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Review Article

Educational interventions to optimize pain management in adult cancer patients: a scoping review

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Abstract

Purpose: *This review investigated educational interventions in optimizing pain management in adult cancer patients.*
Methods: *The preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) guidelines were used. Key search terms and medical subject headings (MeSH) include "cancer pain", "educational intervention", "adherence", "pain management", "pharmacist", "caregiver", "nurse", and "physician".*
Results: *Although 7,042 records were obtained, only 37 articles were included in the final analysis. Most studies were randomized controlled trials and utilized educational interventions targeting the patients. Nine articles reported interventions focusing on healthcare professionals (HCPs), while two reports utilized targeted family caregivers (FCGs). The interventions were aimed at clarifying misconceptions about opioids, improving patients' pain-related knowledge and adherence to therapy, and HCPs' compliance with practice guidelines. Although different methods were utilized to deliver the interventions, face-to-face sessions and interactive group discussions were most commonly implemented for patients, FCGs and HCPs, respectively. Also, these educational interventions improved pain management in adult cancer patients.*
Conclusion: *Educational interventions had positive effect in optimizing pain management in adult cancer patients. However, systematic reviews are necessary to determine the effects of such interventions and identify factors that may play key roles in pain management for adult cancer patients.*

Keywords: *Cancer pain, Caregivers, Education, Healthcare professionals, Intervention*

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INTRODUCTION

Cancer patients frequently experience pain [1]. Moderate to severe pain affects 39.3 % of patients after curative treatment, 55 % during anticancer interventions, 66.4 % in advanced diseases, and 38 % of all cancer patients [1]. Healthcare providers are provided with guidelines on pain relief, which focus on pharmacological, non-pharmacological, and adjuvant therapies, opioid and non-opioid analgesics. The recommendation also emphasizes the importance of pain knowledge, skills in assessing pain intensity, and education about drug usage and side effects to avoid misuse or abuse [2–4]. Cancer pain

management remains suboptimal, hence negatively influencing patients' psychological state, physical performance, and quality of life [5–7]. Barriers at patient, family caregivers, and healthcare professional levels might also hinder effective pain control [9]. Furthermore, misconceptions about pain and fear of opioid addiction may lower medication adherence [10,11]. Meanwhile, caregivers face several challenges which include communication, medication administration, and side effects [12,13]. Healthcare professionals may also have inadequate knowledge, thus hindering optimal pain management [14–17]. This scoping review provided a comprehensive overview of educational interventions for pain management in adult cancer patients. This review characterized relevant studies, described key features of interventions, and identified outcome measures utilized to evaluate interventions.

METHODS

Search strategy

This scoping review was conducted according to the preferred reporting items for systematic reviews and meta-analyses extension for scoping Reviews (PRISMA-ScR) guidelines [19]. PubMed, Scopus, Embase, Web of Science (WOS), and Cochrane electronic databases were searched. Key search terms and medical subject headings (MeSH) were “cancer pain”, “educational intervention”, “adherence”, “pain management”, “pharmacist”, “caregiver”, “nurse”, and “physician”. The primary search terms and MeSH were combined with Boolean operators (AND or OR functions). A manual search was also performed to include references from included articles, grey literature, and Google Scholar.

Inclusion criteria

Reports published in a peer-reviewed journal between 2000 and August 2022, studies involving adult cancer patients (ACPs) 18 years old or older, presence of an active cancer diagnosis and cancer pain, healthcare professionals (HCPs) caring for ACPs or family caregivers (FCGs) of ACPs, must employ any educational intervention targeting patients, FCGs, or HCPs and seeking to improve pain management. All reported outcomes were also included. There was no restriction on the type of cancer, healthcare settings, or type of educational interventions.

Exclusion criteria

Studies not published in English, case reports and series, book chapters, letters, editorials, comments, and conference abstracts without full text were excluded.

RESULTS

Search results and study characteristics

The search yielded 7,042 records. After screening for deduplication, title, and abstract, 186 full-text articles were reviewed for eligibility. Furthermore, 37 studies were included for final analysis and the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) diagram was developed (Figure 1).

Features of educational interventions

The interventions were either sole (n = 30) or part of a complex, multifaceted approach (n = 7). Based on the findings, most interventions targeted patients (n = 21) and focused on clearing misconceptions about opioids, increasing patient adherence to therapy, improving pain-related knowledge, and enhancing HCPs’ adherence to practice guidelines. However, the studies utilised different methods, with face-to-face sessions and interactive group discussions being the most common (Table 1 a – e). Although positive effects were observed, systematic reviews are still required to determine the effects and identify mediating factors.

