A systematic review of randomized controlled trials: web-based interventions for smoking cessation among adolescents, college students, and adults

CRD summary
The review found that evidence that supported the use of web-based interventions for smoking cessation was insufficient to moderate in adults and insufficient in college students and adolescents. The review was well conducted and the authors’ conclusions appear reliable.

Authors’ objectives
To investigate the use of web-based interventions for smoking cessation in adults, college students and adolescents.

Searching
MEDLINE, EMBASE, The Cochrane Library, CINAHL and PsycINFO were searched from 1990 to February 2010. Search terms were reported. The reviewers also checked the reference lists of eligible articles and the tables of contents of the ten journals that published the highest number of included abstracts and articles.

Study selection
Randomised controlled trials (RCTs) of web-based smoking cessation programmes were eligible, provided they had at least one month’s follow-up. The primary outcome of the review was self-reported smoking cessation at longest point of follow-up. Populations of interest in the review were adults, college students and adolescents.

The mean or median age of participants in the included studies was 34 to 48 years in adults, 20 years in college students and 16 years in adolescents, where reported. The proportion of male participants ranged from 22% to 59%. Most participants were white. Smoking rates at baseline ranged from 17-24 cigarettes per day in adults, and three to 10 cigarettes per smoking day in students and adolescents, and use of nicotine replacement therapy varied (where reported). The type and duration of interventions differed widely across studies; most were based on identifiable cognitive-behavioural theories. Some studies compared web-based interventions versus non-web based interventions (such as counselling), delayed intervention or an alternative type of web intervention. Other studies investigated specific aspects of web intervention such as tailoring (to user characteristics), additional components (such as bulletin board, mood management modules) and exposure frequency. The duration of intervention ranged from four to 54 weeks. Outcomes measurement methods included mail, email, telephone and web. Duration of follow-up ranged from one to 12 months. Most studies were conducted in community, population or educational settings (usually in the USA).

Two reviewers independently selected the studies, with disagreements resolved by consensus or adjudication by third reviewer.

Assessment of study quality
The following components of study quality were assessed: clarity of study question, randomisation methods (including allocation concealment), blinding, outcome assessment methods, use of intention-to-treat-analysis and retention rate. Evidence for each population was graded as high, moderate or low, based on Agency for Healthcare Research and Quality recommendations.

Two reviewers independently assessed study quality.

Data extraction
Odds ratios (ORs) for smoking cessation were extracted or calculated with 95% confidence intervals (CIs), using an intention-to-treat approach. One reviewer extracted the data, checked by a second. Primary study authors were contacted for more information if required.

Methods of synthesis
Studies were combined in a narrative synthesis, organised by study population. A forest plot of the odds ratios and 95% confidence interval for point prevalence of abstinence/cessation at seven days in each study was presented. Statistical pooling was not attempted due to clinical and methodological differences between the studies.

Results of the review
Twenty-one RCTs were included (31,481 smokers). Among 15 studies of adults (29,989 smokers) overall quality was moderate: seven out of 15 studies described adequate randomisation and allocation concealment and retention rates ranged from 27% to 86%. The sole RCT of college students (517 smokers) was good quality, with concealed allocation, biochemical validation of smoking status, intention-to-treat analysis and retention of over 90%. Among the five RCTs of adolescents (1,066 smokers) overall quality was fair; none described allocation concealment and losses to follow-up were 13% to 47%.

In studies of adults there was moderate evidence to show that web-based interventions were more effective than delayed intervention (two RCTs, one positive, one equivocal), that tailored websites were more effective than untailored (two out of two RCTs), and that higher web exposure increased quit rates (six out of seven RCTs). There was insufficient evidence to determine whether there was any difference in effectiveness between intensive multi-component web-based interventions and self-help manuals (two RCTs) or web-based intervention and counselling (three RCTs), whether any particular website was more effective than others (three RCTs) or whether addition to a website of a bulletin board or mood management module was beneficial (three RCTs).

For college students and adolescents there was insufficient evidence to draw any conclusion on the efficacy of web-based interventions alone.

Authors’ conclusions
Evidence supporting the use of web-based interventions for smoking cessation was insufficient to moderate in adults and insufficient in college students and adolescents.

CRD commentary
The objectives and inclusion criteria of the review were clear and relevant sources were searched for studies, apparently without restriction by publication status. It was unclear whether the search was limited by language. Steps were taken to minimise the risk of reviewer bias and error by having more than one reviewer independently select studies, undertake quality assessment and extract the data.

Statistical pooling was not attempted, which was appropriate given the clinical and methodological differences between the studies. As the authors noted, the review was limited by confounding from co-interventions, concurrent non-trial interventions, failure to control for nicotine replacement therapy use, small sample sizes, high loss to follow-up, low adherence to follow-up and high levels of heterogeneity. The review was well conducted and the authors’ conclusions regarding the limitations of the available evidence appeared reliable.

Implications of the review for practice and research
Practice: The authors stated that web-based interventions could potentially deliver a low-cost broad-reaching treatment for smoking cessation, which could be standardised and tailored as required.

Research: The authors stated that future RCTs should compare a single web-based intervention with delayed or no treatment and should also systematically compare different techniques within websites using theory-based interventions. Website exposure and dose should be examined, taking supplemental delivery modes into account. Similar length and type of treatment and duration of follow-up across studies would aid evaluation of efficacy. Future studies should report more detail about participant characteristics, use multiple follow-up methods to reduce attrition and use advanced statistical techniques to address losses to follow-up.

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