. Zentrale Aussagen der Teilnehmer wurden auf eine einheitliche Sprachebene paraphrasiert, generalisiert und in zwei Schritten auf die inhaltstragenden Aspekte reduziert, ohne das Grundmaterial aus den Augen zu verlieren. Daraus wurden induktiv Kategorien gebildet, untereinander in Verbindung gebracht und aus der Perspektive der Fragestellung interpretiert. In einem letzten Schritt wurde die Nähe der Resultate zu den Ausgangsdaten überprüft. Zitate aus den Gesprächen illustrieren die einzelnen Ergebnisse und stellen dadurch einen Bezug zu den Originaldaten her.

Zur Qualitätssicherung wurden Transkriptauswahl und Analyseschritte mit AK und Studierenden des Instituts für Pflegewissenschaft, Universität Basel, kritisch diskutiert. AK reflektierte die Resultate aufgrund ihrer Erfahrungen während der Durchführung der Interventionen. ESp brachte dank ihrer ausgewiesenen Fachkenntnisse eine weitere Sichtweise ein.

Resultate

Aussagen der acht Teilnehmer im Verlauf der zehnwöchigen Intervention und im Abschluss-Interview zeigten, dass der Entscheidungsprozess onkologischer Patienten im Umgang mit ihren Schmerzmedikamenten von einem Widerstreit zwischen Zustimmung und Ablehnung geprägt war und Entscheidungen wiederholt umgestossen wurden. Die Kategorien „sich gegen Schmerzmedikamente wehren“ und „es mit Alternativen versuchen“ widerspiegeln die ablehnende Haltung und Versuche, eine Einnahme von Schmerzmedikamenten hinauszuschieben. „Sich doch für Medikamente entscheiden“ beschreibt Aspekte, die eine Einnahme von Schmerzmedikamenten förderten. Persönliche Haltung und ursprüngliche Bedenken verdrängten wiederholt sachliche Argumente und liessen Patienten „immer wieder zweifeln.“ Am Schluss äusserten die meisten Patienten, durch „Umdenken und Lernen“ ihre Haltung gegenüber Schmerzmitteln geändert zu haben. Einer Mehrzahl der Teilnehmer gelang es schliesslich, ihre Schmerzen im Rahmen der Intervention erheblich zu senken. In der Folge werden die Kategorien der Entscheidungsfindung genauer beschrieben. Sie beeinflussten sich oft gegenseitig und gaben dem Prozess einen individuellen Verlauf, der alle erdenklichen Formen annehmen konnte.

Sich gegen Schmerzmedikamente wehren. Obwohl die meisten Patienten ihre Schmerzen als stark und belastend empfanden, sträubten sich fast alle dagegen, Schmerzmittel einzunehmen, sie höher zu dosieren oder auf ein Opiat zu wechseln. Ihre Bedenken blieben oft mit grosser Hartnäckigkeit präsent und beeinflussten im Verlauf

wiederholt Entschlüsse bezüglich der Schmerzmitteleinnahme. Eine einzige Teilnehmerin lehnte Opiate nicht grundsätzlich ab und setzte besprochene Massnahmen konsequent um.

Mehrere Patienten wollten mit der Einnahme von Schmerzmedikamenten oder Opiaten warten, bis die Schmerzen in einem kürzeren Intervall auftreten, noch schlimmer würden oder bis sie es nicht mehr aushielten: „Aber so lange es nicht unbedingt sein muss, will ich damit gar nicht anfangen. Erst, wenn es einmal nicht mehr geht." Ein Patient schilderte, wie er Schmerzen aushielt und mit eisernem Willen dem Bedürfnis widerstand, ein Opiat einzunehmen, das er noch zur Verfügung hatte: „Da beiss' ich mich einfach durch. Ich habe gelernt, die Schmerzen zu unterdrücken oder hinzunehmen."

Gemäss ihren Antworten auf die Fragen in der PRO-SELF©-Broschüre glaubten die meisten der acht Teilnehmer zwar nicht, dass Patienten mit Krebs, die Schmerzmittel nehmen, süchtig davon würden. Abweichend davon kam Sucht jedoch zur Sprache, wenn Patienten Erfahrungen mit Opiaten erwähnten, die sie selbst oder bei Verwandten oder Bekannten erlebt hatten: „Ich habe einfach Angst, von Morphium abhängig zu werden. Ich glaub', ich war süchtig." „Der ist abhängig, der ist abhängig mit dem Spray." In der Literatur beschriebene Vorbehalte gegenüber Opiaten, wie Angst vor Toleranzentwicklung, Verknüpfung mit dem nahen Tod und Angst vor Nebenwirkungen wie Obstipation, Müdigkeit oder „verwirrt sein", fanden sich in den Äusserungen der Teilnehmer wieder: „Wenn man so daran gewöhnt ist, dann wirkt es gar nicht mehr." „Für mich war klar, dieses Pflaster ist Endstation." „Die älteren Leute spinnen doch immer so (nach Schmerzmitteleinnahme)."Allgemein bestand eine grosse Hemmung gegenüber Opiaten. Eine Patientin meinte: „Ich bin einfach blockiert, was das Morphin angeht."

Einige Patienten wollten bewusst mit Schmerzen umgehen. Sie zogen leichte Schmerzen sogar kompletter Schmerzfreiheit vor. Auf diese Weise blieben Schmerzen gegenwärtig und übernahmen verschiedene Signalwirkungen. Einige Patienten wollten einen Hinweis für ihre körperlichen Grenzen. Sie befürchteten bei Schmerzfreiheit nach der Einnahme von Schmerzmedikamenten, nicht mehr durch Schmerzen gebremst zu werden, sich zu übernehmen und ihrem Körper damit zu schaden. So äusserte eine Teilnehmerin:„Ich habe manchmal das Gefühl, es ist besser, ich habe Schmerzen, weil ich dann weniger mache. Wenn ich nichts habe, dann mache ich alles. So wie immer." Patienten wollten auch spüren, dass eine eingeleitete Therapie, wie Bestrahlung oder Chemotherapie, Wirkung zeigte und dass etwas mit dem Körper geschah. Sie glaubten, dies sei bei Schmerzfreiheit unter Medikamenten nicht möglich: „Wenn ich jetzt keine Schmerzen habe, dann weiss ich, dass die Bestrahlung was gebracht hat. Mit den

Schmerzmitteln weiss ich es ja nicht.“ Das Spüren von Schmerzen verlieh einem Patienten das Gefühl von Lebendigkeit: „Also für mich sagt er (Schmerz) immer, ich lebe.“

Es mit Alternativen versuchen. Um ihre Schmerzen bei Vermeiden oder Hinausschieben der Schmerzmitteleinnahme irgendwie in den Griff zu bekommen, versuchten es Patienten mit Alternativen. Sie setzten Mittel auf natürlicher Basis ein, zu denen sie zu Hause Zugang hatten oder die sie ohne Rezept beziehen konnten, wie Cremes, Sprays, Ergänzungsnahrung oder Salze. Dabei entwickelte jeder Patient seine ganz persönlichen Strategien und wusste schliesslich genau, welche Linderung er erwarten konnte: „Ich finde den Traumeel-Spray (homöopathisches Arzneimittel) eigentlich ganz gut. Es nimmt den Reiz weg.“

Die meisten Patienten wandten Wärme an, die sie als entspannend oder wohltuend empfanden. Dafür setzten sie Bäder, Duschen, Kirschsteinsäckchen, Körnerkissen oder Wärmflaschen ein. Ein Patient berichtete, dass er manchmal mehrmals täglich ins Bad stieg, um die Schmerzen für etwa eine Stunde auf ein erträgliches Niveau zu bringen. Bewegung oder dem Körper Ruhe gönnen, waren weitere Strategien zur Schmerzreduktion. Mit Bewegung meinten die Patienten zügig marschieren, den betroffenen Körperteil durchbewegen oder Sport treiben, sei dies Fahrrad fahren, Walking oder Krafttraining. Im Gegensatz dazu half anderen Teilnehmern Ruhe, zum Beispiel sich ins Bett zu legen.