DISCUSSION

Most of the reviewed studies on educational interventions for improving cancer pain management were conducted in high-income countries, where opioid inaccessibility is the predominant obstacle to optimal pain management. Other barriers to pain regulation include poor pain-related knowledge [8], non-adherence to guidelines, and misconceptions about opioids. The results indicated low mean scores of patients' knowledge and attitudes towards pain management, with fear of opioid addiction being the most typical challenge [54]. The educational interventions in the reviewed articles also focused on correcting pain misconceptions, enhancing adherence to therapy, and improving patient communication with physicians. However, non-pharmacological and psychological interventions may be necessary to complement pharmacological therapies for pain management [54].

Pain-related data, patient adherence, and patient knowledge or beliefs could be categorized into three primary categories. Pain-related data was the most commonly reported, with pain intensity being the most widely employed parameter. Pain interference in daily life or QoL were some other pain-related outcome measures documented. The brief pain inventory (BPI) assesses the sensory and reactive aspects of pain and was the frequently utilized tool in the reviewed studies. This scoping review discussed parameters of pain outcome, including self-efficacy, anxiety, depression, and patient satisfaction with pain management. The importance of various measures in reducing chronic pain progression and improving treatment adherence behaviour was also highlighted [60]. Furthermore, the employment of modern technologies, such as the Medication Event Monitoring System (MEMS), in determining non-pain-related information, including patient adherence, was included [17].

Majority of the studies reported a positive association between educational interventions and pain outcomes, particularly for cancer pain patients. However, some randomized controlled clinical trials (RCTs) indicated significant differences in pain reports pre- and post-intervention. For example, a training program improved the cognitive and pain-coping skills of the patients and their partners; however, the differences were not significant. Another article also reported no considerable variations in pain intensity or functional status between study and control groups [35]. A similar trend was noted by Williams *et al* [46] where the pain severity index or QoL between the groups involved was not significantly different, suggesting the necessity for a comprehensive approach to pain management [46].

