Effect of preoperative smoking cessation interventions on postoperative complications and smoking cessation

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CRD summary
This review concluded that surgical patients may benefit from intensive preoperative smoking cessation interventions, including individual counselling begun at least four weeks before surgery and nicotine replacement therapy. This conclusion reflects the results of the review and appears likely to be reliable.

Authors' objectives
To assess the effect of preoperative smoking cessation interventions on postoperative complications and smoking cessation.

Searching
MEDLINE, EMBASE, CINAHL and the Cochrane Library were searched without language or date restrictions. Search terms were reported, but not search dates. References of identified studies were also checked.

Study selection
Randomised controlled trials (RCTs) of preoperative smoking cessation interventions in smokers scheduled for elective surgery were eligible for inclusion in the review. Trials of the following interventions were eligible for inclusion: ask, advise, assess, assist, arrange; behavioural counselling; motivational interviewing; other methods of counselling. All interventions could be delivered with or without concomitant pharmacotherapy and/or postoperative counselling. Pharmacotherapy alone was also included in the review. Control groups could receive placebo (for pharmacological interventions), usual care or standardised brief advice with or without nicotine replacement therapy. Eligible outcomes were: wound healing complications; respiratory, cardiovascular and urological complications; complications requiring treatment; preoperative smoking cessation; and postoperative smoking cessation. In each case, smoking cessation was defined as either point prevalence or continuous abstinence. Biochemical validation of smoking cessation and length of hospital stay were also reported.

A wide range of elective surgeries were represented in the included trials which included hip or knee alloplasties, hernia operations, and laparoscopic cholecystectomies, as well as a range of open surgeries. Interventions in the trials were classified as "intensive", "medium" or "less intensive". Most trials used counselling either in person, on the telephone or via a combination of methods, and several also used nicotine replacement therapy. One trial used only nicotine replacement therapy, while one used primarily pharmacological treatment. The duration of the interventions ranged from the day of surgery to initiation eight weeks prior to surgery.

Two reviewers assessed the studies for inclusion and a third reviewer was consulted in cases of uncertainty.

Assessment of study quality
The studies were assessed by two reviewers using the Cochrane criteria which include randomisation, allocation concealment, blinding and treatment of withdrawals and drop-outs.

Data extraction
Data to enable the calculation of relative risks (RR) with 95% confidence intervals (CI) were extracted by one reviewer and checked by a second reviewer. Where multiple criteria for smoking cessation were reported, those which were stricter were used.

Methods of synthesis
Mantel-Haenszel fixed-effect meta-analyses were used to calculate pooled relative risks with 95% confidence intervals. Statistical heterogeneity between trials was calculated using the $I^2$ statistic; meta-analysis was not performed where this was found to exceed 40% and a narrative synthesis was presented instead. Sensitivity analyses were used to assess the
impact of excluding trials with a drop-out rate above 20%, or without biochemical validation of smoking cessation, and to assess the effect of assuming missing participants to show a negative outcome. Funnel plot analysis for the assessment of publication bias was not conducted because of the small number of trials.

**Results of the review**

Eleven RCTs, based on nine study groups (n=1,194 participants), were included in the review. All trials had adequate randomisation and allocation concealment. Seven trials had adequate blinding. Nine trials dealt appropriately with withdrawals and drop-outs, the other two trials recorded drop-out levels greater than 20%.

Overall, postoperative complications were significantly reduced in the groups given preoperative smoking cessation interventions (RR 0.56, 95% CI 0.41 to 0.78; I²=15%). This result was not significantly affected by sensitivity analyses. Heterogeneity was highly significant for the outcome of smoking cessation both pre and postoperatively, so pooling was not carried out. Smoking cessation before the operation was significantly increased by the intervention in five of seven trials. Postoperatively, two of three trials showed significant increases in smoking cessation in the intervention groups at both one and twelve months. Both of these trials also showed significant benefits in postoperative complications and used more intensive interventions. Two trials both showed non significant differences between the groups when assessed at three and six months postoperatively. There were no significant differences in length of hospital stay.

**Authors' conclusions**

Surgical patients may benefit from intensive preoperative smoking cessation interventions; these included individual counselling begun at least four weeks before surgery and nicotine replacement therapy.

**CRD commentary**

The review question and inclusion criteria were clear. The authors searched several relevant databases without language restrictions, which reduced the chances of relevant studies being omitted or language bias being present. Unpublished studies were not systematically sought, and publication bias could not be assessed, so it was unclear whether this had any impact on the review. The authors reported using methods designed to reduce reviewer bias and error at all stages of the review process. There was considerable clinical heterogeneity between included trials, particularly with regard to the intervention(s) employed. This may limit the usefulness of an overall pooled estimate of effect, even when statistical heterogeneity was low enough for this to be considered appropriate; the narrative synthesis provided key information on characteristics of effective and less effective interventions. The authors' conclusion reflects the results of the review and appears likely to be reliable.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that the impact of intensive collaborative multidisciplinary smoking cessation interventions at preoperative and postoperative patient contact should be evaluated. They also stated that effect smoking cessation interventions appropriate to non-Western settings should be developed. Finally, they stated that the effect of brief preoperative interventions with additional intensive postoperative interventions should be assessed and that future studies should use standardised outcomes.

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**Bibliographic details**


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Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Bias (Epidemiology); Counseling; Humans; Postoperative Complications /prevention & control; Preoperative Care; Randomized Controlled Trials as Topic; Risk Assessment; Smoking Cessation /methods; Treatment Outcome

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.