Sich doch für Medikamente entscheiden. Unerträgliche, an die Grenze des Vorstellbaren gehende Schmerzen bewegten schliesslich die Teilnehmer im Verlauf der Intervention zur Einnahme von Schmerzmitteln, zu einer Dosiserhöhung oder einem Versuch mit Opiaten. Als zermürbend wurden vor allem nächtliche Schmerzen erlebt. Diese beeinträchtigten die Nachtruhe der meisten Patienten erheblich. Sie wachten schmerzbedingt wiederholt auf oder blieben stundenlang wach. Mangelnde nächtliche Erholung führte zu grosser Müdigkeit tagsüber und erschwerte das Verrichten von Tätigkeiten im Alltag. Für mehrere Patienten war der Wunsch, schlafen zu können ein entscheidender Grund, es mit einem Schmerzmedikament oder einem stärkeren Analgetikum zu versuchen: „In der Nacht habe ich Knochenschmerzen, das ist der Grund, denke ich, weshalb ich die eine Tablette genommen habe.“

Wagten sich Patienten einmal an Schmerzmedikamente, gestanden sie sich erst nur die kleinste Menge zu oder verhandelten um eine geringere Dosierung. Sie halbierten oder viertelten ihre Tabletten oder nahmen sie nur jeden zweiten Abend ein. Dies betraf neben Opiaten auch nichtsteroidale Antirheumatika. Auf diese Weise wollten sie die

Wirkung abwarten und eventuell später die Dosierung steigern: „Vielleicht nehme ich mal nur eine halbe und schaue, ob ich damit durchschlafen kann."

Gute Erfahrungen mit Schmerzmitteln, mit einer höheren Dosierung oder mit Opiaten bestärkten Patienten in der Entscheidung, Schmerzmedikamente regelmässig einzunehmen: „Ich habe es selber gemerkt, dieser Schlaf hat mir einfach gut getan. Wenn es mir gut tut, mach ich es (ein schwach wirksames Opiat einnehmen)." Neben der Schmerzlinderung erlebten sie auch Erleichterung und neuen Schwung: „Da blühe ich richtig auf, wenn man keine Schmerzen hat."

Immer wieder zweifeln. Patienten waren im Zeitverlauf immer wieder hin und her gerissen bei ihren Entscheidungen, zu Schmerzmitteln zu greifen. Einerseits hatte ihnen die Einnahme von Schmerzmedikamenten eine verbesserte Lebensqualität durch Schmerzlinderung gebracht, andererseits meldeten sich wiederholt ursprüngliche Vorbehalte gegenüber Schmerzmedikamenten und verdrängten rationale Argumente. Die Patienten überdachten getroffene Entscheidungen und stiessen sie oft wieder um. Dabei fehlten häufig fassbare Begründungen: „Es ist halt so, dass Morphium ein Reizwort ist, und das möchte man eigentlich nicht so gern." Trotz grosser Erleichterung durch Morphium schilderte eine Patientin wiederkehrende Angst vor diesem Medikament. Ihr half die Unterstützung von professioneller Seite. Sie wurde darin bestärkt, das Medikament weiter einzunehmen: „Es ist halt dieses Morphium enthaltende Mittel. Da hat mich Frau K. immer unterstützt, weil ich da manchmal Angst davor hatte." Bei einem Patienten kamen Zweifel indirekt zum Ausdruck. Einerseits bestätigte er grösseres Vertrauen Schmerzmitteln gegenüber, andererseits nahm er die möglichen Bedarfsmedikamente kaum ein und ertrug extreme Schmerzattacken, obschon er mit Morphin Linderung erfahren hatte: „Heute ist das Vertrauen in die Schmerzmittel sowieso viel grösser wie früher. Ja, ich hatte schon (eine Schmerzattacke), aber da habe ich kein Morphin genommen."

Sobald ihre Schmerzen etwas nachgelassen hatten, wollten die meisten Patienten Schmerzmedikamente reduzieren. Teilweise äusserten sie diese Absicht bereits zu einem Zeitpunkt, als die Schmerzen noch ungenügend behandelt waren und nahmen dadurch wieder intensivere Schmerzen in Kauf. Ein Teilnehmer beschrieb die eigene Zerrissenheit zwischen Wunsch nach weniger Schmerzmitteln und den empfundenen Schmerzen: „Mein Gedanke ist grundsätzlich, von diesen Mitteln wegzukommen, dies ist ein bisschen widersprüchlich (lacht), klar. Ich habe Schmerzen, auf der anderen Seite möchte ich gern von den Mitteln runterkommen." Eine Patientin musste sich richtig zureden, Schmerzmittel einzunehmen: „Ich tendiere immer dazu zu denken: ‚Nicht so viele Schmerzmittel' und dann denke ich wieder: ‚Nein, nimm's lieber. Du hast eine bessere Lebensqualität'." Um die Menge

Schmerzmittel zu verringern, unternahmen einige Patienten im Verlauf Auslassversuche, reduzierten die Dosierung, zögerten die Einnahme hinaus oder versuchten es mit schwächeren Schmerzmedikamenten. Mit solchen Experimenten erlebten sie die Grenzen der Wirksamkeit: „Zwischenzeitlich habe ich gedacht, es wäre alles ziemlich gut, hab dann mal versucht, das Sevredol (stark wirksames Opiat) wegzulassen, und es bekommt mir gar nicht." Diese Erfahrungen schafften Klarheit, bestätigten oft die Notwendigkeit von Schmerzmitteln und unterstützten Patienten in ihren Entscheidungen.

Umdenken und lernen. Im Abschlussinterview betonten die meisten Patienten, durch das deutsche PRO-SELF© PLUS PCP viel über Schmerzmedikamente und deren Handhabung gelernt zu haben. Sie äusserten Zweifel immer seltener und meinten, nun anders mit den Medikamenten umzugehen oder zu „spielen", wie sich eine Patientin ausdrückte. Neu war für fast alle, dass sie Schmerzmedikamente regelmässig rund um die Uhr einnehmen sollten, um einen konstanten Wirkstoff-Spiegel im Blut zu erhalten: „Ich habe gelernt, dass man Tabletten regelmässig nehmen soll, zur gleichen Zeit."

Ein wichtiger Aspekt des Umdenkens betraf auch die Einsicht, dass die Angst vor Sucht nicht gerechtfertigt war. Dies erlaubte den Patienten, Opiaten gelassener zu begegnen: „Diese Ängste sind genommen worden, gerade was im Bereich Abhängigkeit ist." Einer Patientin, die im Vorfeld jede Einnahme von Schmerzmedikamenten verweigert hatte, wurde bewusst, dass sie dem Körper mit Schmerzmitteln keinen Schaden zufügte: „Man kann den Körper doch besser in den Griff kriegen mit Medikamenten. Das macht mich jetzt nicht abhängig, aber man unterstützt den Körper für einen alltäglich besseren Halt." Dies entsprach einer grundlegenden Haltungsänderung.

Eine angemessene Medikamentendosierung tat gut. Das bestätigten Patienten, nachdem sie von der Haltung abgewichen waren, möglichst wenige Tabletten einzunehmen. Ein Patient scheute auch vor höherer Dosierung nicht mehr zurück: „Wenn wirklich dieser Schmerz da ist, lieber eine Tablette zu viel nehmen als zu wenig." Das zusätzliche Wissen vermittelte den Patienten mehr Sicherheit. Sie wussten, wie sie bei ungenügender Schmerzbehandlung die Medikation anpassen und wie sie diese bei nachlassenden Schmerzen wieder reduzieren konnten: „Ich nehme dann auch etwas dazu, wenn ich merke, okay, das reicht nicht."