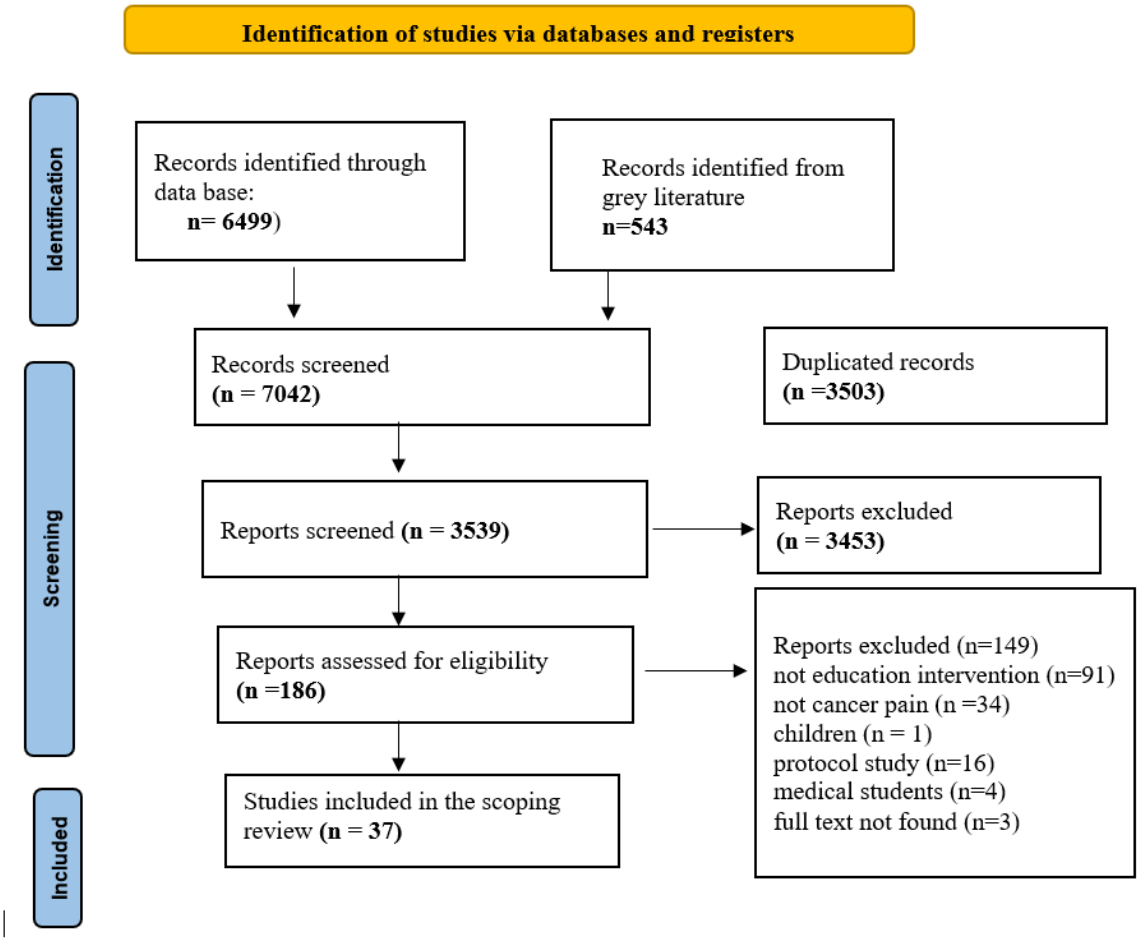

Figure 1: The PRISMA flow employed in this study

Table 1a: Features of educational interventions

Study ID	Education intervention description	Outcome measures and findings
Arthur *et al* [20]	The annual 10-hour educational event in 2018 and 2019 covered topics, including cancer pain, substance use disorder, opioid role, prescribing best practices, and communicating with non-medical opioid users.	Self-perceived knowledge and confidence in caring for cancer and NMOU patients significantly increased.
Bauwens *et al* [21]	Three-day educational sessions and interactive group discussions.	Considerable improvement on all outcome measures.
Capewell *et al* [22]	The intervention consisted of a six-minute DVD and a booklet focused on cancer pain and the use of potent opioids.	Pain interference was notably reduced on day 10, but no further improvement on day 35 post-intervention. No changes in HAD or CSQ scores. Although the PPQ scores significantly improved on day 10, no further improvement was observed on day 35. Adherence to therapy also increased.
Cowperthwaite and Kozachik [23]	Nurses received seven-day education on cancer pain, NCCN, and follow-up communications via email, pain stoppers, and visual aids, while patients received written materials and communication about pain.	No considerable differences in pain management and scores and patient satisfaction between the before and after groups. Nurse knowledge or attitudes towards pain scores also exhibited no notable increase.
De Wit and Van Dam [24]	The intervention group underwent a pain education program, which included topics such as pain management, myths, non-pharmacological treatment, pain assessment, and healthcare provider communication, with post-discharge phone calls for evaluation.	The intervention nurses reported better pain treatment satisfaction and pain intensity estimation than the control nurses. Nonetheless, no significant variation was observed four weeks post-discharge.
De Wit *et al* [25]	The intervention utilized individualized sessions, audiotapes, and brochures to educate patients on pain causes, management, non-adherence, misconceptions, and cancer treatments, with follow-up phone calls to assess understanding.	The control group patients were notably more inadequately treated at two, four, and eight weeks after discharge than their intervention group counterparts.
Du Pen *et al* [26]	A five-hour training session on cancer pain management algorithm, with a reference notebook consisting of an algorithm flow chart, prescribing principles, and side effect treatment.	The patients treated by trained healthcare professionals for over four months reported reduced pain intensity and symptom severity, with minimal improvement in opioid prescribing.
Edwards *et al* [27]	The study involved patients and non-users receiving consultations at a specific pharmacy, with a feedback questionnaire sent two weeks post-consultation to evaluate self-perceived benefits.	A lower mean pain score of four compared to four post-intervention was recorded. Three patients also felt more knowledgeable about their medications.

Table 1b: Features of educational interventions *(continued A)*

Study ID	Education intervention description	Outcome measures and findings
Gustafsson and Borglin [28]	The intervention was based on Ajzen's theory of planned behaviour, a 120-minute workshop on pain assessment and cancer treatment that introduced guidelines and provided handouts to nurses.	After four weeks of follow-up, the intervention group documented a significant increase in knowledge and attitude scores. Conversely, the control group had no changes.
Haozous *et al* [29]	Nine videos of case conferences on pain management featured expert presentations, discussions, and participants presenting their cases, with an average of five cases discussed per conference.	Providers who attended the video conferences scored considerably high on perceived competence regarding pain.
Jahn *et al* [30]	The education program includes: pharmacological pain management, non-pharmacological pain management, and self-management at discharge and two follow-up sessions, telephone counseling, booklets and CDs	The intervention group showed significantly better adherence to pain medication compared to the control group, despite no significant differences in pain intensity, quality of life (QoL), and coping.
Jeba *et al* 2009 [31]	Following an audit, the pulmonary medicine department conducted a one-hour educational intervention and pocket guidelines and a poster on the World Health Organization (WHO) pain management standards for cancer patients.	Significant improvements in correctly following the WHO analgesic ladder and prescribing breakthrough analgesics. Nonetheless, documenting pain recorded no enhancement.
Kasasbeh *et al* [32]	The ALP program involved participants in informal meetings and YouTube videos lasting 30 minutes to identify cancer-related pain topics and take action throughout a six-month program.	Notable advancement in HCPs' knowledge and attitudes. Documentation scores also significantly increased.
Keefe *et al* [33]	The three-session booklet-based program was aimed at addressing pain relief barriers, treatment types, side effects, communication with healthcare providers, relaxation training, and coping skills.	The intervention group reported reduced pain scores, caregiver strain levels, and negative mood and improved QoL and partners' self-efficacy for pain management.
Kizza *et al* [18]	The study involved interactive training sessions, home visits, and regular follow-up visits for cancer patients to understand pain characteristics, sources, management principles, pain assessment, and addiction concepts.	Significantly increased FCGs' knowledge, beliefs, and SE scores.
Kwekkeboom *et al* [34]	The participants in the 20-minute CBS training session were introduced to pain, fatigue, and sleep issues related to cancer. They were also provided with MP3 recordings and educational materials.	Although no considerable variation in symptom cluster severity or daily life interference between the groups at weeks three, six, and nine, the CBS group had reduced distress at week six.

