

Effect of pre-operative education on post-operative pain management among adult patients undergoing elective surgery: An integrative review

Supplement: Summary of included studies

Author (year) Country of origin	Study purpose	Sample Design	Setting Data collection tool	Educational intervention (method)	Major findings	Strengths and limitations
Best et al. (2018) ¹ United States of America (USA)	To investigate patient satisfaction with pain management education.	n = 100 quasi-experimental	Outpatient abdominal procedure units Survey and follow-up telephone call	printed materials	Structured and focused pain education improved patient satisfaction with pain management after surgery.	Strength: trained nurses with similar demographic characteristics. Limitation: pain education and location indicated a concern in understating.
Cetkin and Tuna (2018) ² Turkey	To determine the effect of health education on post-operative pain, anxiety level and respiratory function.	n = 60 quasi-experimental	Chest surgery unit VAS, STAI and digital spirometer device	- verbal discussion - booklet	Significant reduction of pain, cough and anxiety among patients who received pre-operative education.	Strengths: validated assessment tools, educational tools were developed based on patient's needs. Limitation: small sample size.
Gunduz and Caliskan (2021) ³ Turkey	To determine the effect of pre-operative video-based pain training on post-operative pain and analgesic use.	n = 81 case-control study	Orthopedics and trauma clinic BPI, analgesic non-pharmacological methods, pain training questionnaire, SMMSE	- printed materials - video	The use of videos and booklets is an effective tool for educating surgical patients.	Strengths: evidenced-based materials, the study was piloted. Limitation: only Turkish-speaking participants, one hospital setting.
Ho et al. (2022) ⁴ Taiwan	To investigate the impact of an integrated education program (IEP) on clinical pain, anxiety and recovery after total knee arthroplasty (TKA).	n = 72 quasi-experimental	Two medical care hospitals Self-report questionnaires, VAS, STAI, AKS, WOMAC	- one-on one discussion - photos and diagrams - demonstration	Significant improvement in clinical pain, anxiety status and knee function among patients who received education.	Strength: valid data collection tools. Limitations: the differences in medical staff and environment may cause an interpretation bias, the clinical efficacy of the education program was difficult to analyse.
Ilyas et al. (2021) ⁵ USA	To examine the effect of pre-operative opioid education on opioid consumption.	n = 237 Randomised control trial	Outpatient surgical The survey, pain diaries, VAS, total morphine equivalents	multimedia presentation using tablets	Pre-operative opioid education resulted in a significant decrease in post-operative consumption among patients undergoing orthopaedic surgery.	Strength: surgeons were blinded to randomisation results. Limitation: inability to capture patients' awareness, no long-term evaluation of the impact of education.
Kennedy et al. (2017) ⁶ Canada	To explore the education experience following hip or knee replacement surgery.	n = 32 qualitative case study	Outpatient clinics at the Canadian orthopaedic centre Semi-structured interview, focus groups, telephone interviews	- multimedia presentation - pre-operative education class	There are educational gaps around pain management. The use of multiple modalities and clear language educational tools improved patients' knowledge.	Strengths: the sample variation was pilot tested, multiple examiners performed each step, the analysis was reflexive. Limitations: only English-speaking, exclusion of younger patients, no demographic details.
Khorfan et al. (2020) ⁷ USA	To assess patient exposure to the opioid reduction program and the impact of this program on post-operative opioid use.	n = 112 quasi-experimental	Surgical clinics Survey by phone, BPI	- booklet - verbal discussion	Pre-operative focused education decreased the use of post-operative opioids.	Strength: the intervention was high fidelity. Limitation: some patients were unaware of disposal boxes.
Kwan et al. (2019) ⁸ USA	To assess the viability of patient education or counselling and changes in reducing post-operative opioid use.	n = 66 cohort study	University of California, San Francisco Medical Center Electronic health record, automated surveys, patient satisfaction survey at the clinic	- patient education handout - post-operative SMS about pain management	Patient education reduced post-operative opioid use, improved pain management and increased patient satisfaction.	Strength: easy to use intervention. Limitations: language barrier as well type of phone and technology affected data collection, no information about analgesic, the context of the study may not allow generalisation.