Für ihre Haltungsänderung gegenüber Schmerzmedikamenten nannten die Patienten verschiedene Gründe. Einer Patientin war es sehr wichtig, die Informationen zu einer Schmerztherapie mehrmals zu hören und bestätigt zu erhalten, was schon der Arzt gesagt hatte. „Die Schmerztherapeuten hatten mir das zwar irgendwann mal gesagt, aber ich hatte das nicht wirklich so verinnerlicht." Im Gegensatz dazu war ein Patient froh, auch einmal eine

andere Meinung als jene des Hausarztes zu hören. Einige Patienten erhielten beim Verschreiben eines Medikamentes keine Informationen zu dessen Handhabung. Ihnen halfen die zusätzlichen Erläuterungen und praktischen Hinweise. „Zu Beginn habe ich Frau Doktor X gefragt: ‚Diese Tabletten?' Da hat sie gesagt, das seien alles Schmerztabletten, das muss ich selber machen. Da war ich schon froh, dass mir Frau K. gesagt hat: ‚Das machen wir jetzt so'." Das Besprechen ohne Zeitdruck erwies sich als sehr wertvoll für die Patienten. Dies ermöglichte es, auf persönliche Anliegen oder die individuelle Situation einzugehen.

Alle Patienten hatten im Laufe der Intervention die Schmerzmitteldosierung mindestens einmal angepasst. Es konnte nicht bei jedem Teilnehmer ein idealer Schmerzmitteleinsatz erreicht werden. Trotzdem erzielten bei Abschluss fast alle eine eindrückliche Schmerzreduktion auf Werte von 1-2 auf der NRS. Neben der Studienintervention war dies natürlich auch auf Chemotherapien oder Bestrahlung zurückzuführen. Während des Abschlussinterviews äusserten die Patienten jedoch übereinstimmend, durch das Programm viel rund um Schmerzmittel gelernt zu haben und diese nun gezielter einsetzen und bei neu auftretenden Schmerzen anpassen zu können.

Diskussion

Nach unserem Wissen werden in dieser Studie erstmals die sehr individuell verlaufenden Entscheidungswege onkologischer Patienten bezüglich ihrer Schmerztherapie über einen Zeitabschnitt von zehn Wochen beschrieben. Diese waren von Ambivalenz zwischen dem Bedürfnis nach Schmerzlinderung und den Bedenken gegenüber Schmerzmedikamenten geprägt.

Patientenbezogene Barrieren, die onkologische Patienten an der Schmerzmitteleinnahme hindern, wurden bisher vor allem in Querschnittstudien detailliert beschrieben[6,19]. Die Ergebnisse dieser Langzeitstudie zeigen zusätzlich, wie die Patienten einmal getroffene Entscheidungen, Schmerzmittel einzunehmen, wiederholt anzweifelten und umstiessen. Diese beharrliche Ambivalenz könnte eine weitere Erklärung dafür sein, dass einmalige Interventionen bisher nur eine moderate Verbesserung bei den Einstellungen der Patienten zu ihrem Schmerzmanagement und dem schmerzbezogenen Wissen gezeigt haben[20]. Die meisten Patienten erlebten jedoch, dass das deutsche PRO-SELF© PLUS PCP ihnen über die Zeit zum allmählichen Umdenken und einer Verbesserung ihrer Schmerzsituation verholfen hat. Im Verlauf äusserten sie ihre Zweifel seltener und lernten routinierter mit ihren Schmerzmedikamenten umzugehen. Hilfreiche Faktoren waren hierfür zunächst eine detaillierte, individuell angepasste und kompetente Beratung. Als essentielle Bestandteile der Intervention zeigten sich weiterhin die immer wiederkehrende Bestärkung in der getroffenen

Entscheidung und die Notwendigkeit, genügend Zeit zur Verfügung zu haben. So konnten die persönliche Situation genauer betrachtet und Details in der Schmerzbehandlung besprochen werden, was während regulärer Arztbesuche oft zu kurz kam. Diese Ergebnisse decken sich mit der Studie von Matthias[21], die darauf hinweist, dass Zeit und Zuhören bei Patienten mit chronischen Schmerzen für den Behandlungserfolg von grosser Bedeutung sind. Weiter bestätigt Schmalenbach[22], dass Wiederholungen zu den häufigsten Lernstrategien gehören.

Die in dieser Studie gefundenen patientenbezogenen Barrieren stimmten weitgehend mit den in der Literatur beschriebenen überein[6-9]. Auffallend war in dieser Untersuchung jedoch, dass Teilnehmer Fragen zu Sucht in den zur Studie gehörenden Fragebogen häufig richtig beantworteten, jedoch weiterhin während der Interventionen Bedenken diesbezüglich äusserten. Dies spiegelt möglicherweise eine Diskrepanz zwischen kognitiven und emotionalen Prozessen in der Entscheidungsfindung wider, wie es schon Donovan[11] beschrieb. Forscher und Kliniker, die mit Fragebogen Wissen zu Schmerzselbstmanagement und patientenbezogenen Barrieren ergründen, sollten diese Diskrepanz zukünftig bedenken.

Eine zusätzliche Barriere stellte der bewusste Verzicht einiger Teilnehmer auf eine vollständige Schmerzlinderung dar, um den Schmerz als Signal zu nutzen. Hierbei wurden Schmerzen nicht nur als Signal für Verschlechterung der Erkrankung genannt, wie in vorigen Untersuchungen dargestellt[6], sondern auch als Signal, damit sich die vormals häufig äusserst aktiven Personen im Alltag nicht „übernehmen“ würden. Schmerz könnte hier eine wichtige Funktion für die Krankheitsverarbeitung darstellen[23]. In zukünftigen Interventionen könnte mit Patienten exploriert werden, ob sie Schmerzen als erwünschtes Signal sehen und wie diese Sichtweise in eine bestmögliche Schmerztherapie integriert werden kann.

Wie von Reid et al.[10] beschrieben, führten auch in unserer Studie extreme, zermürbende Schmerzen dazu, dass Patienten schliesslich doch Schmerzmedikamente einnahmen. Bei unseren Studienteilnehmern waren jedoch vor allem nächtliche Schmerzen ausschlaggebend. Dies ist nicht erstaunlich, da gestörte Nachtruhe, erheblich eingeschränkte Lebensqualität und Schmerz bei Krebspatienten häufig eng zusammenhängen[24]. Für künftige Forschungsprojekte und die klinische Praxis könnte das bedeuten, dass ein durch Schmerz gestörter Nachtschlaf verstärkt als Ansatzpunkt in Interventionen dienen könnte, um Patienten bei der Entscheidung zu einer Schmerzmitteleinnahme zu unterstützen. Weiter beeinflussten sowohl persönliche Ansichten wie auch frühere Erfahrungen die Studienteilnehmer, in bestärkender oder zurückhaltender Weise, in ihrem Umgang mit Schmerzmedikamenten, wie dies von anderen Autoren bereits beschrieben wurde[8,12-14].

Limitationen. Für diese Sekundäranalyse wurden Daten verwendet, die während der Intervention zur Qualitätskontrolle und mittels Interviews zu Erfahrungen mit der Pilotstudie erhoben wurden. Die hier untersuchte Fragestellung war folglich nur indirekt Thema in Interventionsgesprächen und Interviews. Direkte Nachfragen zu unklaren Aussagen waren nicht möglich. Positiv betrachtet konnten aber mit der Sekundäranalyse reale Entscheidungsprozesse im Zeitverlauf exploriert werden. Eine weitere Einschränkung ist die kleine Untersuchungsgruppe und die Tatsache, dass möglicherweise eher Patienten, die bereit waren, Neues zu lernen, einer Teilnahme an der Pilotstudie zustimmten. Da nur Daten aus der Interventionsgruppe zur Verfügung standen, konnten Entscheidungen von Patienten mit einer üblichen Schmerzbehandlung nicht untersucht werden. Schliesslich konnte im Rahmen dieser Sekundäranalyse keine Rücküberprüfung der Resultate mit den Teilnehmern durchgeführt werden. Bei der vorliegenden Studie wurden zwar Angehörige einbezogen, jedoch reichte die Datenmenge nicht für eine Analyse aus.

