Systematic review of the effectiveness of nursing interventions in reducing or relieving post-operative pain

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CRD summary
The review concluded that there was no strong evidence to support use of any nursing intervention for the relief or reduction of postoperative pain compared to usual care. The authors’ cautious conclusion appeared reasonable, but it should be borne in mind that methodological quality of the included studies was variable and some had small sample sizes.

Authors' objectives
To assess the effectiveness of nursing interventions for the relief or reduction of postoperative pain in comparison with either standard care or other nursing interventions.

Searching
AMED, CINAHL, The Cochrane Library, DARE, EMBASE, Ingenta, MEDLINE, PsycINFO, PubMed, Web of Science and Dissertation Abstracts were searched for studies published in English between 1985 and 2004. Search terms were reported. Reference lists of retrieved articles were scanned for additional studies.

Study selection
Randomised controlled trials (RCTs), quasi-randomised controlled and quasi-experimental studies that compared interventions administered directly by nursing staff against standard care or another intervention for the relief or reduction of postoperative pain of adults in an acute care hospital were eligible for inclusion. Secondary outcomes of interest were consumption of analgesia, patient satisfaction and length of stay in hospital. Relief or reduction of pain needed to be measured using validated tools, either subjectively or objectively. Included studies had to include patients who had pain assessed at least once during the first 24-hour postoperative period after undergoing surgery that required general anaesthesia or who had an epidural or spinal block anaesthesia during surgery, were hospitalised and expected postoperative hospital stay to be more than 24 hours. Studies that included patients aged 65 or over only, patients who had neurosurgery or patients with a history of substance abuse or a cognitive impairment were excluded. Eligible interventions included administration of analgesia, preoperative patient education, assessment, documentation and management of pain, and non pharmacological interventions such as massage and relaxation. Studies that included only administered local anaesthetics without using another analgesic and studies that measured intervention and control groups at different time points were excluded.

Nurse administered interventions included in the review included preoperative education sessions, nurse-controlled analgesia, intramuscular injections, continuous infusion, intravenous, continuous epidural infusion, patient-controlled analgesia plus continuous infusion (PCACI). Various analgesics and regimens were administered (details reported in the review). Non-pharmacological interventions included pleasant imagery, relaxation, electroacupuncture and music. Comparison groups included patient-controlled analgesia, patient-assisted epidural, basic procedural information preoperatively and usual care. Participants underwent a variety of surgical procedures (details reported in the review). Mean age of participants ranged from 18 to 65 years. Outcomes were measured by a variety of scales, including the visual analogue scale, McGill's pain questionnaire and Likert scale.

Two reviewers independently selected studies for inclusion. Differences were resolved through discussion or recourse to a third reviewer.

Assessment of study quality
Validity was assessed using published criteria (Joanna Briggs Institute). The following criteria were used to assess validity for RCTs: randomisation; blinding of participants and outcome assessors; outcome measurements; and follow up. Criteria used for non-RCT studies were: method of allocation to treatment groups; clearly defined inclusion criteria; objective outcome measures; sufficient description of treatment groups; and appropriateness of data collection.
methods. RCTs were assessed as being of adequate methodological quality for inclusion in the review if they demonstrated that: groups received the same treatment other than the intervention; outcomes were measured in the same way for both groups; groups were comparable at baseline; and there was adequate concealment randomisation.

Two reviewers independently assessed validity. Differences were resolved through discussion or recourse to a third reviewer.

Data extraction

Data were extracted from individual studies on postoperative pain, analgesia consumption and length of stay in hospital. These were used to calculate the mean difference and 95% confidence interval (CI). The standard deviation was calculated for studies that only reported the standard error of the mean. Data calculation/transformations were performed by one reviewer and checked by a second. Authors were contacted for additional data.

Two researchers independently extracted data using a standardised extraction tool.