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Lee et al. (2018) ⁹ Taiwan	To determine the effects of pre-operative educational intervention on the anxiety and pain of patients undergoing spinal surgery.	n = 86 randomised controlled trial	Medical center STAI, VAS, PMPI	• booklet • pictures • video • operating room visit	Significant reduction of anxiety and pain among patients who received education.	Strength: participants were blinded from their assigned group. Limitations: participants were recruited from the same hospital, investigators did not control the trait of anxiety.
Lemay et al. (2017) ¹⁰ USA	To evaluate the use of non-medical methods of pain management by patients.	n = 1609 cohort study	132 orthopedic surgeons in 22 states Self-report survey, modified Charlson comorbidity index, knee or hip disability, and osteoarthritis outcome score pain survey	• verbal discussion • web-based education	Patients who received information about pain management reported lower pain and higher levels of pain relief.	Strength: randomised sample of surgeons. Limitations: bias regarding receipt of pain management information, literacy levels and pain control strategies were not assessed.
Louw et al. (2019) ¹¹ USA	To determine the immediate effects of providing pain neuroscience education (PNE) before total knee arthroplasty (TKA) surgery on patient self-report measures.	n = 12 quantitative case series	University of Nevada Las Vegas Spencer Hospital NPRS, WOMAC, PCS, TSK, TKA questionnaire, physical performance measures (PPT, SPWT, knee flexion active range of motion)	• booklet • multidisciplinary education approach • multiple educational sessions • group discussion	Statistically significant decrease in pain, fear related to movement, and a positive shift in beliefs regarding the upcoming surgery.	Strengths: independent physical therapists performed pre-and-post- tests, the PNE outcome and physical measures were blinded to the exact purpose of the study. Limitations: inclusion of the group session method, only English-speaking participants.
O'Donnell (2018) ¹² USA	To examine the impacts of pre-operative pain education on patient pain management outcomes.	n = 99 quasi-experimental	Outpatient general surgery service at a teaching institution Revised APS-PQQ	• one-on-one education • booklet	Structured pre-operative patient education increased patients' knowledge of pain management and prevented negative post-operative outcomes. Knowledgeable and trained providers improved patient knowledge and attitude.	Strength: the education session provided using the Iowa Model of evidence-based practice. Limitation: unknown education providers were reported by some patients.
Parrish et al. (2020) ¹³ USA	To evaluate the outcomes of a modified enhanced recovery after surgery (ERAS) protocol for ambulatory anorectal surgery.	n = 774 quasi-experimental	14 Southern California Kaiser Permanente (SCAL-KP) medical centers Comprehensive and itemised checklist	• pre-operative information sheet	Significant reduction in pain scores and use of opioids after the implementation of the ERAS patient education protocol.	Strength: various centre participants covered the cases from different views. Limitations: data collection was done by a nurse, certain protocol items had higher adherence than others, involvement of anaesthesiologists and surgeons was not mandatory.
Rahmani et al. (2019) ¹⁴ Iran	To evaluate the effect of family and patient educational intervention on post-operative pain in patients undergoing orthopedic surgery.	n = 47 quasi-experimental	Ayatollah Mousavi Hospital in Zanjan VAS, Spielberger questionnaire, face validity of patient and family viewpoint on pain	Session one: booklet and discussion Session two: reinforcement of information	The patient and family members play a significant role in managing pain. Patient and family education improved communication, positive emotional health and pain control.	Strengths: there are limited studies about the effect of family education on post-operative pain control, equal surgical sites in both groups. Limitation: non-random allocation of samples and inclusion of Farsi speakers.
Sabesan et al. (2020) ¹⁵ USA	To evaluate the impact of patient education and multimodal pain management in achieving an opioid-free post-operative recovery after shoulder arthroplasty.	n = 50 case-control study	Single institution VAS, PENN, ASES score	• counselling about pain management • written educational material	Standardised patient education can be successful in reducing opioid use, reducing post-operative opioid consumption and increasing patient engagement in decision-making.	Strengths: standardised surgical implants and techniques, patients self-selected an opioid-free post-operative course. Limitations: no clear description of the study setting.
Sawhney et al. (2017) ¹⁶ Canada	To examine the effectiveness of an individualised hernia repair education intervention (HREI) for patients following inguinal hernia repair.	n = 50 randomised controlled trial	Two hospitals in southern Canada Telephone survey, NRS, BPI-I, McGill pain questionnaire, PRI, analgaesic and adverse effects questionnaire, APS-PQQ	• written educational material • face-to-face discussion • support telephone call	Clinically significant lower pain intensity on movement, lower interference scores for general activity and walking ability, lower opioid consumption with pre-operative patient education.	Strengths: use of a conceptual framework, a blinded randomised controlled trial, use of a standardised education intervention. Limitations: homogenous patient population, only English-speaking and reading participants.