Schlussfolgerungen

Mit dieser Sekundäranalyse konnten Entscheidungen einer kleinen Gruppe von onkologischen Patienten im Umgang mit Schmerzmedikamenten im Verlauf einer Intervention beschrieben werden, die darauf abzielte, das Schmerz-Selbstmanagement der Patienten zu verbessern. In zukünftigen grösseren Langzeitstudien sollten Sichtweise und Verhalten von onkologischen Patienten mit ihrer Schmerzbehandlung weiter exploriert werden. Dabei sollte in zukünftigen Studien auch die Perspektive von Angehörigen einbezogen werden, weil sie eine wichtige Rolle im Schmerz-Selbstmanagement spielen. In der klinischen Praxis scheint es erforderlich, sich der grossen und manchmal lange bestehenden Ambivalenz Betroffener gegenüber Schmerzmitteln bewusst zu sein. Für eine erfolgreiche Intervention zur Unterstützung des Schmerz-Selbstmanagements onkologischer Patienten scheint es wesentlich, genügend Zeit für Gespräche zu haben, Erfahrungen und Verhalten mit dem Patienten zu reflektieren, seine Schmerzbehandlung entsprechend anzupassen und Beratungen solange fortzusetzen, bis der Patient eine gute Schmerzkontrolle erreicht hat und das Schmerz-Selbstmanagement sicher umsetzen kann.

Danksagung

Wir danken den Forschungsassistentinnen, welche die Abschlussinterviews der PEINCA-Pilotstudie durchgeführt haben und den Kommilitoninnen des Masterseminars am Institut für Pflegewissenschaft der Universität Basel für die kritischen Gespräche und die Unterstützung bei der Analyse.

Referenzen

1. Robert-Koch-Institut. Krebs in Deutschland 2003 - 2004 Häufigkeiten und Trends. Gesellschaft der epidemiologischen Krebsregister in Deutschland e V, Gesundheitsberichterstattung des Bundes, 2008.
2. Marcus DA. Epidemiology of cancer pain. Curr Pain Headache Rep 2011;15:231-234.
3. Zech DF, Grond S, Lynch J, Hertel D, Lehmann KA. Validation of World Health Organization Guidelines for cancer pain relief: a 10-year prospective study. Pain 1995;63:65-76.
4. World Health Organisation. Cancer pain relief: Geneva, 1986.
5. Fine PG, Miaskowski C, Paice JA. Meeting the challenges in cancer pain management. J Support Oncol 2004;2:5-22.
6. Jacobsen R, Moldrup C, Christrup L, Sjogren P. Patient-related barriers to cancer pain management: a systematic exploratory review. Scand J Caring Sci 2009;23:190-208.
7. Ersek M, Kraybill BM, Pen AD. Factors hindering patients' use of medications for cancer pain. Cancer Pract 1999;7:226-232.
8. Schumacher KL, West C, Dodd M, et al. Pain management autobiographies and reluctance to use opioids for cancer pain management. Cancer Nurs 2002;25:125-133.
9. Randall-David E, Wright J, Porterfield DS, Lesser G. Barriers to cancer pain management: home-health and hospice nurses and patients. Support Care Cancer 2003;11:660-665.
10. Reid CM, Gooberman-Hill R, Hanks GW. Opioid analgesics for cancer pain: symptom control for the living or comfort for the dying? A qualitative study to investigate the factors influencing the decision to accept morphine for pain caused by cancer. Ann Oncol 2008;19:44-48.
11. Donovan J. Patient education and the consultation: the importance of lay beliefs. Ann Rheum Dis 1991;50 Suppl 3:418-421.
12. Donovan JL. Patient decision making. The missing ingredient in compliance research. Int J Technol Assess Health Care 1995;11:443-455.
13. Chewning B, Wiederholt JB. Concordance in cancer medication management. Patient Educ Couns 2003;50:75-78.

14. Liang SY, Yates P, Edwards H, Tsay SL. Factors influencing opioid-taking self-efficacy and analgesic adherence in Taiwanese outpatients with cancer. Psychooncology 2008;17:1100-1107.

15. Koller A, Miaskowski C, De Geest S, Opitz O, Spichiger E. Research proposal: Pilot study to test the feasibility and pre-test the efficacy of the German language adapted PRO-SELF© Plus Pain Control Program, an educational intervention directed at patients and their family caregivers to reduce cancer pain and related symptoms PEINCA (Pain Education INtervention CAncer), 2009.

16. West CM, Dodd MJ, Paul SM, et al. The PRO-SELF(c): Pain Control Program--an effective approach for cancer pain management. Oncol Nurs Forum 2003;30:65-73.

17. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.

18. Mayring P. Qualitative Inhaltsanalyse - Grundlagen und Techniken, ed 10th Weinheim und Basel, Beltz, 2008.

19. Ward SE, Goldberg N, Miller-McCauley V, et al. Patient-related barriers to management of cancer pain. Pain 1993;52:319-324.

20. Bennett MI, Bagnall AM, Jose Closs S. How effective are patient-based educational interventions in the management of cancer pain? Systematic review and meta-analysis. Pain 2009;143:192-199.

21. Matthias MS, Parpart AL, Nyland KA, et al. The patient-provider relationship in chronic pain care: providers' perspectives. Pain Med 2010;11:1688-1697.

22. Schmalenbach L. Lernstrategien, Lerntypen und Lernstile. Norderstedt: GRIN, 2008.

23. Keefe FJ, Abernethy AP, Campbell LC. Psychological approaches to understanding and treating disease-related pain. Annu Rev Psychol 2005;56:601-630.

24. Mystakidou K, Parpa E, Tsilika E, et al. The relationship of subjective sleep quality, pain, and quality of life in advanced cancer patients. Sleep 2007;30:737-742.

Chapter 9

Discussion

Pain remains a major problem in a large proportion of individuals with cancer[1,2]. Patient-related barriers are known to significantly hinder optimal pain control[3]. Therefore, this research project was focused on the support of pain self-management in patients with cancer and their family caregivers (FCs).

First, a systematic review of the literature provided a summary, an evaluation of efficacy, and a critique of various components of interventions that were used to support oncology patients' and their FCs' pain self-management (see Chapter 3). To our knowledge, the review was the first to systematically describe seven structure and 16 content components that were used in 24 different cancer pain self-management interventions. The various components were used inconsistently across these studies. Furthermore, significant heterogeneity was found in study designs as well as methods that were used to test the interventions. As a result, the most effective components of interventions designed to support cancer pain self-management remain to be determined in future trials.

As part of this dissertation research, the first mixed methods pilot study was done to evaluate the German PRO-Self© Plus Pain Control Program (PCP) for feasibility and potential efficacy. To our knowledge, it was the first project in which a cancer pain self-management intervention that was developed in the United States (U. S.)[4,5] was tested in a German speaking population. First, translation and adaptation of the PRO-Self© Plus PCP were performed successfully. For the mixed methods pilot study, a randomized controlled pilot trial (pilot RCT) was combined with two qualitative substudies. Findings from the pilot RCT (see Chapters 5 and 6) demonstrated feasibility of study and intervention procedures and provided the basis for a multicenter RCT. While pain management related knowledge

improved significantly, effect size calculations showed low to moderate reductions in average and worst pain.

In the first qualitative substudy, it was explored how nine patients and four FCs who finished the intervention experienced intervention and study procedures. Findings confirmed that for patients and FCs, a trustful relationship with the intervention nurse was of utmost importance. Furthermore, the intervention's focus on cancer pain self-management was novel for and appreciated by the participants. The discussion of everyday problems, the intervention nurse's profound knowledge about pain self-management, and sufficient time to discuss problems repeatedly resulted in a high satisfaction of the participants, as well as a meaningful reduction in pain for most patients in this substudy.

Findings from the second qualitative substudy of eight patients' decision-making processes about taking analgesic medications showed that cancer patients stayed ambivalent about the use of analgesics over the whole course of the intervention. The need for adequate pain relief contrasted with the desire to avoid analgesic medications. Despite positive experiences with analgesics, decisions were reconsidered and overturned. Individually tailored counseling helped these patients to adopt new attitudes towards analgesics and to gradually reduce their pain levels.

In the following paragraphs, various aspects of this research project are analyzed and critiqued. First, a critical appraisal of the methods is done to determine their appropriateness. Next, the German PRO-Self© Plus PCP is put into an international context by comparing it with other cancer pain self-management interventions that were summarized in a meta-analysis[6] and in our systematic review. Furthermore, reflections on the conceptual frameworks that guided this research project are presented. In addition, limitations of this research project and implications for future research are enumerated. The final section includes the conclusions from this dissertation research.