Methods of synthesis

Studies were grouped by route of administration and non-pharmacological methods. Data from RCTs for pain, analgesia consumption and length of stay in hospital were combined in a meta-analysis using a fixed-effect model where data were homogenous. Data were combined using a standardised mean difference and 95% CI where different measurement scales had been used, otherwise weighted mean difference and 95% CI were calculated. Heterogeneity was assessed using $\chi^2$ and $I^2$ tests. Where there was evidence of significant statistical heterogeneity, studies were combined in a narrative synthesis. For studies that used a three-group design, intervention groups were combined to compare with the control. Any data for groups that did not match the inclusion criteria were excluded from the analysis. Non-randomised studies and studies that reported only p values were discussed in a narrative synthesis. Only data from high-quality studies were included in the analysis.

Results of the review

Twenty nine studies were included in the review, but only 25 RCTs were included in the analysis. Only nine studies reported adequate concealment of allocation. Sixteen studies reported inclusion of randomised participants, but did not report the process of allocation. Only three studies reported concealment of intervention. Ten studies reported attrition rates greater than 80% follow-up.

Four pharmacological RCTs and two non-pharmacological RCTs reported significant reductions in the level of pain intensity in nursing intervention groups compared to controls; however, 10 pharmacological RCTs and four non-pharmacological RCTs reported no significant differences between groups for level of pain intensity.

There was a significant reduction in analgesia consumption for pharmacological intervention (five RCTs) and non-pharmacological interventions (three RCTs) compared to control groups; however, seven pharmacological RCTs and one non-pharmacological RCT reported no significant differences between groups for analgesia consumption.

One non-pharmacological RCT reported a significantly shorter postoperative hospital stay than the usual-care group, but four pharmacological and two non-pharmacological RCTs reported no significant differences between groups for length of hospital stay.

One non-pharmacological RCT reported that promotion of self-care activities increased patient satisfaction more than the usual-care group, but three pharmacological RCTs reported no significant differences between groups.

Authors' conclusions

There was no strong evidence to support use of any intervention compared to usual care. Some interventions showed benefit but these were often based on single studies.

CRD commentary

The review question was clear and supported by detailed inclusion criteria. Several relevant sources were searched, but
no attempts were made to reduce language bias and only some attempts were made to reduce publication bias. Appropriate methods were used to reduce the potential for reviewer error and bias in the selection of studies, assessment of validity and extraction of data. Validity was assessed using specified criteria and results of the assessment were reported. Some studies were combined in a meta-analysis and statistical heterogeneity was assessed. The remaining studies were described in a narrative synthesis. Given the differences between the studies in terms of participants and interventions, combining studies in a meta-analyses may not have been appropriate, particularly as generally only two or three studies were combined for most outcomes. Sample sizes were generally small. Many interventions included only one study. The authors appropriately advised caution in generalising the results to other populations and settings. The authors’ cautious conclusion appeared reasonable, but it should be borne in mind that methodological quality of the included studies was variable and some had small sample sizes.

Implications of the review for practice and research

Practice: The authors stated that although there was no strong evidence to support a particular intervention, none were found to be harmful. Nurses needed to weigh positives and negatives of similarly effective interventions with regard to side effects, risk of adverse events, cost and patient preference. Patients’ past pain experiences, type of surgery and prescribed analgesia should also be taken into consideration and the process documented.

Research: The authors stated that further research was required to discover: whether there were any associations among type of pain assessment tools, timing of assessment and pain scores in postoperative adults; whether regular assessment and documentation was associated with reduced pain scores; whether a standard protocol, care path or flow sheet was associated with documentation of pain management and a patient’s level of pain; and whether there were any associations between pain scores and the proportion of prescribed analgesia that was actually administered.

Funding
Not stated.

Bibliographic details

Original Paper URL
http://www.ingentaconnect.com/content/bsc/jbr/2008/00000006/00000004/art00004

Indexing Status
Subject indexing assigned by CRD

MeSH
Evidence-Based Medicine; Humans; Nursing; Pain, Postoperative

AccessionNumber
12009102176

Date bibliographic record published
31/03/2009

Date abstract record published
03/03/2010

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.