Computer and other electronic aids for smoking cessation

Effectiveness and cost-effectiveness of computer and other electronic aids for smoking cessation: a systematic review and network meta-analysis

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Executive summary

Health Technology Assessment 2012; Vol. 16: No. 38
DOI: 10.3310/hta16380

Health Technology Assessment
NIHR HTA programme
www.hta.ac.uk

Executive summary

Background and scope

The primary research question we sought to answer was: What is the effectiveness and cost-effectiveness of internet, PC and other electronic aids to help people stop smoking?

Specifically, we addressed the following three questions:

1. What is the effectiveness of internet sites, computer programs, mobile telephone text messages, and other electronic aids (alone or in combination with other smoking cessation support), compared with alternative interventions or no intervention, in increasing the success rate of smoking cessation for adult smokers and/or reducing relapse for quitters?
2. What is the cost-effectiveness of incorporating internet sites, computer programs, mobile telephone text messages, and other electronic aids into current NHS smoking cessation programmes, or offering these as an alternative to these programmes, in increasing the success rate of smoking cessation for adult smokers and/or reducing relapse for quitters?
3. What are the current gaps in existing research into the effectiveness of internet sites, computer programs, mobile telephone text messages and other electronic aids to help people stop smoking?

Smoking is harmful to health. On average, lifelong smokers lose 10 years of life, and about half of all lifelong smokers have their lives shortened by smoking. Half of these premature deaths occur before the age of retirement. Fortunately, stopping smoking reverses or prevents many of these harms. Stopping smoking before the age of 40 years (when most smokers have smoked for at least 20 years) results in minimal loss of life expectancy. Computerised interventions have considerable potential in public health because many people are ambivalent about smoking, and a good number are prepared to make quit attempts with only modest prompting. Electronic aids could provide such a prompt and, although most quit attempts end in early failure, a small proportion succeed. It is possible that the behavioural support provided by electronic aids could reach many of these smokers who otherwise use no support and thus might have much higher reach than the NHS Stop Smoking Services.

Methods

Searches of electronic databases were performed in MEDLINE, EMBASE, PsycINFO, Cumulative Index to Nursing and Allied Health Literature (CINAHL) (all from 1980–2009), Cochrane Central Register of Controlled Trials (CENTRAL) (2009) and Health Management Information Consortium (HMIC) (2009) using index and text words that encompassed the concepts of 'smoker or smoking cessation' and various types of computer and electronic aids. Retrieved records were screened and selected for inclusion according to explicit criteria. Selected studies were included in one of the three component reviews in this report according to their study design: the effectiveness review focused on randomised controlled trials (RCTs) or quasi-RCTs; the cost-effectiveness review focused on economic evaluations; and the supplementary review focused on studies of various designs that provided qualitative evidence. Meta-analyses were carried out in the effectiveness review where evidence permitted. Narrative synthesis of evidence was provided in the cost-effectiveness and supplementary reviews. In addition, a Bayesian mixed-treatment comparison (MTC) meta-analysis was performed to make consistent comparisons

across multiple interventions. Survival models for the time to relapse allowed the synthesis of data from studies with different follow-up times. The results of the MTC were used to inform a decision-analytic model from which estimates were derived of the cost-effectiveness of adding electronic interventions to conventional smoking cessation support.

Results

Our effectiveness review concluded that computer and other electronic aids increase the likelihood of cessation compared with no intervention or generic self-help materials, but the effect is small (prolonged abstinence: relative risk = 1.32, 95% confidence interval 1.21 to 1.45). The effectiveness does not appear to vary with respect to mode of delivery and concurrent non-electronic co-interventions. Overall, similar sizes of effect are observed in both aid to cessation studies (which provide support to smokers who are ready to quit) and cessation induction studies (which attempt to encourage a cessation attempt in smokers who are not yet ready to quit). Furthermore, the MTC found that the hazard of relapse falls sharply over time, so that the chance of sustaining a quit attempt increases dramatically once the first month has been negotiated successfully. The hazard ratio (HR) for electronic interventions as a single class was 0.87 (95% credible interval 0.83 to 0.92). HRs for individual classes of electronic intervention ranged from 0.85 to 1.02, with large and overlapping credible intervals, reflecting the lack of data to differentiate between different types of electronic intervention.