Critical Appraisal of Methods Used

Systematic review. An extensive literature search yielded 24 studies of interventions designed to support cancer pain self-management (see Chapter 3), two systematic reviews[7,8], and a meta-analysis[6]. In the systematic reviews and meta-analysis, the major conclusion was that cancer pain self-management interventions may be efficacious in improving patients' knowledge and decreasing pain intensity. No conclusions could be drawn about the specific components of the various interventions and which components were the most efficacious.

With the systematic review (see Chapter 3), we thus aimed to describe and evaluate the various intervention components within the identified intervention studies. A narrative approach was used in which a content analytical approach[9] was combined with statistical methods (i.e., calculation of effect size) in order to systematically summarize intervention components and effect sizes of tested cancer pain self-management interventions. A quantitative meta-analytical approach (i.e., meta-regression) may have been the preferred method to identify the most effective components as was done in a study of disease management interventions for patients with diabetes[10]. However, such a quantitative meta-analytic approach was considered to be inappropriate given the number of different interventions and intervention components, as well as the heterogeneity of study designs that were identified. Our approach proved to be appropriate and valuable to provide the basis for future studies in which study designs may be applied that permit the discrimination of specific intervention components (e.g., factorial designs).

Choice of intervention and pilot testing. Interventions designed to support cancer pain self-management are largely unknown in German speaking populations. Therefore, the decision was made to translate and adapt an effective intervention from the U. S., instead of "reinventing the wheel" by developing and testing a new intervention without established efficacy. In this thesis, the PRO-Self© Plus PCP was chosen for three reasons. First, the Program's efficacy was established in a large RCT in the U. S.[4]. Second, adaptations after the first RCT were based on extensive qualitative and quantitative analyses that suggested that specific revisions would improve its efficacy[11,12]. Third, the authors of the PRO-SELF© Plus PCP agreed to collaborate closely during the implementation of the German PRO-SELF© Plus PCP. Before testing the German PRO-Self© Plus PCP in a large RCT, a pilot study was appropriate in order to evaluate feasibility and establish effect sizes. Adaptation and pilot testing of the PRO-Self© Plus PCP was overall successful. Moreover, the mixed methods pilot study yielded valuable information to be able to plan of a larger multicenter RCT.

Mixed methods. To evaluate the German PRO-Self© PCP, a nested concurrent mixed methods design[13] was used in order to augment findings from the pilot RCT with data from two qualitative substudies. Initially, a single qualitative substudy was planned in order to explore participants' experiences with study and intervention procedures. However, audiotapes of the intervention sessions and the debriefing interviews provided rich data for a second qualitative study that yielded additional interesting findings about the patients' decision-making processes regarding their analgesic intake.

Inferences in mixed methods research are drawn from the separate quantitative and qualitative parts of the study as well as across the two parts[13]. Thus, interpretability of the separate qualitative and quantitative findings are improved and more comprehensive conclusions may be drawn by combining qualitative and quantitative findings. Although the small sample sizes for both, the pilot RCT and the qualitative substudies, may have resulted in a limited variance in findings, the combination of qualitative and quantitative methods was found to be highly appropriate to evaluate the German PRO-Self© Plus PCP for feasibility and for its potential to reduce cancer pain. The following examples illustrate how qualitative findings facilitated the interpretation of quantitative findings and vice versa.

With the Patient Pain Questionnaire[14], nine common knowledge deficits or perceived barriers to pain self-management were assessed. While overall improvements were statistically significant, a detailed analysis showed that single items of the Patient Pain Questionnaire showed no improvement in patients' knowledge. Patients who participated in the debriefing interviews provided an explanation for this finding. They reported that the print material was not relevant in assisting them to improve their pain self-management. Furthermore, for the entire intervention group, pain scores did not improve significantly in this pilot RCT. However, participants of the qualitative substudy experienced a clinically meaningful reduction in pain. In fact, a subanalysis of their average and worst pain scores showed a statistically significant improvement between baseline and week 10.

Conduction of pilot RCT. In this pilot RCT, the feasibility of research and intervention procedures was well established. Furthermore, a pilot RCT was an appropriate method to evaluate the intervention's efficacy and to estimate effect sizes for a larger RCT. However, recruitment and retention of participants posed many challenges in this population of patients with advanced cancer and their FCs. Moreover, the inclusion of a control group that received only an attention intervention and standard care confronted the nurse who conducted the attention control visits with ethical dilemmas. The problem was increased because, in this pilot study, the same nurse conducted both the attention control and the intervention visits. This nurse was a pain expert who identified problems with pain self-management in the control group while checking the study questionnaires for completeness. If problems with pain self-management were revealed during these visits, the nurse referred patients to their clinicians instead of providing education and coaching to improve pain control. In future research, the challenges that were identified during the pilot RCT will need to be addressed in order for a larger RCT to be successful. For example, to address the ethical dilemma, the control group may be offered the intervention after study completion (i.e., waiting control group).

Comparison of PRO-Self© Plus PCP to Other Interventions in the Systematic Review

Findings from the evaluation of the German PRO-Self© Plus PCP will be discussed below in relationship to the findings from the studies that were summarized in a meta-analysis[6] and in our systematic review (see Chapter 3). Compared with the studies in the meta-analysis and our systematic review, the German PRO-Self© Plus PCP was an intensive and comprehensive intervention in terms of both its structure and its content.

Structure components. The German PRO-Self© Plus PCP consisted of 6 visits and 4 phone calls (i.e., multiple exposures) by an intervention nurse over ten weeks. Patients in the intervention group received a median dose of 283 minutes (25/75 percentile = 229/372 minutes). Patients completed a daily pain diary and were given a booklet that contained information about 9 common patient-related barriers. In the PRO-Self© Plus PCP, interaction between patients, their FCs, and the intervention nurse was an integral part of all contacts. Interactions included the provision of information and coaching. These interactions continued until no further questions remained. In addition participants were invited to ask questions at any time during the visits and phone calls.

As in most of the analyzed studies (15 of the 24), the German PRO-Self© Plus PCP was delivered with multiple exposures. However, patients in our pilot RCT were exposed to a high dose of intervention compared to those interventions that were included in our systematic review. In the pilot RCT, the median dose of the German PRO-Self© Plus PCP was higher than the dose of intervention in any of the trials in the systematic review (range of 30 to 270 minutes).

As in most interventions (23 of 24 studies), print materials were used in the Pro-Self© Plus PCP to reinforce information. Print materials are viewed as a cost effective method to deliver information about various types of self-management[15]. However, during the debriefing interviews in our qualitative substudy, participants stated that, except for the pain diary, print materials were not important and that they preferred personal and tailored information by a trustworthy and competent clinician. This finding supports previous work that suggests that the efficacy of print materials for self-management depends on the mode of delivery (e.g., contacts in which print materials are discussed with patients) and the amount of tailoring of the materials for a specific patient[15]. In a future study, print materials may be integrated repeatedly (e.g., by repeating academic detailing at subsequent visits) in the intervention in order to enhance their perceived usefulness.

Content components. Except for direct contact of research staff with clinicians, the German PRO-Self© Plus PCP included all content components that were found in our systematic review. In the systematic review, across interventions, cognitive content components were used more frequently than behavioral components. This approach may be due to the fact, that provision of information is more easily performed and less costly than the support of skills and behavior change[16]. Regarding cognitive content components, most interventions included information on patient-related barriers to pain management (23 of 24), analgesic medications (20 of 24), communication with the clinicians (18 of 24), and information about the side effects of analgesic medications (16 of 24). Tips on how to communicate with clinicians about unrelieved pain was the behavioral content component included most frequently (10 of 24).

In contrast to most studies in our systematic review (3 of 24 studies comprised goal setting), the PRO-Self© Plus PCP included goal setting as an individually tailored method to enhance patients' sense of mastery and success based on social cognitive theory[17]. The pilot study yielded mixed findings regarding the evaluation of goal setting. The intervention's significant effect on the item "The pain has hindered me to do the things I wanted to do today" suggests that goal setting was effective (see Chapter 6). However, significant increases in ratings of self-efficacy were not found in this pilot RCT. The effect of goal setting within an intervention to support cancer pain self-management needs further exploration in future studies.

