Are there sex differences in transdermal nicotine replacement therapy patch efficacy: a meta-analysis

Munafo M, Bradburn M, Bowes L, David S

CRD summary
This review found that there are no significant differences in the efficacy of nicotine replacement therapy for smoking cessation in men and women. The review was based on a Cochrane review, but was limited by the inclusion of only 35% of the eligible trials for which gender-specific data were available; this severely weakens the reliability of the findings.

Authors' objectives
To investigate whether there are significant sex differences in the efficacy of transdermal patch nicotine replacement therapy (NRT) for smoking cessation.

Searching
The eligible studies were identified from the most recent Cochrane review (2002) of NRT for smoking cessation. Where necessary, the study authors were contacted to obtain the data required for this review.

Study selection
Study designs of evaluations included in the review
Only randomised controlled trials (RCTs) were eligible for inclusion in the review.

Specific interventions included in the review
Placebo-controlled studies of the nicotine transdermal patch were eligible for inclusion. Studies of other forms of NRT were excluded.

Participants included in the review
Studies of participants attempting to quit smoking were eligible for inclusion. Studies that did not include both male and female participants were excluded.

Outcomes assessed in the review
Studies that reported smoking cessation rates at 6 months or longer were eligible for inclusion. Only studies for which the outcome data were reported separately by gender, or where these data were obtained from the authors of the primary studies, were included. The outcomes reported in the review were the proportion of participants abstinent at 6 months and at 12 months, and the number of deaths. All outcomes were reported separately for males and females.

How were decisions on the relevance of primary studies made?
The authors included all studies included in the Cochrane review for which they could obtain the necessary outcome data.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Two authors independently extracted the data for the review, and any discrepancies were resolved by consensus. The odds ratios (ORs) for NRT versus controls was calculated separately for males and females for each included trial. The proportion of participants abstinent was based on number randomised, and all drop-outs (apart from deaths) were
assumed to have resumed smoking.

Methods of synthesis
How were the studies combined?
The studies were combined in a meta-analysis. Within-trial differences between the ORs for abstinence of males and females were pooled across the included trials using a fixed-effect (inverse variance) model. The statistical significance of the OR of the gender difference was assessed using a Wald test. Pooled ORs were calculated for abstinence at ‘early’ (less than 6 months), 6 months and 12 months’ follow-up. Pooled ORs for the gender difference were also calculated for these time points.

Publication bias was assessed using the Begg rank correlation.

How were differences between studies investigated?
Heterogeneity was tested for using a chi-squared test. Where there was statistically significant heterogeneity, a random-effects model was to be used.

Results of the review
Of the 33 trials in the Cochrane review, 11 were included in this review; data could not be obtained for the remainder. Thus, only 35% of the eligible data and 36% of the participants were included in this review.

There was no statistically significant heterogeneity for any pooled OR at any time point. The pooled ORs revealed no statistically significant relative advantage of men over women in response to transdermal NRT patch at any follow-up duration.

Early (8 trials): the OR was 0.97 (95% confidence interval, CI: 0.69, 1.36, P=0.88; heterogeneity, P=0.80).

Six months (11 trials): the OR was 1.33 (95% CI: 0.91, 1.95, P=0.14; heterogeneity, P=0.74).

Twelve months (10 trials): the OR was 1.21 (95% CI: 0.79, 1.84, P=0.38; heterogeneity, P=0.75).

The Begg rank correlation suggested no evidence of a differential gender response to NRT influencing the ascertainment of the data (P values >0.71).

The pooled difference in placebo quit rates in men and women at all time points were not statistically significantly different.

The pooled ORs for all trials of the transdermal patch from the Cochrane review (OR 1.93, 95% CI: 1.58, 2.36) were compared with those included in this review (OR 1.69, 95% CI: 1.50, 1.93). The difference was not statistically significant (P=0.28).

Authors’ conclusions
The results of the meta-analysis did not suggest that the response rate of men to NRT is greater than that of women.

CRD commentary
This review addressed a clear question, supported by well-defined inclusion criteria. Being based on a Cochrane review, some of the more general inclusion criteria were not well reported and readers should refer to the Cochrane review. The literature search depended entirely on the quality of that done for the Cochrane review and is therefore likely to have been adequate. Details of the included primary trials were presented, but the quality of the included trials was not assessed. Other methodology reported by the authors demonstrated that efforts were made to limit reviewer bias.

The authors’ meta-analysis was appropriate given the available data and lack of heterogeneity. The main limitation of this review was the restricted body of trials included: since the included trials were limited to those for which gender-
specific data were available, this review was based on only 35% of the eligible trials. Thus, the body of evidence was severely restricted. Publication bias and other tests conducted by the authors suggest that the included trials may be representative of the whole body of eligible trials. However, as such tests are not robust, this must be taken as a limitation to any conclusions drawn.

Implications of the review for practice and research
Practice: The authors stated that it is premature to conclude that there are clinically significant differences between the efficacy of NRT in men and women.

Research: The authors did not state any implications for further research.

Bibliographic details

PubMedID
15700912

Indexing Status
Subject indexing assigned by NLM

MeSH
Administration, Cutaneous; Adult; Eligibility Determination; Ganglionic Stimulants /administration & dosage /therapeutic use; Humans; Nicotine /administration & dosage /therapeutic use; Odds Ratio; Patient Selection; Randomized Controlled Trials as Topic; Sex Factors; Tobacco Use Disorder /drug therapy; Treatment Outcome

AccessionNumber
12004006919

Date bibliographic record published
31/05/2006

Date abstract record published
31/05/2006

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.