Effective behaviour change techniques in smoking cessation interventions for people with chronic obstructive pulmonary disease: a meta-analysis

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CRD summary
This review concluded that smoking cessation interventions targeting people with chronic obstructive pulmonary disease appeared to be more effective when they included action planning, prompts for self-recording, advice on weight control, use of social support, and linking of the disease with smoking. This conclusion reflects the evidence presented and seems reliable.

Authors' objectives
To identify the most effective behaviour change techniques for smoking cessation in people with chronic obstructive pulmonary disease (COPD).

Searching
Nine databases (including MEDLINE and EMBASE) were searched up to December 2012, for English-language publications. The search strategy was presented in an appendix. Relevant reviews and articles that cited the included studies were examined to locate further studies; reference lists of the included articles were checked.

Study selection
Eligible studies were randomised controlled trials (RCTs) that evaluated the effectiveness of an intervention to change the behaviour of smokers with diagnosed COPD. The outcome of interest was smoking cessation (quit rate), measured by point prevalence or continuous abstinence.

The included trials were published between 1991 and 2012, and were conducted in the USA, Europe (including two in the UK), or Australia. The mean age of participants across trial groups ranged from 48 to 67 years; the percentage of female participants per trial ranged from 24 to 65. The combinations of behaviour change techniques and the intervention intensity (number or duration of sessions) varied across trials. Interventions lasted from the time in hospital (where hospitalised), to five years. Where reported, most trials used both self-reported and biochemical measures of smoking cessation. Seven interventions included cessation medication. Most control groups received usual care or a placebo.

The authors did not state how many reviewers selected the trials for inclusion in the review.

Assessment of study quality
Trial quality was assessed using the Delphi list (10 criteria); a score of 5 or more indicated high quality. Trials were also assessed for power calculations and attrition rates.

The authors did not state how many reviewers assessed the quality of the trials.

Data extraction
The data were extracted to calculate sample-weighted quit rates and effect sizes, with 95% confidence intervals. If point prevalence and continuous abstinence rates were both reported in a trial, the one with the highest ranking (according to a published system) was used. Behaviour change techniques were coded using a published taxonomy. Authors were contacted for any missing information.

One expert and one reviewer independently coded the techniques; any disagreements were resolved by discussion. The authors did not state how many reviewers extracted other data.

Methods of synthesis
The effect estimates and 95% confidence intervals from individual trials were pooled using random-effects models. Moderator analyses were performed using the between-group heterogeneity statistic (Qb) to compare effect sizes.
Sensitivity analyses were performed by removing outlying trials and those with inadequate power. To assess publication bias, a funnel plot was constructed and Egger's test was performed.

**Results of the review**

Seventeen RCTs were included in the review (7,446 participants; range 30 to 3,925). Quality scores ranged from 2 to 9; 10 trials were rated as high quality. Ten trials reached the specified threshold for adequate power (55%). The mean attrition rate was 17% (SD 11) by the end of follow-up. Follow-up ranged from three-to-five months to five years.

The overall sample-weighted quit rate was 13%. Compared with control groups, the intervention groups demonstrated statistically significant higher rates of smoking cessation (SMD 0.33, 95% CI 0.23 to 0.43; 17 RCTs). This result was not substantially changed when an outlier was removed, nor when only trials with adequate power were analysed. The moderator analyses revealed that interventions were significantly more effective when they provided stop smoking medication, were delivered exclusively in a clinical setting, and were delivered to groups.

Interventions that included one of the following behaviour change techniques were found to be more effective than interventions that did not: facilitate action planning or develop a treatment plan; prompt self-recording; advise on methods of weight control; and advise on or facilitate use of social support. Interventions that linked COPD and smoking were more effective than those that did not.

No evidence of publication bias was found. Further results from the moderator analyses were reported.

**Authors' conclusions**

Smoking cessation interventions for people with COPD appeared to be more effective when they included action planning, prompts for self-recording, advice on weight control, use of social support, and linking of COPD with smoking.

**CRD commentary**

The review question was clear and supported by sufficiently replicable inclusion criteria. Relevant databases were searched, but the restriction to publications in English means that some relevant trials may have been missed. It was unclear whether the the review processes were performed by two people or not, so reviewer error and bias may have been present.

Quality was assessed using a published checklist, but few details were reported; it appears that quality varied. Trial details were presented and the methods of synthesis were appropriate. The review authors stated that the overall effect size was within the mode range reported in a previous review of meta-analyses of psychological and behavioural treatments. They also stated that the quit rate of 13% would be important for health care services, given the relatively high prevalence of COPD.

Overall, the authors’ conclusions reflect the evidence presented and seem reliable.

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

**Practice:** The authors stated that interventions should be tailored to specific populations because it could not be assumed that all behaviour change techniques were effective for all populations.

**Research:** The authors stated that adequately powered RCTs should investigate whether smoking interventions for groups were more effective for people with COPD than for smokers in general, and determine the best way to provide feedback from nicotine dependence assessments. Interventions should measure motivation and self-regulation capacity before they start, and include more authoritative analyses of the specific techniques associated with the best cessation rates. Any new interventions should be evaluated in relation to quit rates observed in the NHS Stop Smoking Services and where possible, use the Russell Standard to measure smoking cessation. The authors suggested that any reviews should include high-quality grey literature.

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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.