Table 1c: Features of educational interventions *(continued B)*

Study ID	Education intervention description	Outcome measures and findings
Kwok *et al* [15]	The intervention, which was based on the theory of planned behaviour, involved a three-hour workshop for nurses to educate patients on breakthrough cancer pain (BTCP), correct assessment practices, and opioid use misconceptions.	The intervention group reported improved knowledge, attitude, and adherence to BTCP evaluation practices at 12 weeks post-intervention compared to the control group.
Kravitz *et al* [35]	The intervention involves assessing knowledge, correcting misconceptions, educating patients on pain control, communication, planning goals, rehearsing, and displaying learned skills, with patient surveys conducted at various intervals.	The study found no significant differences in pain severity, impairment, functional status, or self-efficacy between groups, but the intervention group showed significantly improved perceived efficacy in communicating about pain.
Lai *et al* [36]	The experimental group was provided with a structured pain education program that covered topics, including cancer pain control and assessment, opioid misconceptions, therapy adverse effects, and pain communication with healthcare providers.	The PEP group experienced reduced pain intensity, endurance, catastrophizing, negative pain beliefs, and misconceptions regarding opioids compared to the control group.
Liu *et al* [6]	The pharmacists assessed patients' prescriptions and beliefs, providing individualized education, teaching about opioid dependence, and counseling patients about adverse effects or breakthrough pain. Each encounter lasted from 20 to 30 mins.	The joint group reported significantly less pain intensity and better management than the patients receiving usual care. Nevertheless, no differences in pain interference or QoL were recorded.
Machira *et al* [37]	The seven-hour education program introduced pain management and assessment, pharmacological and non-pharmacological pain interventions, and patient effects of pain.	Nursing pain knowledge and attitudes indicated considerable advancements immediately following the program and persisted after two weeks.
Musavi *et al*., 2021 [38]	The clinic provided pain self-administration education to interventional groups, involving practical training in VAS scale and complementary medicine strategies, and regular follow-up evaluations of pain severity and quality of life.	The quality of life in patients with metastatic cancers (significantly improved) Pain severity (significantly reduced)
Oldenmenger *et al* [17]	Patients were assigned to standard care or pain consultation groups, with the PEP program aimed at enhancing knowledge on pain, assisting behaviours, and filling knowledge gaps.	The PC-PEP patients recorded notably less pain and interference than their control counterparts, improved patient knowledge and analgesic adherence. Nevertheless, no significant differences in worsening pain or pain management were reported.

Table 1d: Features of educational interventions *(continued C)*

Study ID	Education intervention description	Outcome measures and findings
Oliver *et al* [39]	A 20-min personalized education session focused on reviewing a patient's questionnaire, addressing misconceptions, explaining WHO pain control guidelines, identifying treatment goals, and developing strategies to achieve them.	The average pain in the experimental group significantly improved compared to the control group. Meanwhile, pain frequency, impairment caused by pain and knowledge regarding pain between the groups indicated no considerable variations.
Tse *et al* [40]	The pain management program PMP was initiated with a 30-min session on day 1, followed by 15-minute sessions on the third and fifth days. The control and experimental groups received routine pain management education, including a one-page pamphlet on pain and non-drug methods.	The control and experimental groups revealed no significant differences in pain scores following the PMP. Nevertheless, the patients in the intervention group had significantly reduced barriers to managing cancer pain compared to the control group.
Valeberg *et al* [41]	An oncology nurse visited patients and their family caregivers in the PRO-SELF group and conducted an academic detailing session to address knowledge deficits. The content of the program was reinforced through visits and telephone interviews.	The FCGs in the PRO-SELF group documented considerably improved knowledge in all single items and total FPQ scores than their control counterparts.
Valenta *et al* [42]	The intervention aimed to evaluate a psychoeducational pain management program (PRO-SELF) through in-home visits and weekly interviews. The structured component focused on documenting analgesics, using pillboxes, monitoring pain, and communicating pain with physicians, while the tailored component focused on medication adjustments.	The intervention group had notably improved SEQ scores compared to the control group. The patients who received the intervention also documented significantly higher PPQ scores than the control group.
Van Der Peet *et al* [43]	A home-based PEP program was implemented to improve patients' pain knowledge, management, and help-seeking behaviour. The intervention involved three 1.5 hr visits, pain diary recording, and a pain brochure.	The intervention group showed significant pain reduction at week 4 but no considerable alterations in depression or anxiety levels. At week 8, pain knowledge was notably better.
Wang *et al* [44]	The intervention group received booklets on cancer pain definition, causes, assessment and control, healthcare consultation, opioid dosage adjustments, and medication guide followed by eight face-to-face sessions over four weeks.	Pain intensity and interference were significantly reduced in the intervention group compared to the control group. Patients' knowledge regarding cancer pain control and analgesia was also notably increased in the intervention group.
Wells *et al* [45]	The study aimed to educate patients and caregivers on pain management through a 15-min videotape, individualized consultation, and written information. The patients involved were divided into control, hotline access, and telephone call groups.	Although the patients in all groups reported improved pain intensity and interference and analgesic adequacy, no significant variations were observed. Similarly, patient and caregiver beliefs improved but not analgesic employment.
Williams *et al* [46]	The intervention group received an initial pain assessment, an individualized pain management plan, weekly follow-up, and educational intervention, whereas the control group did not receive the services.	Although the intervention significantly improved the pain treatment adequacy of the intervention group, no considerable alteration in QOL measures was observed between the two control and intervention groups.