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Stepan et al. (2020) ¹⁷ USA	To create a standardised peri-operative patient education program, to determine the impact of education on opioid use after ambulatory hand surgery.	n = 191 randomised controlled trial	An academic tertiary care centre. Post-operative log, pain level assessed on a scale of 0 to 10, five-point Likert scale on pain and satisfaction	- counselling - booklet - video	Significantly fewer or no opioid pills post-operatively with education. Positive effect of education on patient satisfaction with pain management.	Strengths: 72% of patients completed the study once enrolled. Limitations: patients in intervention group were on average 4.5 years older than the control group.
Togac and Yilmaz, (2021) ¹⁸ Turkey	To examine the impact of pre-operative individualised audio-visual education given according to patients' learning needs on post-operative anxiety and pain after laparoscopic cholecystectomy.	n = 124 randomised controlled trial	General surgery clinic Face-to-face interview, observation form, VAS, STAI, PLNS	- audio-visual materials - booklet - video	Significantly lower pain scores and anxiety among patients who received education, in addition to better patient perception of operation, physical recovery, and fewer post-operative complications.	Strength: surgery performed by the same team. Limitations: participants were in Turkey, procedures were applied by a researcher without a second observer, researcher was not blinded to experimental conditions, no noise control.
Van Dijk et al. (2017) ¹⁹ Netherlands	To measure patients' and nurses' knowledge and beliefs about post-operative pain management.	Patient participants: n = 760 randomised controlled trial Nurse participants: n = 1184 cross-sectional study	73 hospitals Questionnaires, five-point Likert scale, pain knowledge questionnaire, beliefs subscale of the barrier's questionnaire, pain assessment questions.	leaflet	Discrepancies between patient-reported pain and nurses' impressions. Significant difference in knowledge and beliefs among patients who received education. Nurses with pain training had higher knowledge levels and fewer barriers to managing patient pain.	Strength: large sample size. Limitations: no pre-operative knowledge evaluation, no evaluation of the behavior after surgery, no randomisation for nurses for the additional education.
YaDeau et al. (2021) ²⁰ USA	To determine the impact of the adoption of a clinical pathway – including patient education, nerve block and multimodal analgesia – on pain, opioid use and patient outcomes.	n = 140 cohort study	Musculoskeletal disorders specialist centre Patient interviews NRS pain scores Modified PAIN OUT questionnaire	detailed presentation	Lower patient-reported worst pain with movement, lower scores at rest, less opioid consumption, high satisfaction rate with pain treatment were associated with adoption of the clinical pathway.	Strengths: pragmatic design, with fewer exclusion criteria and higher rates of enrolment. Limitations: single-centre study conducted at a hospital with a preference for regional anaesthesia.
Yajnik et al. (2019) ²¹ USA	To evaluate the hypothesis that improved clinician-patient communication and a patient education card will result in decreased opioid use.	n = 40 cohort study	A tertiary care university with a perioperative surgical home model of care Medical record, pain rating scale	educational cards	Improved clinician-patient communication resulted in decreased opioid consumption.	Strength: standardised model of care. Limitations: single-centre with a small sample size, most of the patients were male, increased duration of clinician-patient encounters may have influenced the results.

Key: VAS = visual analog scale, STAI = state-trait anxiety inventory, BPI = brief pain inventory, SMMSE = standardised mini-mental state examination, AKS = American Knee Society scores, WOMAC = Western Ontario and McMaster universities arthritis index, SMS = short message service, PMPI = patient monitors for physical indicators, NPRS = numeric pain rating scale, PCS = pain catastrophisation scale, TSK = Tampa scale of kinesiophobia, PPT = pressure pain threshold, SPWT = self-paced walk test, APS-POQ = American Pain Society patient outcome questionnaire, PENN = Penn shoulder score, ASES score = American Shoulder and Elbow Surgeons standardised shoulder assessment, NRS = numeric rating scale, BPI-I = modified brief pain inventory interference subscale, PRI = pain rating index, PLNS = patient learning needs scale, PAIN-OUT is an international quality improvement and registry project aimed at improving treatment of patients with post-operative pain.

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