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Review Article

REVIEW ARTICLE

Perioperative psychotherapy for persistent post-surgical pain and physical impairment: a meta-analysis of randomised trials

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Abstract

Persistent post-surgical pain affects 10–80% of individuals after common operations, and is more common among patients with psychological factors such as depression, anxiety, or catastrophising. We conducted a systematic review and meta-analysis of randomised, controlled trials to evaluate the efficacy of perioperative psychotherapy for persistent post-surgical pain and physical impairment. Paired independent reviewers identified studies, extracted data, and assessed risk of bias. The Grading of Recommendations, Assessment, Development and Evaluation system was used to assess the quality of evidence. Our search of five electronic databases, up to September 1, 2016, found 15 trials (2220 patients) that were eligible for review. For both persistent post-surgical pain and physical impairment, perioperative education was ineffective, while active psychotherapy suggested a benefit (test of interaction $P=0.01$ for both outcomes). Moderate quality evidence showed that active perioperative psychotherapy (cognitive-behaviour therapy, relaxation therapy, or both) significantly reduced persistent post-surgical pain [weighted mean difference (WMD) −1.06 cm on a 10 cm visual analogue scale for pain, 95% confidence interval (CI) −1.56 to −0.55 cm; risk difference (RD) for achieving no more than mild pain (≤3 cm) 14%, 95% CI 8–21%] and physical impairment [WMD −9.87% on the 0–100% Oswestry Disability Index, 95% CI −13.42 to −6.32%, RD for achieving no more than mild disability (≤20%) 21%, 95% CI 13–29%]. Perioperative cognitive behavioural therapy and relaxation therapy are effective for reducing persistent pain and physical impairment after surgery. Future studies should explore targeted psychotherapy for surgical patients at higher risk for poor outcome. **Clinical trial registration:** PROSPERO CRD42016047335.

Keywords: chronic pain; meta-analysis; postoperative pain; psychotherapy

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Editor's key points

- Persistent post-surgical pain is common, and may be influenced by psychological factors.
- In this systematic review and meta-analysis, perioperative cognitive behavioural therapy and relaxation therapy were found to be effective for reducing persistent, postoperative pain and physical impairment; perioperative education was ineffective.
- Future trials should explore targeted psychotherapy for surgical patients at higher risk for persistent pain and impairment.

Acute pain is an inevitable experience after surgery, however, 10–80% of surgical patients develop persistent pain,[1–4] and 2–10% of patients will report severe pain.[2] Persistent post-surgical pain lasts ≥2 months after a surgical procedure and excludes other causes of pain, such as pre-existing pain or postoperative infection.[5–7] This complaint is particularly common after limb amputation (30–80%), coronary artery bypass surgery (30–50%), thoracotomy (30–40%), and breast surgery (20–70%),[1–3] and is associated with reduced quality of life, physical and psychological impairment, increased healthcare costs, and accounts for a substantial portion of chronic pain in general.[1,2,4,6,8,9] A study from the UK identified surgery as an antecedent in 22.5% of attendees to a chronic pain clinic.[10]

There is evidence to suggest that depression, anxiety, stress, and catastrophising are associated with pain that persists after surgery.[4,6] If this is true, persistent post-surgical pain, and associated physical impairment, may be reduced or prevented by intervention directed towards modifying cognitive distortions associated with these common psychological symptoms; however, controlled trials of perioperative psychotherapy have yielded conflicting results. We therefore conducted a systematic review and meta-analysis of randomised controlled trials (RCTs) to assess the effects of perioperative psychological interventions on persistent postoperative pain and physical dysfunction.

Methods

We followed the reporting standards for systematic reviews and meta-analyses of RCTs according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement,[11] and registered our protocol with PROSPERO - an international prospective register of systematic review protocols (registration number: CRD 42016047335) (http://www.crd.york.ac.uk/PROSPERO/index.asp). We made one modification to our protocol, and included physical impairment as an outcome measure.

Data sources and searches

We searched Medline, PsycINFO, CINAHL, and the Cochrane Central Registry of Controlled Trials to identify relevant RCTs, in any language, from inception of each database to September 1, 2016. An experienced medical librarian (R.J.C.) developed database-specific search strategies to identify trials that enrolled surgical patients and explored the effect of perioperative psychotherapy on persistent pain or physical impairment (Supplementary Appendix S1). To maximise the sensitivity of our searches, we used terms for postoperative pain in general instead of persistent pain. We searched Google Scholar, and ProQuest Dissertations and Theses Full Text Database to identify relevant conference abstracts and dissertations. We also searched the Cochrane Database of Systematic Reviews, and reviewers screened the reference lists of all eligible RCTs and relevant systematic reviews to identify additional studies. We contacted authors for eligibility clarification, data verification, or to request missing data.

Study selection

We included RCTs that compared any perioperative psychological intervention against usual care. Eligible studies explicitly reported data on persistent post-surgical pain or physical impairment at ≥2 months follow-up. Because our specific purpose was to examine psychological interventions, we excluded randomised trials comparing psychological interventions combined with other active interventions (e.g. physiotherapy) against usual care, unless co-interventions were also provided to control patients.

Two reviewers (Y.C. and S.A.K.) independently and in duplicate, screened titles/abstracts and full texts for eligible articles using standardised pilot-tested forms with detailed instructions. Reviewers resolved disagreement by discussion or through an arbitrator (J.W.B.) when disagreement remained. We consulted a psychologist (L.W.), blinded to study results, if there was uncertainty as to whether a study intervention was eligible. Two experienced psychologists (P.J.B. and R.E.M.), blinded to trial results, independently categorised each trial intervention as education or active psychotherapy and showed perfect agreement.

Data extraction

Paired reviewers trained in research methodology (Y.C., S.A.K., N.C., P.J.H. and L.W.), used standardised pilot-tested forms and a detailed instruction manual to extract data, independently and in duplicate. We collected information regarding study characteristics (e.g. author name, year of publication, study design, sample size, length of follow-up), intervention characteristics, and outcome data for persistent post-surgical pain and physical function. We used outcome data from the longest follow-up time point reported for our analyses.

If investigators used more than one instrument within a trial to measure persistent pain or physical impairment, we chose the most commonly used instrument. Based on feedback from experts (B.D., Y.R.), when both persistent leg pain and back pain were reported among patients undergoing lumbar spine surgery, we extracted data for persistent leg pain.

Risk of bias assessment in individual studies

Paired reviewers (Y.C., S.A.K., N.C., P.J.H. and L.W.) independently assessed risk of bias using a modified Cochrane risk of bias instrument that includes response options of 'definitely or probably yes' (assigned a low risk of bias) or 'definitely or probably no' (assigned a high risk of bias).[12] On the study level, we assessed randomisation sequence generation, concealment of allocation, blinding of patients, caregivers and data analysts, selective outcome reporting (by comparing planned reporting in the methods with actual reporting in the results), and stopping early; for each outcome within studies we