Meta-analysis of studies investigating one-year effectiveness of transdermal nicotine patches for smoking cessation

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CRD summary
This review evaluated the effectiveness of transdermal nicotine patches, compared to placebo patches, in terms of smoking abstinence over one year. The authors reported odds ratios of around 1.8, regardless of whether the endpoint was point-prevalence abstinence, continuous or sustained abstinence, or both. These conclusions appear appropriate given the evidence presented, but some relevant evidence was excluded.

Authors' objectives
To determine the effectiveness of transdermal nicotine patches compared to placebo patches, in terms of continuous or sustained abstinence from smoking over one year.

Searching
MEDLINE, EMBASE and the Cochrane Central Register of Controlled Trials were searched for English language publications up to April 2006. Search terms were reported.

Study selection
Randomised controlled trials (RCTs) comparing transdermal nicotine patches with placebo patches for smoking cessation were eligible for inclusion in the review. Included trials had to have at least one year of follow-up, have abstinence biochemically verified and report this outcome as an odds ratio.

Among included trials, the nicotine dosage administered via patch ranged from 5 to 30 mg/day and duration of treatment ranged from three to 18 weeks. In included trials, abstinence was validated by measuring either exhaled carbon monoxide or serum/saliva cotinine. Sustained, continuous and point prevalence abstinence outcomes were all included.

Two reviewers independently selected studies for inclusion, with disagreements resolved by discussion.

Assessment of study quality
Validity of the included studies was assessed according to the Jadad scale, which evaluates studies in terms of reporting of randomisation, blinding and withdrawals, resulting in a total score of between 0 and 5 points. Studies scoring 0 points were excluded from the meta-analysis.

The authors did not state how many reviewers performed the validity assessment.

Data extraction
Data were extracted on the proportion of participants abstaining at one year in each treatment group.

The authors did not state how many reviewers performed the extraction.

Methods of synthesis
Odds ratios were pooled using a Mantel-Haenszel fixed-effects model, for all trials together and then by type of abstinence outcome (sustained/continuous, point prevalence). Statistical heterogeneity was assessed using the $\chi^2$ test. Publication bias was assessed with Begg's funnel plot and Egger's test.

Results of the review
A total of 16 randomised controlled trials (RCTs) were included in the review (n=9,457 participants). The authors
stated that all trials scored more than 1 point on the Jadad scale, with the majority scoring 4 or 5 points (details not reported).

For all studies, the pooled odds ratio for abstinence at one year significantly favoured nicotine patches over placebo patches (odds ratio 1.79, 95% confidence interval (CI): 1.55 to 2.08). There was no evidence of statistical heterogeneity (p=0.34).

Similar results were found after excluding four trials which reported only point-prevalence abstinence (no smoking during the previous seven days/several months at one-year interview, regardless of smoking at previous intervals), with an odds ratio of 1.75 (95% CI: 1.49 to 2.05).

The pooled odds ratio for the six point-prevalence abstinence studies alone was 1.89 (95% CI: 1.44 to 2.49).

The funnel plot appeared symmetrical, though Egger's test approached statistical significance (p=0.059), suggesting potential for publication bias.

Authors' conclusions
The meta-analysis indicated odds ratios of smoking abstinence of about 1.8 at one year after the start of therapy, regardless of whether the endpoint was point-prevalence abstinence, continuous or sustained abstinence, or both.

CRD commentary
This review was based on a question that was generally well defined in terms of study designs, interventions and outcomes of interest. Multiple databases were searched for relevant studies, but the authors did not attempt to identify unpublished or non-English language studies. The authors acknowledged that at least two relevant trials were excluded from the review purely on the basis of language, which may have impacted on the findings of the meta-analysis. The authors attempted to minimise the potential for errors and bias in the selection of trials for inclusion, but did not report whether this was done for the validity assessment or data extraction processes. The statistical methods used to combine the included trials appeared appropriate. The authors' conclusions appear appropriate given the evidence presented, but they should be interpreted in the context of the limitations described above.

Implications of the review for practice and research
The authors did not state any implications for research or practice.

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