

Submission to Parliamentary Committees Inquiry into personal health promotion interventions using telephone and web-based technologies

Cochrane evidence brief of personal health promotion interventions using telephone and web-based technology to increase physical activity and improve healthy eating

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Note: This submission contains material which may be published as a Cochrane Review in accordance to the protocol:

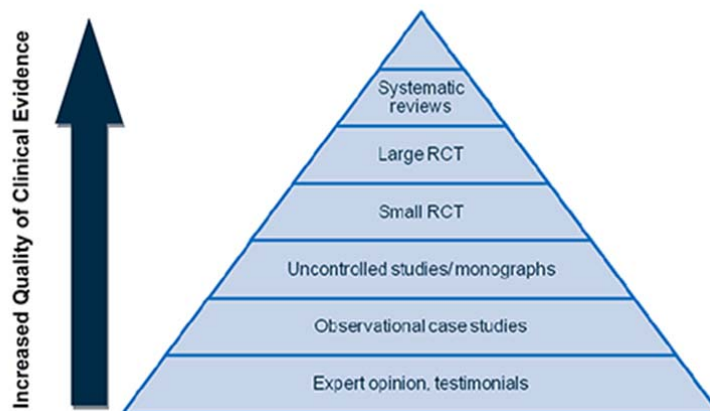
(<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD011454/abstract>)

Background:

We are now very aware of the role of physical activity and nutrition in the health of individuals and populations (1-5). Physical activity is associated with enhanced health and reduced risk of all-cause mortality, with lack of physical activity estimated to account for 6% of global deaths (5). Similarly, the Australian population is experiencing significant social and economic costs due to obesity. In 2008 alone, the costs associated were estimated to be more than \$58 billion per year (6). There are many challenges however in tackling these problems. It is likely that a broad range of actions are necessary to promote better nutrition and increased physical activity including policy infrastructure (government leadership, 'health in all' policies, health promotion funding, workforce capacity etc.), population-wide policies and interventions (laws and regulations, taxes and subsidies, social marketing), and locally-delivered community-based initiatives. The increasing burden of disease

from physical inactivity, poor nutrition and obesity in Australia, and especially in disadvantaged populations, necessitates action using interventions demonstrated to be effective

Systematic reviews employ scientifically rigorous methods to investigate the effects of interventions. Our team is currently undertaking the Cochrane Overview (or umbrella review) of systematic reviews on interventions to increase physical activity(7). That is, we are looking at all systematic reviews of relevance to increasing physical activity, to explore whether any effects of the interventions are different within and between populations; and to highlight gaps in the present evidence base. The primary purpose of the overview is to aid decision makers by highlighting interventions which demonstrate effectiveness, and where there is a need to do further investigation. A significant strength of this work is that it only includes systematic reviews which are recognized as the highest standard in evidence-based health care resources (as demonstrated by the figure below). As this work - along with some of our previous work - is of relevance to the current inquiry we have attempted to compile and synthesize the relevant evidence, with the hope it will be beneficial for the purposes of the inquiry.



NHMRC Hierarchy of evidence

Methodology

This submission aims to provide an objective and up-to-date synthesis of relevant research using data obtained during the ongoing overview of systematic reviews(8) which, once completed, will be published as a Cochrane Systematic Overview Review.

Explicit and rigorous methodology is critical in the undertaking of a systematic review or evidence synthesis, as the use of methods which lack scientific rigour can alter the identification and inclusion of studies, and thus lead to conclusions which are not trustworthy(7). Therefore, in producing this submission, we have employed a systematic, transparent, reproducible and trustworthy process based upon methodology developed by the Cochrane Collaboration; an organisation seeking to provide the world with trusted evidence to inform decisions and lead to better health outcomes. Full details of our methodology can be found in our published protocol in the Cochrane Library (<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD011454/abstract>).

The evidence summary Physical Activity:

Potentially of benefit:

- Direct, remote live contact during exercising using internet, video or telephone in older people
- Telephone based behavioural change showing significant improvements, from moderate quality studies.
- Remote and web 2.0 interventions when compared to controls, and also a tailored approach to the type of physical activity and used telephone support to provide feedback.