The German PRO-Self© Plus PCP is a cancer pain self-management intervention directed at patients and their FCs. Therefore, direct contact between the intervention nurse and the patient's clinicians was not a component of the intervention. The coordination of cancer pain treatment recommendations and self-management support was noted to be an essential component of effective pain management[18]. In addition, patients in our qualitative substudy stated that the concordance of recommendations between their clinician and the intervention nurse was a factor that strongly supported changes in their behaviors (see Chapter 7). In future trials, it may be useful to evaluate how the coordination of recommendations between physicians and the intervention nurse could be optimized.

Effect sizes. In the context of the intensity of the German PRO-Self© Plus PCP, reductions in pain intensity scores in this pilot RCT were relatively small compared to findings from a recent meta-analysis[6] (i.e., weighted mean differences of average and worst pain scores = 0.65 to 1.1). Possible reasons for the small effect sizes include that the doses of taken opioid analgesics (i.e., median doses ranged from 6.7 to 20 mg across the study period) were relatively low compared to another study of patients with similar levels of

cancer pain[19]. It could not be assessed whether the low opioid intake was due to patients' lack of adherence or because the analgesic prescriptions were not adapted by the patients' physicians. Furthermore, patients' ongoing doubts and returns to previous attitudes regarding analgesic intake that were found in one of the qualitative substudies may explain the low effect sizes. In addition, the German PRO-Self© Plus PCP focused mainly on patient-related barriers. However, barriers to effective pain management include system- and clinician-related barriers[3]. These types of barriers were not addressed in the German PRO-Self© Plus PCP.

Moreover, not all patient-related barriers were addressed equally over the course of the intervention (e.g., only those patient-related barriers that were directly related to the patient's analgesic regimen were repeatedly discussed during the nurse coaching). In addition, symptoms that may have impaired analgesic intake (e.g., nausea and vomiting associated with therapy) were not addressed as a routine part of the intervention. Moreover, the small sample in this pilot study may have resulted in the uneven distribution of curative patients in the control (n = 2) and intervention (n = 0) groups.

Based on the findings from the systematic review, we hypothesized in concordance with previous research[6], that intervention components not previously described (e.g., empathy by clinician) may have influenced the interventions' efficacy. Interestingly, this hypothesis was supported by findings from the qualitative substudy on the participants' experiences with the intervention and study procedures (see Chapter 7). These patients and their FCs stressed the importance of a trustful relationship with the intervention nurse which was shaped by the intervention nurse's establishment of a therapeutic relationship (e.g., a caring attitude); her expert knowledge of pain management; as well as the repeated meetings and the provision of a sufficient amount of time to discuss questions which arose during the implementation of pain self-management. This finding is consistent with Rodin et al.[20] who suggested clinicians need training in communication skills as well as opportunities to de-brief after consultations in order to increase the efficacy of communication between clinicians and oncology patients. The inclusion of these components in future trials[20] may improve the patients' and FCs' comprehension as well as the efficacy of interventions on cancer pain self-management.

As noted above, the effect size for pain intensity was relatively small in the pilot RCT. However, interesting findings were obtained when changes in pain scores of the patients in the intervention group who participated in the debriefing interviews of the pilot study were analyzed. These patients were found to have statistically and clinically significant reductions in pain scores from the beginning to the end of the intervention

(compared to baseline, average pain scores decreased by 1.95 [SD = 2.49; p = 0.47] on a scale from 0 [no pain] to 10 [worst pain imaginable] and worst pain scores decreased by 2.67 [SD = 2.84; p = 0.02]). Furthermore, all participants in the qualitative substudy were extremely satisfied with the Program and had internalized important aspects of pain self-management (e.g., around-the-clock intake of analgesic medication). Those patients who dropped out of the study had a lower functional status at baseline than those patients who remained in the study. Therefore, one possible explanation for this relatively large effect for participants in the qualitative substudy was that these patients received the entire dose of the intervention. In addition, these patients were in better health and may have been more capable to participate actively in the intervention as well as make the required behavior changes. Future studies, need to develop different types of interventions for patients with lower levels of physical function.

Reflections on the Conceptual Frameworks

In mixed methods research, cancer pain self-management interventions need to be evaluated within the context of a theoretical framework in order to outline possible cues for action or guide thoughts and inferences[13,21]. Because an all-inclusive conceptual framework is not available for self-management interventions, two frameworks were chosen to guide this thesis (see Chapter 1). First, symptom management theory (SMT)[22,23] was chosen to guide the study and intervention procedures. Second, social cognitive theory[17,24] was used to guide the development and delivery of the intervention.

Overall, SMT was a useful framework for the pilot RCT because it guided the selection of appropriate outcomes and the placement of the intervention within a broad context. In SMT, adherence is placed as a link between the two dimensions “Symptom management strategies” and “Symptom status outcomes”. Even though the inclusion of adherence in SMT is unquestioned, a discussion is occurring in the literature about the correct placement for adherence within SMT[23]. Rather than being related to only two dimensions of SMT (i.e., “Symptom management strategies” and “Symptom status outcomes”), adherence may be related with numerous concepts within the entire SMT[25]. For example, distress from high pain intensity may result in the patient’s decreased capability to adhere to the intervention nurse’s recommendations. In future research the placement of adherence within SMT (e.g., relationship of adherence with patients’ experience of cancer pain)[25] may be explored in more detail.

Social cognitive theory provided a sound basis for planning and conducting the German PRO-Self© Plus RCT. However, a surprising finding was that the intervention did not have an effect on the participants' rating of their self-efficacy (see Chapter 6) as reported previously[26]. The intervention may not have included sufficient components that increased the patients' self-efficacy (e.g., verbal persuasion or role modeling)[17]. These inconsistent findings need to be explored in future RCTs. Furthermore, as stated above, the role of goal setting in enhancing the participants' sense of mastery needs further evaluation.

Another important finding from the qualitative substudy of patients' decision processes was related to their analgesic medication intake (see Chapter 8). In this substudy, patients' answers to some of the items of the Patient Pain Questionnaire[14] were not congruent with the doubts they expressed during sessions and interviews (e.g., patients continued to state their fear of becoming addicted to their analgesic medications even though their answers on the Patient Pain Questionnaire improved). This finding suggests that cognitive responses to an intervention targeted at cancer pain self-management may differ from emotional responses and is congruent with concepts in social cognitive theory[24]. Social cognitive theory emphasizes that the transfer of knowledge and skills into appropriate performance in daily life depends on many factors (e.g., self-efficacy) that are influenced to a great extent by emotions. The inconsistencies in patients' emotional and cognitive responses to the German PRO-Self© Plus PCP need to be explored in future research.

Limitations

This thesis has several limitations. In our systematic review, the description of the interventions' components did not include unpublished components because the analysis was based on available publications (see Chapter 3).

Furthermore, one of the major limitations of the pilot RCT was the low recruitment rate which is a serious threat to the external validity of the findings. In addition, a high attrition rate limits the generalizability of the findings. Moreover, findings from the qualitative substudies were limited to those patients who reported a relatively good health status. Even though patients with cancer pain may be unable to complete RCTs because of deterioration in their health status, reducing study burden and tailoring the intervention to meet patients' needs may help to decrease attrition rates in future trials. As a result of the low recruitment and high attrition rates, fewer patients were included in the pilot study than planned (39 instead of 60 patients) and only a small number of patients provided complete data (n = 18). Therefore, findings from this study need to be interpreted with caution.

Finally, resources in this research project were limited. As a result, all of the study visits for both the intervention and the control groups were performed by the same nurse. Therefore, an occasional unintentional contamination cannot be totally excluded given the ethical dilemma that patients in the control group were not provided with direct support if problems with their pain self-management arose.

Implications for Future Research

Implications for future research that were derived from this thesis include the need for improvements in study and intervention procedures as well as reflections on the conceptual frameworks that guided this research project. The systematic review may serve as a basis for future trials with appropriate study designs (e.g., factorial designs) to evaluate which components of the interventions are the most effective. Experiences with the pilot RCT revealed that the clinical setting and the population need to be taken into account in order to optimize recruitment and decrease attrition (e.g., reduce study burden).