Table 1e: Features of educational interventions *(continued D)*

Study ID	Education intervention description	Outcome measures and findings
Woo *et al* [47]	Early palliative care involving nursing assessment, pain control, psychoeducation, and patient education was provided through telephone or outpatient care, which was according to NCCN guidelines.	The proportion of patients with BPI worst pain score ≤3 was exceptionally high, and the EPC pain intensity score reduction was significantly greater than in the usual care group. The QoL increment at 4 weeks was also superior in the EPC group.
Yamada *et al* [48]	Pharmacists in palliative care provided home counseling and telephone interviews to patients, teaching them pain assessment, analgesic treatment, breakthrough pain treatment, and preventing side effects, which significantly decreased with analgesics.	Exceptionally decreased pain intensity and increased adverse effects were reported.
Yang *et al* [49]	Oncology professionals developed the Pain Guard App, which included nine modules: self-evaluation, reminders, real-time medication consultation, musical soothing treatment, pharmaceutical moments, team expert introduction, and my center.	The mobile application group (IG) reported improved pain remission rates, QoL, and adherence and diminished adverse reactions. A total of 74% of the patients also stated satisfaction.
Yildirim *et al* [50]	The pain education program (PEP) offers cancer pain, pharmacological pain treatment, side effects, addiction, and pain assessment to patients. The intervention was performed in patients' rooms utilizing booklets and audiovisual approaches. Each session was repeated after three to seven days and lasted between 5 and 15 mins.	The intervention group indicated better satisfaction with the treatment in the second, fourth, and eighth weeks. The BQ-r scores of the intervention patients were also higher than the control group at week 2.
Yoshida *et al* [51]	In the pharmacist-involved education program of a multidisciplinary team (PEMT), the pharmacists developed a medication instruction manual regarding dental care, pain management, and medications (mechanism of drug, usage, and side effects). The professionals explained the guidelines in person to the patients at least once a week.	The PEMT group had a lower incidence of OM, local anesthetic, and opioid use, and shorter LOD than the control group.
Zhang *et al* [52]	The intervention group received daily pain diaries, ADR forms, and BPI via a WeChat-supported platform known as Medication Housekeeper. Subsequently, pharmacists reviewed the information, suggested pharmacological interventions, and provided education. The patients in the control group received standard care without consultation or regular monitoring.	Pain intensity, patient adherence rates, and adverse drug reactions between the groups were considerably different, whereas the intervention group experienced increased rates.

Knowledge-related data were also more commonly reported than pain or practice-related outcomes. However, it was not clear if the improvements translated to better pain-related practice. Inadequate knowledge, sub-optimal pain assessment, and fear of adverse effects of utilizing opioids are typical challenges that healthcare professionals (HCPs) face in providing optimal cancer pain management [15-17,53]. Consequently, educational interventions should address the issues to improve practitioners' pain-related practices. Ten of the articles reviewed cited interventions focused on opioids and pain management standards. Meanwhile, interactive delivery methods, such as workshops and case scenarios, were implemented to enhance pain assessment skills of nurses.

Reports on practice-related outcomes revealed significant improvement in adherence to guidelines by physicians and nurses' pain assessment practices. However, it was not clear if the outcomes led to better pain management as only one of the studies assessed pain intensity. Generally, studies on sustainability of effects of educational interventions on HCPs' knowledge or practice did not present much information, as the longest follow-up period reported was only three months after completing the intervention. Only one article [26] evaluated physicians trained in the implementation of pain for 18 months. Unfortunately, the positive effects of the intervention on prescribing practices declined over time [26].