Promising, but the evidence is weak:

- Tailored print, using computers to choose individual feedback based on decision algorithms or generating advice from individual assessment is promising, but the evidence base is problematic in some instances.
- Non-face to face behaviour change for older healthy adults combined approaches of print media & phone, internet or media to increase or maintain PA, exercise and /or walking. Intervention components were tailoring, goal setting, self-monitoring and motivation. The quality of the evidence base of the included studies is of concern.

Unknown – insufficient evidence to decide:

- Using web 2.2 compared to face to face behavioural interventions, no difference. The evidence base is poor.

Ineffective:

- Using SMS messaging in children made no difference to exercise, screen time and sweet drink reduction (conclusion of 2 systematic reviews).
- Social media interventions fail to demonstrate a significant benefit for improving exercise.

The evidence summary Nutrition:

Potentially of benefit:

- Telephone based behavioural change approaches show significant improvements, from moderate quality studies.

Promising, but the evidence is weak:

- Tailored print, using computers to choose individual feedback based on decision algorithms or generating advice from individual assessment is promising. The evidence base is problematic in some instances.

Unknown – insufficient evidence to decide:

- Social media interventions fail to demonstrate a significant benefit for improving weight, but might be useful for a healthy diet, including fat intake.

Ineffective:

- Using SMS messaging in children made no difference to sweet drink reduction (conclusion of 2 systematic reviews).

Please see Appendix for details

Summary

There is good evidence that using remote approaches including tailored feedback with telephone support can increase a person's level of physical activity and improve their diet. Unfortunately, few systematic reviews provided specific details for children as many of the interventions such as community-wide interventions, do not measure the effect upon children. However, there is clear evidence from other systematic reviews that another approach, school-based interventions, can increase children's physical activity levels(9). Tailored print, using computers to choose individual feedback based on decisions has been found to be beneficial for both improving physical activity and dietary intake.

The overview research has however found there is insufficient evidence of effect for many of the types of interventions often provided to children and adults including text-messaging and social media. The evidence base is generally weak in identifying effective interventions for increasing physical activity levels of persons who are socio-economically disadvantaged and for priority ethnicities such as indigenous people.

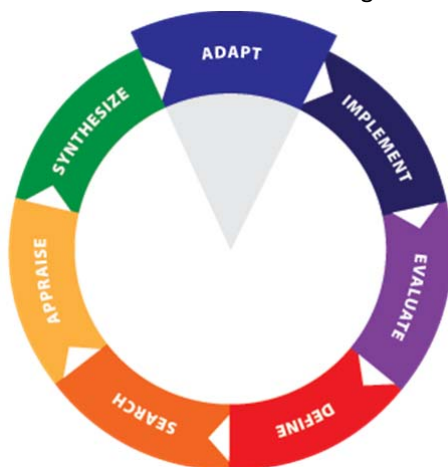
More high quality research is needed in quantifying the effects of behavioural change programs provided with supervision, computer tailored print, family-based, the promotion of cycling messaging..

The overview will have several limitations as the summaries are based upon the conclusions of the included systematic reviews. Further, the findings summarised here are based upon the focused questions posed by the systematic reviewers. As a result, this overview can only report upon the outcomes which the systematic reviewer authors have provided.

Many of the reviews included studies conducted in Australia, however this does not mean that the interventions can be generalised to all Australian settings. None of the reviews specifically summarised interventions conducted in indigenous settings, although some reviews reported interventions which were conducted for ethnic priorities or other disadvantaged groups.

It worked there, will it work here?

Evidence-informed decision making involves using the best available evidence from research, context and experience, and using the evidence to improve health service provision and policy (10). Evidence-informed decision making consists of seven steps shown in the figure. This brief provides the foundations of the first four steps of Define, Search, Appraise and Synthesis. Prior to implementation and formation of policy, adaption of the evidence is required. Adaption helps answer the question "Can I use this research with my client, community of population?" Evidence must be considered at two levels: Is the evidence in the study applicable? and can it be transferred (11). Applicability describes feasibility and considers would it be appropriate and possible to undertake the identified



interventions in the intended settings. Transferability describes generalizability and asks the question “Can we expect similar results?” This submission of systematic review evidence offers a systematic approach to providing a higher level synthesis to broad public health issues such as physical activity and nutrition. Translation requires the use of specialised tools such as the applicability tool (<http://www.nccmt.ca/pubs/A&Trevised-startEN.pdf>) from National Collaborating Centre of Methods and Tools and the use of experience knowledge brokers working with policy makers. In complex situations such as improving health of Aboriginal peoples, the mixed-method of translation described by Baker (12) comparing systematic review evidence overviews informed by a systematic summary of contextual knowledge may be appropriate.