To increase effect sizes, improvements of the intervention may be considered in future studies as suggested in this thesis (e.g., repeated integration of print materials). Furthermore, the coordination of recommendations by patients' physicians and the intervention nurse should be considered in future trials. In addition, it is highly recommended that intervention nurses work to build trusting relationships with patients and constantly convey professional competence and a caring attitude.

Moreover, it may be necessary to explore how patients with lower functional status could benefit more from the German PRO-Self© Plus PCP. Possible adaptations may include the reduction of study burden as well as the tailoring of the intervention more closely to patients' needs and situation.

In future research, the optimal balance of costs and benefits of a cancer pain self-management intervention needs to be determined. In this context, the amount of time that is spent with the patients needs to be evaluated in view of the optimal pain reduction that each patient may gain. Findings from our research project indicate that a cancer pain self-management intervention with multiple face-to-face contacts may be more efficacious than a single exposure intervention even though this hypothesis was not confirmed by findings from a recent meta-analysis[6]. However, the optimal dose of the intervention remains to be determined. In the U. S., a second RCT is currently underway by the U. S. PRO-Self© study group at the University of California San Francisco that addresses this gap (Miaskowski, C., personal communication, January 14, 2012). A low dose PRO-SELF©

Plus PCP (8.0 hours over 10 weeks) is being compared with high dose PRO-SELF© Plus PCP (12.3 hours over 10 weeks).

In future studies, some aspects of the theoretical frameworks may be reconsidered. For example, within SMT[22,23], the role of adherence in cancer pain self-management requires further investigation. Furthermore, according to social cognitive theory[17], the intervention's lack of effect on self-efficacy may be examined in more detail. An additional interesting aspect for further exploration may be the incongruence between cognitive and emotional responses regarding some patient-related barriers towards pain self-management (e.g., fear of addiction).

Conclusions

The systematic review in this thesis is the first to provide a comprehensive overview of components of cancer pain self-management interventions in the context of their potential to reduce cancer pain. Furthermore, the transfer and evaluation of the German PRO-Self© Plus PCP, an intervention to support cancer pain self-management, was performed successfully. In the pilot RCT, pain self-management related knowledge increased significantly and it was possible to calculate effect sizes for the intervention's potential for pain reduction. Findings demonstrated patients' high satisfaction with the German PRO-Self© Plus PCP and showed how patients remained highly ambivalent regarding analgesic intake even if they decided to take analgesics. Even though the effects were rather small, findings from this mixed methods research project provided valuable data on how to improve the intervention and plan a larger multicenter RCT.

References

1. Breivik H, Cherny N, Collett B, et al. Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. Ann Oncol 2009;20:1420-1433.
2. Spichiger E, Mueller-Froehlich C, Denhaerynck K, et al. Prevalence of symptoms, with a focus on fatigue, and changes of symptoms over three months in outpatients receiving cancer chemotherapy. Swiss Med Wkly. DOI: w13303.
3. Jacobsen R, Liubarskiene Z, Moldrup C, et al. Barriers to cancer pain management: a review of empirical research. Medicina (Kaunas) 2009;45:427-433.
4. Miaskowski C, Dodd M, West C, et al. Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. J Clin Oncol 2004;22:1713-1720.
5. West CM, Dodd MJ, Paul SM, et al. The PRO-SELF(c): Pain Control Program - an effective approach for cancer pain management. Oncol Nurs Forum 2003;30:65-73.
6. Bennett MI, Bagnall AM, Jose Closs S. How effective are patient-based educational interventions in the management of cancer pain? Systematic review and meta-analysis. Pain 2009;143:192-199.
7. Allard P, Maunsell E, Labbe J, Dorval M. Educational interventions to improve cancer pain control: a systematic review. J Palliat Med 2001;4:191-203.
8. Devine EC. Meta-analysis of the effect of psychoeducational interventions on pain in adults with cancer. Oncol Nurs Forum 2003;30:75-89.
9. Mayring P. Qualitative Inhaltsanalyse: Grundlagen und Techniken [Content analysis: basic principles and techniques], ed 11th. Weinheim, Beltz., 2010.
10. Pimouguet C, Le Goff M, Thiebaut R, Dartigues JF, Helmer C. Effectiveness of disease-management programs for improving diabetes care: a meta-analysis. CMAJ 2011;183:E115-127.
11. Schumacher KL, Koresawa S, West C, et al. Putting cancer pain management regimens into practice at home. J Pain Symptom Manage 2002;23:369-382.
12. Miaskowski C, Dodd M, West C, et al. The use of a responder analysis to identify differences in patient outcomes following a self-care intervention to improve cancer pain management. Pain 2007;129:55-63.
13. Creswell JW, Plano Clark VL. Designing and Conducting mixed methods research, ed 2nd. Thousand Oaks, California, Sage, 2011.

14. Ferrell BR, Rhiner M, Ferrell BA. Development and evaluation of the family pain questionnaire. J Psychosoc Oncol 1993;10:21-35.

15. Noar SM, Benac CN, Harris MS. Does tailoring matter? Meta-analytic review of tailored print health behavior change interventions. Psychol Bull 2007;133:673-693.

16. Lorig KR, Holman H. Self-management education: history, definition, outcomes, and mechanisms. Ann Behav Med 2003;26:1-7.

17. Bandura A. Self-efficacy mechanisms in psychological activation and health promoting behavior. In Madden J, Matthysse S, Barchas (eds): Adaptation, learning and affect. New York, Raven Press, 1989, pp 1-51.

18. National Comprehensive Cancer Network. NCCN Clinical Practice GuidelinesTM: Adult cancer pain, retrieved Jan 14, 2012, from http://www.nccn.org/professionals/physician_gls/PDF/pain.pdf.

19. Zech DF, Grond S, Lynch J, Hertel D, Lehmann KA. Validation of World Health Organization Guidelines for cancer pain relief: a 10-year prospective study. Pain 1995;63:65-76.

20. Rodin G, Zimmermann C, Mayer C, et al. Clinician-patient communication: evidence-based recommendations to guide practice in cancer. Curr Oncol 2009;16:42-49.

21. Glanz K, Rimer B, Lewis F, Jossey-Bass S. Health behavior and health education: Theory, research, and practice. Education for Health 2004;17:399-402.

22. Dodd M, Janson S, Facione N, et al. Advancing the science of symptom management. J Adv Nurs 2001;33:668-676.

23. Humphreys J, Lee KA, Carrieri-Kohlmann V, et al. Theory of symptom management. In Smith MJ, Liehr PR (eds): Middle range theory for nursing. New York, Springer, 2008, pp 145-158.

24. Bandura A, Walters RH. Social Learning and personality developement. New York, Thomson, 1963.

25. Donesky-Cuenco D, Janson S, Neuhaus J, Neilands TB, Carrieri-Kohlman V. Adherence to a home-walking prescription in patients with chronic obstructive pulmonary disease. Heart Lung 2007;36:348-363.

26. Keefe FJ, Ahles TA, Sutton L, et al. Partner-guided cancer pain management at the end of life: a preliminary study. J Pain Symptom Manage 2005;29:263-272.

Curriculum Vitae

Personal Data

Name	Antje Koller
Address	Buchenstrasse 22, 79108 Freiburg, Germany
E-Mail	antje.koller@unibas.ch
Date of birth	July 12th, 1972
Nationality	German

Education

Graduate

2008 - 2012 **PhD study program**
Institute of Nursing Science, Faculty of Medicine, University of Basel, Switzerland
Faculty representative: Prof. Dr. S. De Geest
PhD advisor: Dr. E. Spichiger
Co-referee: Prof. Dr. C. Miaskowski
External Expert: Prof. Dr. T. Rustœn
Expert: Prof. Dr. med. O. Opitz

2001 - 2005 **Master in Nursing Science**
Institute of Nursing Science, Faculty of Medicine, University of Basel, Switzerland

Undergraduate

1993 - 1996	**Diploma in Nursing** St. Josef's' Hospital, Freiburg, Germany
1991 - 1993	**Studies in Mathematics** Albert-Ludwigs-Universität, Freiburg, Germany
1991	**University Entrance Diploma (Abitur)** Albert-Einstein-Gymnasium, Buchholz in der Nordheide, Germany

Other Relevant Trainings

2011	**Pain Nurse Certificate** Centrum für Kommunikation Information Bildung (cekib); University Medical Center, Nürnberg, Germany.