CONCLUSION

The interventions were tailored to the requirements of the participants, knowledge gaps, or malpractices related to cancer pain. Pain-related data were frequently employed to assess effectiveness of the interventions. However, the quality of the articles was not evaluated, requiring systematic reviews to validate and provide evidence for clinical implementation.

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Ethical approval

None provided.

Use of Artificial intelligence/Large language models

We also declare that we did not use Generative artificial intelligence (AI) and AI-assisted technologies in writing the manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflict of interest

No conflict of interest is associated with this work.

Contribution of authors

We declare that this work was done by the author(s) named in this article, and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. Conceptualization: Nancy Y Nashwan, and Farida Islahudin, methodology: Hala ZI Alagha, and Noraida M Shah, validation: Nancy Y Nashwan, and Noraida M Shah, formal analysis: Hala Alagha, investigation: Nancy Y Nashwan and Hala ZI Alagha, resources: Nancy Y Nashwan, and Farida Islahudin, data curation and writing of original draft: Nancy Nashwan, reviewing and editing: Hala Alagha, visualization, supervision and project administration: Nancy Y Nashwan, Hala ZI Alagha. Nancy Y Nashwan and Hala ZI Alagha contributed equally to this work.

REFERENCES

1. *Van den Beuken-van, Everdingen MH, Hochstenbach LM, Joosten EA, Tjan-Heijnen VC, Janssen DJ. Update on prevalence of pain in patients with cancer: systematic review and meta-analysis. J Pain Symptom Manage 2016; 5(16): 1070–1090.*
2. *Fallon M, Giusti R, Aielli F, Hoskin P, Rolke R, Sharma M, Ripamonti CI, on behalf of the ESMO Guidelines Committee. Management of cancer pain in adult patients. ESMO Clinical Practice Guidelines. Ann Oncol 2018; 29 (4): 166 –191.*
3. *Swarm RA, Paice JA, Anghelescu DL, Are M, Bruce JY, Buga S, Chwistek M, Cleeland C, Craig D, Gafford E, et al. NCCN clinical practice guidelines in oncology. Adult Cancer Pain Version 3.2019. J Natl Compr Canc Netw 2019; 17(8): 977–1007.*
4. *World Health Organization (WHO). WHO guidelines for the pharmacological and radiotherapeutic management of cancer pain in adults and adolescents. Geneva:*

World Health Organization 2018. License: CC BY-NC-SA 3.0 IGO. Accessed on 22-2-2023 https://www.who.int/publications/i/item/9789241550390.