Appendix: The supporting details of evidence:

Potentially of benefit:

Direct, remote live contact

Geraedts 2013 (13):Behavioural change, remote feedback, non face to face for **physical activity**

Interventions: a) Frequent telephone contact (16 studies), b) Non-frequent telephone contact (5 studies) or c) Direct remote contact during exercising using live feedback by internet, video or telephone (3 studies)

24 studies, randomised controlled trials, controlled studies. Narrative review. Older adults

Findings: Compared to home-based intervention. Frequent, non-frequent and direct contact all seem beneficial to effectiveness, but the strength of evidence varies between these categories. Direct remote contact seems a particularly good alternative to supervised onsite exercising; frequent, non-frequent or direct remote feedback seem more effective than treatment as usual and equally effective as supervised exercise interventions. Strong evidence based on three studies indicates that direct remote contact provides positive results on **physical activity** and capacity measures comparable to supervised training

Primarily telephone

Eakin 2007(14) - telephone was the primary method of intervention delivery for **physical activity and dietary change**

Interventions in which the telephone was the primary method of delivery of the intervention. For PA targeting walking (2 studies) and moderate physical activity. Theory-based approaches with Social-cognitive Theory and trans-theoretical model. Included motivational interviewing. Some programs combined PA with nutrition (4 studies) whilst other PA or nutrition separately (6 studies).

16 studies on physical activity, 6 studies on dietary & 4 PA & nutrition analysed by narrative vote count all in high income countries: Australia (4 studies), New Zealand (1 study) & USA (21 studies)

Findings: Positive outcomes were reported for 69% of physical activity studies.83% dietary studies, and 75% addressing both outcomes. Effect related to intensity: length of intervention 6 to 12

months, 12 or more phone calls tending to produce the most favourable outcomes. All studies RCTs, limited information on the study quality, but appears to be moderate strength.

Desroches 2013 (15)– telephone used with interventions for follow-up to **dietary advice**

Adult participants in chronic disease prevention using telephone

38 studies, in total analysed using narrative and vote count.

Findings: Some promising effects - using telephone follow-ups, videos, contracts, feedback, nutrition tools and multiple intervention components showed at least one positive diet adherence outcome initially, but not in the longer-term.

Remote and web 2.0

Richards 2013a (16) – remote and web 2.0 **physical activity**, compared against control

Principle intervention delivered using remote or web 2.0 technologies (e.g. smart phones or traditional methods like mail- outs and phone calls)

11 studies of 5,862 healthy adults in high income countries.

Findings: Effect of cardiovascular fitness was positive and moderate at one year (2 studies, high quality). Self-reported PA (9 studies, moderate quality). One study reported positive results at two years (SMD 0.20; 95% CI 0.08 to 0.32; moderate quality evidence). The poorer quality studies reported greater effect than the strong studies. The most effective interventions applied a tailored approach to the type of PA and used telephone contact to provide feedback and to support changes in PA levels.

Promising, but the evidence is weak:

Tailored Print

Krebs 2010 (17): Tailored Print for physical activity and healthy diet

Using computers to choose individual feedback based on decision algorithms and provided the intervention primarily via communication channels that did not use live counsellors for physical activity and healthy diet

25 studies, in adults, mostly female.

Findings: Clinically and statistically significant overall effect sizes were found across all behaviours (**physical activity, healthy diet, smoking & mammography screening**) suggesting tailored print to be an effective approach. The mean effect size across all behaviours (was $g=0.16$ (95 CI= 0.10 - .21, $p < 0.001$). Authors state “methodological considerations necessarily limit the conclusions able to be drawn from the present work”. Work better over time than one off.

Short 2011 (18): tailored-print interventions to promote **physical activity**

Advice tailored for the specific person based on information from individual assessment using a computer system.

12 studies, in predominantly middle-aged inactive females. Narrative summary and vote count.

Finding: Seven studies included in the review showed significant short- and long-term positive effects favouring the interventions (1 to 24 months post-baseline and 3 to 18 months post interventions), reported effect sizes range from OR 0.82 to OR 1.34. Five studies did not find significant positive effects of the interventions on physical activity. However, one of these studies reported a negative effect and another study found a positive trend. Interventions with multiple contacts appear to be more effective than interventions with one contact. There is preliminary evidence that computer tailored-print interventions to promote physical activity are promising in adult populations.