Our cost-effectiveness review suggests that making some form of electronic support available to smokers actively seeking to quit is highly likely to be cost-effective. This is true whether the electronic intervention is delivered alongside brief advice or more intensive counselling. For a willingness to pay (WTP) of £20,000/quality-adjusted life-year (QALY), threshold analysis found that an electronic intervention would be cost-effective up to a cost of £1053 per user [with nicotine replacement therapy (NRT) and brief advice] or £1387 (with NRT and counselling). If the WTP rose to £30,000/QALY, the equivalent thresholds were £1579 and £2081 per user. It is less clear from the available evidence what form that electronic support should take. What the analysis does suggest, however, is that the decision is not very sensitive to the cost differentials between electronic interventions. Instead, the key source of uncertainty is that around the comparative effectiveness of different types of electronic interventions.

Our results also suggest that such aids may be cost-effective in populations of smokers not actively looking to quit, based on the finding that the efficacy of electronic interventions is similar in such populations compared with those actively seeking to quit. However, this is only a tentative finding based on the information available at present.

Conclusions and recommendations for further research

Neither of the main reviews was able to determine, from the available evidence, what form electronic aids should take or how the content of interventions may affect outcomes. Evidence from the supplementary review does not directly fill these research gaps, but it does highlight some of the factors that may affect the usability and acceptability of interventions and suggests who is most likely to use electronic aids for smoking cessation. A potential role for electronic interventions is to cause a quit attempt where motivation did not previously exist. Owing to a lack of evidence, we were unable to explore the impact of electronic aids in different populations defined by their motivation to quit – for example, there are few studies that have explored efficacy of these interventions in smokers who are not yet willing to quit.

Smokers who choose to use electronic aids are likely to have a similar profile to smokers who access face-to-face interventions but may have higher levels of education and may be less nicotine dependent than the general population of smokers. There is little direct evidence to suggest that electronic aids are likely to encourage younger smokers to quit in larger numbers. There is limited evidence regarding the acceptability (measured by uptake or continued use) of different forms of electronic aids amongst subpopulations of smokers, in particular disadvantaged and black and minority ethnic groups. Particular design features may enhance usability, including involving users in intervention design, simplifying enrolment procedures in programmes to reduce dropout, and adding interactive or social support elements to aids, particularly internet sites.

The effectiveness and cost-effectiveness reviews suggest that further research is needed on the relative benefits of different forms of delivery for electronic aids (internet, mobile telephone) and the content of delivery (including more research on the efficacy of interactive electronic aids). The supplementary review, in addition, points to the need for further research on the acceptability of these technologies for smoking cessation with subpopulations of smokers, particularly disadvantaged groups. More evidence is also required on the relationship between involving users in the design of interventions and the impact this has on effectiveness, and on how electronic aids developed and tested in research settings are applied in routine practice and in the community.

Compared with previously published reviews that have focused on specific types of computer and/or other electronic aids, this review is wider in its scope and encompasses all interventions that make use of automated features brought by the advance in information technology and telecommunication in the past couple of decades. The broader scope allows us to include a larger evidence base in this review and to examine the potential impact of different computer/electronic tools on the effectiveness and cost-effectiveness of the interventions.

Funding

Funding for this study was provided by the Health Technology Assessment programme of the National Institute for Health Research.

Publication

Chen Y-F, Madan J, Welton N, Yahaya I, Aveyard P, Bauld L, *et al*. Effectiveness and cost-effectiveness of computer and other electronic aids for smoking cessation: a systematic review and network meta-analysis. *Health Technol Assess* 2012;**16**(38).

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The research reported in this issue of the journal was commissioned by the HTA programme as project number 08/60/01. The contractual start date was in April 2009. The draft report began editorial review in February 2011 and was accepted for publication in December 2011. As the funder, by devising a commissioning brief, the HTA programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

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ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

ISSN 2046-4932 (DVD)

Published by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk), on behalf of NETSCC, HTA.

Printed on acid-free paper in the UK by Charlesworth Press.