5. *Su YJ, Yan YD, Wang WJ, Xu T, Gu ZC, Bai YR, Lin HW. Preliminary exploration on the role of clinical pharmacists in cancer pain pharmacotherapy. Ann Palliat Med 2020; 9: 3070–3077.*
6. *Liu K, Huang H, Zhang L, Huang Y, Sun S, Chen X, Chen Y, Liu W, Xiao J. Effects of a physician- and pharmacist-managed clinic on pain management in cancer patients in China. Basic Clin Pharmacol Toxicol 2021; 129: 36–43.*
7. *Kristanti MS, Setiyarini S, Effendy C. Enhancing the quality of life for palliative care cancer patients in Indonesia through family caregivers: a pilot study of basic skills training. BMC Palliat Care 2017; 16 (4).*
8. *Krakauer EL, Wenk R, Buitrago R, Jenkins P, Scholten W. Opioid inaccessibility and its human consequences: reports from the field. J Pain Palliat Care Pharmacother 2010; 24(3): 239–243.*
9. *Lovell M, Agar M, Luckett T, Davidson PM, Green A, Clayton J. Australian survey of current practice and guideline use in adult cancer pain assessment and management: perspectives of palliative care physicians. J Palliative Med 2013; 16(11): 1403–1409.*
10. *Schug SA, Chandrasena C. Pain management of the cancer patient. Expert Opin Pharmacother 2015; 16: 5–15.*
11. *Miaskowski C, Dodd MJ, West C, Paul SM, Tripathy D, Koo P, Schumacher K. Lack of adherence with the analgesic regimen: a significant barrier to effective cancer pain management. Clin Oncol 2001; 19: 4275–4279.*
12. *Oldenmenger WH, Sillevis Smitt PAE, Van Dooren S, Stoter G, Van Der Rijt CCD. A systematic review on barriers hindering adequate cancer pain management and interventions to reduce them: a critical appraisal. Eur J Cancer 2009; 45(8): 1370–1380.*
13. *Porter LS, Steel JL, Fairclough DL, LeBlanc TW, Bull J, Hanson LC, Fischer S, Keefe FJ. Caregiver-guided pain coping skills training for patients with advanced cancer: background, design, and challenges for the caring pals study. Clin Trials 2019; 16: 263–272.*
14. *Kardas P, Lewek P, Matyjaszczyk M. Determinants of patient adherence: a review of systematic reviews. Front Pharmacol 2013; 4: 91. doi: 10.3389/fphar.2013.00091.*
15. *Kwok CYL, Chan DNS, So WKW. Effect of a theory-driven educational intervention on the level of knowledge, attitudes, and assessment practices regarding breakthrough cancer pain (BTCP) management among medical nurses in Hong Kong. Eur J Oncol Nurs 2021; 52: 101945.*
16. *Lee JS, Howard RA, Klueh MP. The impact of education and prescribing guidelines on opioid prescribing for breast and melanoma procedures. Ann Surg Oncol 2019; 26: 17–24.*
17. *Oldenmenger WH, Sillevis Smitt PAE, Van Montfort CAG, De Raaf PJ, Van Der Rijt. A combined pain consultation and pain education program decreases average and current pain and decreases interference in daily life by pain in oncology outpatients: A randomized controlled trial. Pain 2011; 152: 2632–2639.*
18. *Kizza IB, Muliira JK. The influence of a home-based education intervention on family caregivers' knowledge and self-efficacy for cancer pain management in adult patients within a resource-limited setting. J Cancer Edu 2019; 34: 1150–1159.*
19. *Tricco AC, Lillie E Zarin W, O'Brien KK, Colquhoun H, Levac D, Weeks L. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med 2018; 169: 467–473.*
20. *Arthur J, Edwards T, Lu Z, Hui D, Fellman B, Bruera E. Health care provider attitudes, beliefs, and perceived confidence in managing patients with cancer pain and nonmedical opioid use. J Pain Symptom Manage 2021; 61: 128-135.*
21. *Bauwens S, Distelmans W, Storme G, Kaufman L. Attitudes and knowledge about cancer pain in Flanders. The educational effect of workshops regarding pain and symptom control. Palliat Med 2001; 15: 181–189.*
22. *Capewell C, Gregory W, Closs S, Bennett M. Brief DVD-based educational intervention for patients with cancer pain: feasibility study. Palliat Med 2010; 24: 616–622.*
23. *Cowperthwaite SM, Kozachik SL. Improving the pain experience for hospitalized patients with cancer. Oncol Nurs Forum 2019; 46: 198–207.*
24. *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(6): 742–754.*
25. *De Wit R, Van Dam F, Loonstra S, Zandbelt L, Van Buuren A, Van Der Heijden K, Leenhouts G, Duivenvoorden H, Huijer Abu-Saad H. Improving the quality of pain treatment by a tailored pain education programme for cancer patients in chronic pain. Eur J Pain 2001; 5(3): 241–256.*
26. *Du Pen AR, Du Pen S, Hansberry J, Miller Kraybill B, Millen J, Everly R, Syrjala K. An educational implementation of a cancer pain algorithm for ambulatory care. Pain Manag Nurs 2000; 1: 116–128.*
27. *Edwards Z, Bennett MI, Blenkinsopp A. A community pharmacist's medicines optimization service for patients with advanced cancer pain: a proof-of-concept study. Int J Clin Pharm 2019; 41: 700–710.*
28. *Gustafsson M, Borglin G. Can a theory-based educational intervention change nurses' knowledge and attitudes concerning cancer pain management? A quasi-experimental design. BMC Health Serv Res 2013; 13: 328.*
29. *Haozous E, Doorenbos AZ, Demiris G, Eaton LH, Towle C, Kundu A, Buchwald D. Role of telehealth/videoconferencing in managing cancer pain in rural American Indian communities. Psychooncol 2012; 21: 219–223.*
30. *Jahn P, Kitzmantel M, Renz P, Kukk E, Kuss O, Thoke CA, Horn I, Landenberger M. Improvement of pain-*

related self-management for oncologic patients through a trans institutional modular nursing intervention: A cluster-randomized multicenter trial. Pain 2014; 155: 746-754.