Professional Experience

Mar. 2012 - present	**Clinical Nurse Specialist (80%)**
Mar. 2012 - present	**Research assistant (20%)**
2007 – Feb. 2012	**Research assistant (40%)** Institute of Nursing Science, Faculty of Medicine, University of Basel, Switzerland
2009 - 2010	**Junior-member of leadership team** Institute of Nursing Science, Faculty of Medicine, University of Basel, Switzerland
2008 – Feb. 2012	**Clinical Nurse Specialist (20%)** Department of Internal Medicine, Hemato-/Oncology, University Medical Center, Freiburg, Germany
2007 - 2008	**Clinical Nurse Specialist (60%)** Department of Internal Medicine, Hemato-/Oncology, University Medical Center, Freiburg, Germany

2005 - 2007	**Clinical Nurse Specialist (100%)** Department of Internal Medicine, Hemato-/Oncology, University Medical Center, Freiburg, Germany
2002 - 2005	**Trainee Clinical Nurse Specialist (50%)** Department of Internal Medicine, Hemato-/Oncology, University Medical Center, Freiburg, Germany
1999 - 2002	**Staff nurse (100%)** Intensive Care Unit, Department of Neurology, University Medical Center, Freiburg, Germany
1998 - 1999	**Staff nurse (100%)** Beli Home Care Service, Freiburg, Germany
1998	**Registered agency nurse** Various hospitals in London, Great Britain
1996 - 1998	**Staff nurse (100%)** Septic-surgical unit, St. Josef's Hospital, Freiburg, Germany

Research

2008 - 2012	PEINCA (Pain Education In CAncer Patients) project. Pilot study to test the feasibility and pre-test the efficacy of the German PRO-SELF© Plus Pain Control Program, an educational intervention directed at patients and their family caregivers to reduce cancer pain and related symptoms.
2007 - 2008	Collaboration in SYCAP (SYmptoms in CAncer Patients) project. Prevalence and evolution of symptom experience in cancer patients with focus on fatigue and anemia as its potential correlate.
2004 - 2005	Master thesis: Two-dimensional evaluation of symptom occurrence and symptom distress associated with side effects of immunosuppressive medication in renal transplant patients.

Financial Support

2010 - 2011	**PEINCA study** Ebnet Foundation: 175'000 CHF
2009 - 2011	**PEINCA study** Parrotia Foundation: 31'600 CHF Stiftung zur Krebsbekämpfung: 20'000 CHF Hans-H. Hasbargen GmbH & Co.KG sponsoring of pill boxes
2011	**Sponsoring of Pain Nurse training** Mundipharma, Germany
2009	**Sponsoring of special study visit at the University of California San Francisco** Ruth Quenzer Fondation

Publications

Articles in Peer Reviewed Journals

2012	Koller A., De Geest S., Miaskowski C., Opitz O., Spichiger E.; Supporting oncology patients' pain self-management: Methods and lessons learned from a randomized controlled pilot study. European Journal of Oncology Nursing, in press.
2011	Koller A., De Geest S., Miaskowski C., Opitz O., Spichiger E.; Results of a randomized controlled pilot study of a self-management intervention for cancer pain. Submitted to European Journal of Oncology Nursing.
2011	Luescher C., Koller A., Schaefer I., Spichiger E.; Entscheidungswege von onkologischen Patienten im Umgang mit Schmerzmedikamenten im häuslichen Umfeld: eine qualitative Sekundäranalyse [Oncological patients' decision-making processes concerning their pain medication at home: a qualitative secondary analysis]. Pflege: Die wissenschaftliche Zeitschrift für Pflegeberufe, in press.

2011 Koller A., De Geest S., Miaskowski C., Opitz O., Spichiger E.; A systematic evaluation of content, structure, and efficacy of interventions to improve patients' self-management of cancer pain. Journal of Pain and Symptom Management, in press.

2010 Koller A., Denhaerynck K., Moons P., Steiger J., Bock A., De Geest S.; Distress associated with adverse effects of immunosuppressive medication in kidney transplant recipients. Progress in Transplantation, 20:40-46. (Master thesis).

Other Journals

2011 Koller A., Spichiger E.; Tumorschmerzen in den Griff bekommen [Getting a grip on tumor pain]. Krankenpflege 104, 26-27.

Book Review

2004 Strehl, E., Speckner, W.; Arzneimittel in der Pflege (6 ed.): Eschborn, Govi.

Presentations

International

2010 Koller A., De Geest S., Miaskowski C., Opitz O., Spichiger E.; Pilot study to test the feasibility and pre-test the efficacy of the German language adapted PRO-SELF© Plus Pain Control Program, an educational intervention directed at patients and their family caregivers to reduce cancer pain and related symptoms (PEINCA); poster; 6th Research Congress of the European Association for Palliative Care, Glasgow, Great Britain, 10-11 June.

2005 Koller A.; Generation and implementation of evidence based guidelines for prophylaxis and therapy of chemotherapy induced mucositis; poster; Annual Congress of the European Bone Marrow Transplant Group; Prag, Czech Republic.

National

2011 Koller A.; Patient-related barriers to cancer pain self-management: How do I educate my patients; oral presentation and workshop; Tumorzentrum Ludwig Heilmeyer – Comprehensive Cancer Center Freiburg, Germany, 22 October.

2010 Koller A.; Pathophysiology and state of the art for prophylaxis and therapy of chemotherapy induced mucositis; oral presentation; Tumorzentrum Ludwig Heilmeyer – Comprehensive Cancer Center Freiburg, Germany, 22 March.

2009 Koller A., De Geest S., Miaskowski C., Opitz O., Spichiger E.; Pilot study to test the feasibility and pre-test the efficacy of the German language adapted PRO-SELF© Plus Pain Control Program, an educational intervention directed at patients and their family caregivers to reduce cancer pain and related symptoms; oral presentation; 3rd National Research Day Palliative Care, palliative.ch, Basel, Switzerland, 11 September.

2009 Koller A., De Geest S., Miaskowski C., Opitz O., Spichiger E.; Pilot study to test the feasibility and pre-test the efficacy of the German language adapted PRO-SELF© Plus Pain Control Program, an educational intervention directed at patients and their family caregivers to reduce cancer pain and related symptoms; poster; yearly meeting and 3rd National Research Day Palliative Care, palliative.ch, Basel, Switzerland, 10-11 September.

2006 Koller A., Wolf-Kienzler M.; Implementation of Primary Nursing on the bone marrow transplant unit; oral presentation; Primary Nursing Congress, Erlangen, Germany.

2004 Koller A.; Recommendations for guidelines for prophylaxis and therapy of chemotherapy induced mucositis; oral presentation; Tumorzentrum Ludwig Heilmeyer - Comprehensive Cancer Center, Freiburg, Germany.

2003	Koller A.; Evidence based mouth care for oncology patients, workshop; European School of Oncology-German Nursing Congress, St. Gallen, Switzerland.

Academic Teaching Experience

2010 - present	Quantitative Master seminar. Supervision of Master students of the Institute of Nursing Science, University of Basel
2010 - present	Quantitative proposal writing course. Supervision of Master students of the Institute of Nursing Science, University of Basel.
2010 - 2011	Qualitative proposal writing course. Seminars and supervision of Master students of the Institute of Nursing Science, University of Basel.
2009 - present	Quantitative research course. Lectures and seminars for Bachelor students of the Institute of Nursing Science, University of Basel.
2009 - present	Doctoral seminar. Organization and coordination.
2009 - 2010	Advanced Nursing Practice course. Lecture for Bachelor students of the Institute of Nursing Science, University of Basel.
2008 - present	Leadership course. Action learning for Bachelor students of the Institute of Nursing Science, University of Basel.

Membership in Professional Organizations

2009 - present	German Association for the Study of Pain (Deutsche Gesellschaft zum Studium des Schmerzes)
2006 - present	German Cancer Society (Deutsche Krebsgesellschaft)
2006 - present	German Oncology Nursing Conference (Konferenz Onkologischer Kranken- und Kinderkrankenpflege)