Muller 2014 (19) : various forms of non-face-to face interventions, in health adults aged 50 or older. Including print media & phone, internet or media to increase or maintain physical activity exercise and /or walking. Intervention components were tailoring, goal setting, self-monitoring and motivation.

16 studies, mostly randomised controlled trials. Narrative and vote count summary.

Findings: 14 of the 16 included studies reported significant improvements in PA over the respective study periods (1 week to 24 months). The approach appears to be effective, however study quality was not summarised by the authors and appears with most studies lacking quality.

See **Williams 2014 (20)** for details of effectiveness in reducing in dietary fat consumption.

Unknown – insufficient evidence to decide:

Remote and web 2.0 compared against face to face

Richards 2013b (21) remote and web 2.0 compared against face to face for physical activity

1 included study

Findings: Difference between the remote and web 2.0 versus face-to-face arms was not significant (SMD -0.02; 95% CI -0.30 to 0.26; high quality evidence (1 study). Greater adherence in home based exercise sessions compared to facilities, but no greater improvements in fitness. Insufficient evidence to determine whether web is better than face to face.

Ineffective:

Social Media

Williams 2014 (20): Social Media interventions aimed to promote **healthy diet** and **exercise** behaviours.

Approaches of online learning modules and self-report diaries of weight, physical activity or dietary behaviours along with a social support component using social media such as blog/microblog, social networking and discussion boards.

22 included studies (12 of physical activity), ranging 12 weeks to 2 years. Study participants were typically middle-aged Caucasian women of mid-high socioeconomic status.

Findings: Meta-analysis showed no significant differences in changes in **physical activity** (standardised mean difference (SMD) 0.13 (95% CI -0.04 to 0.30), 12 studies) and **weight** (SMD -0.00 (95% CI -0.19 to 0.19), 10 studies). However, pooled results from five studies showed a significant decrease in **dietary fat consumption** with social media (SMD -0.35 (95% CI -0.68 to -0.02)). The evidence is generally of poor quality. The results give a trend that text-message-based interventions have potential to promote healthy behaviours. Especially populations with a low socioeconomic status, varying ethnicities, less educated populations and those who frequently change their address have access to mobile phone technology. There is no evidence that social media based interventions have significant effect on physical activity or weight, but might be useful for dietary.

Text Messaging

Vodepivec-Jamsek 2012 (22): use of text messaging for preventive health behaviours using information and support for healthy behaviours (**physical activity and nutrition related**) delivered by mobile phone messaging compared to diary

1 included study of 32 children, RCT

Findings: Tracking of healthy behaviours in children using mobile phone messages did not result in any significant differences on their level of physical activity, consumption of sugar-sweetened beverages or screen time, compared to tracking using a paper diary or no tracking at all. Evidence is of low quality

Militello 2013 (3): use of text messaging to promote healthy behaviours including physical activity

Children and adolescent populations aged 18 or younger

3 studies

Findings: Three of the included studies used **physical activity** as an outcome measurement, only one of those studies showed a significant difference in physical activity across groups. However, this study had a follow-up length of two weeks only. The study with nutrition related outcomes did not report an effect. The results give a trend that text-message-based interventions have potential to promote healthy behaviours. Especially populations with a low socioeconomic status, varying ethnicities, less educated populations and those who frequently change their address have access to mobile phone technology. Text-message-based interventions have the potential to transform health promotion efforts. However, it is not certain how effective these interventions are.

Insufficient evidence, high risk of bias. Effectiveness is uncertain, but potentially possible.

Hutfless 2012(23) :interventions to prevent weight gain in adults, including use of reminder text messages

22 included studies (various designs), in adults in group lifestyle sessions

Finding: The evidence is insufficient due to most studies in the review being rated high risk of bias (strength of evidence low), with high loss-to follow-up among participants. However, the results can be seen as promising and good starting points for future research.

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Submitted in Brisbane, Queensland, the 30th day of April, 2015 by Professor Dr Philip Baker



As global leaders in providing evidence for better public health decisions we welcome the opportunity to collaborate and cooperate in future work.



Queensland University of Technology



National Collaborating Centre
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