31. *Jeba J, George R, Thangakunam B, Christopher DJ. Pain assessment and analgesic prescription for cancer patients in a medical ward: the influence of an educational intervention. Natl Med J India 2009; 22(4): 177–180.*
32. *Kasasbeh MAM, McCabe C, Payne S. Action learning: an effective way to improve cancer-related pain management. J Clin Nurs 2017; 26: 3430–3441.*
33. *Keefe FJ, Ahles TA, Sutton L Dalton J, Baucom D, Pope MS, Syrjala K. Partner-guided cancer pain management at the end of life: a preliminary study. J Pain Symptom Manage 2005; 29: 263–272.*
34. *Kwekkeboom K, Zhang Y, Campbell T, Coe CL, Costanzo E, Serlin RC, Ward S. Randomized controlled trial of a brief cognitive-behavioural strategies intervention for the pain, fatigue, and sleep disturbance symptom cluster in advanced cancer. Psychooncol 2018; 27: 2761–2769.*
35. *Kravitz RL, Tancredi DJ, Grennan T, Kalauokalani D, Grennan T, Wun T, Saito N. Cancer Health Empowerment for Living without Pain (Ca-HELP): effects of a tailored education and coaching intervention on pain and impairment. Pain 2011; 152: 1572–1582.*
36. *Lai YH, Guo SL, Keefe FJ, Sun W Z, Tsai LY, Cheng PL, Chiou JF, Wei LL. Effects of brief pain education on hospitalized cancer patients with moderate to severe pain. Support Care Cancer 2003; 1: 1–1.*
37. *Machira G, Kariuki H, Martindale L. Impact of an educational pain management programme on nurses' pain knowledge and attitudes in Kenya. Int J Palliat Nurs 2013; 19: 341–345.*
38. *Musavi M, Jahani S, Asadizaker M, Maraghi E, Razmjoo S. The effect of pain self-management education on pain severity and quality of life in metastatic cancer patients. Asia Pac J Oncol Nurs 2021; 8: 419–426.*
39. *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.*
40. *Tse MM, Wong AC, Ng HN, Lee HY, Chong MH, Leung WY. The effect of a pain management program on patients with cancer pain. Cancer Nurs 2012; 35(6): 438-446.*
41. *Valeberg BT, Kolstad E, Småstuen MC, Miaskowski C, Rustøen T. The PRO-SELF pain control program improves family caregivers' knowledge of cancer pain management. Cancer Nurs 2013; 36(6): 429–435.*
42. *Valenta S, Miaskowski C, Spirig R, Zaugg K, Rettke H, Spichiger E. Exploring learning processes associated with a cancer pain self-management intervention in patients and family caregivers: A mixed methods study. Appl Nurs Res 2021; 62: 151480.*
43. *Van Der Peet EH, Van Den Beukenvan Everdingen MH, Patijn J, Schouten HC, Van Kleef M, Courtens AM. Randomized clinical trial of an intensive nursing-based pain education program for cancer outpatients suffering from pain. Support Care Cancer 2009; 17(8): 1089–1099.*
44. *Wang Y, Huang H, Zeng Y, Wu J, Wang R, Ren B, Xu F. Pharmacist-led medication education in cancer pain control: a multicenter randomized controlled study in Guangzhou, China. J Int Med 2013; 41(5): 1462–1472.*
45. *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.*
46. *Williams JE, Peacock J, Gubbay AN, Gubbay A, Kuo P, Ellard R, Gupta R, Yao G. Routine screening for pain combined with a pain treatment protocol in head and neck cancer: a randomized controlled trial. Br J Anaesth 2015; 115: 621–628.*
47. *Woo S, Song M, Lee M, Joo J, Kim DH, Kim JH, Lee WJ. Effect of early management on pain and depression in patients with pancreatobiliary cancer: a randomized clinical trial. Cancers 2019; 11: 79.*
48. *Yamada M, Matsumura C, Jimaru Y, Ueno R, Takahashi K, Yano Y. Effect of continuous pharmacist interventions on pain control and side effect management in outpatients with cancer receiving opioid treatments. Biol Pharm Bul 2018; 41: 858–863.*
49. *Yang J, Weng L, Chen Z, Cai H, Lin X, Hu Z, Zhuang Q. Development and testing of a mobile app for pain management among cancer patients discharged from hospital treatment: Randomized Controlled Trial. JMIR Mhealth Uhealth 2019; 7: e12542.*
50. *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(4): 220–228.*
51. *Yoshida K, Kodama Y, Tanaka Y, Pak K, Soga M, Toyama A, Takagi R. Pharmacist involved education program in a multidisciplinary team for oral mucositis: Its impact in head-and-neck cancer patients. PLoS One 2021; 16. e0260026.*
52. *Zhang L, McLeod HL, Liu KK, Liu WH, Huang HX, Huang YM, Liu FZ. Effect of physician-pharmacist participation in the management of ambulatory cancer pain through a digital health platform: Randomized Controlled Trial. JMIR Mhealth Uhealth 2021; 9: e24555.*
53. *Makhlouf SM, Pini S, Ahmed S, Bennett MI, Managing pain in people with cancer - a systematic review of the attitudes and knowledge of professionals, patients, caregivers and public. J Cancer Edu 2020; 35(2): 214–240.*
54. *World Health Organization. Cancer Pain Relief, https://apps.who.int/iris/bitstream/handle/10665/37896/9241544821.pdf?sequence=1&isAllowed=y. 1996), Accessed 2 March 2023.*