Effects of remote feedback in home-based physical activity interventions for older adults: a systematic review

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CRD summary
The authors concluded that interventions that used frequent, non-frequent or direct remote feedback (telephone, internet, video) seemed more effective than treatment as usual and as effective as supervised exercise interventions in an older population getting increasingly used to modern technology. There was some heterogeneity in the data but the review used careful methodology and the conclusions appear reliable.

Authors’ objectives
To assess the effectiveness of remote feedback on physical activity and capacity in home-based physical activity interventions in older adults with or without medical conditions. Effects on adherence were examined.

Searching
PubMed, PsycINFO, Cochrane Central Register of Controlled Trials (CENTRAL) and EMBASE were searched for studies published between 1990 and July 2012. The search strategy was reported. Additional searches included a related articles search in PubMed and checking reference lists of included studies. Inclusion was restricted to articles in English, Dutch or German.

Study selection
Primary studies that assessed a physical activity intervention programme in the home situation were eligible for inclusion. Physical activity had to be structured, situated exclusively in the participant's home and aim at raising the level of physical activity or physical capacity. The study had to involve remote feedback without including an element of structural contact that was not remote (except for measurements and explanation or initiation of the exercise programme). Studies had to assess at least one aspect of general physical activity behaviour or physical activity capacity. Participants in at least one study group had to be aged 55 years or older. Case studies were excluded. For the assessment of effectiveness, only controlled studies with an exercise or non-exercise control group were included. Studies had to receive a PEDro quality score of at least 4 out of 10. Adherence was defined as the degree to which a person correctly followed a prescribed exercise routine.

In most of the included studies, participants had some form of comorbidity (cardiovascular disease, previous or current cancer, Parkinson’s disease, osteoporosis, diabetes, hip replacement). Mean age ranged from 55 to 81 years. Intervention durations ranged from four weeks to 12 months (mostly short to intermediate durations). Most studies had control groups with no active intervention; some included active control groups (such as centre-based structured exercise sessions). Various exercise strategies were used and these ranged from walking to more structured programmes. The main method of remote contact was by telephone. Only a few studies based their remote feedback on any theory-based approaches.

Two reviewers independently selected studies for inclusion. Discrepancies were resolved by discussion or by referring to a third reviewer.

Assessment of study quality
Study quality was assessed independently by two reviewers using the PEDro scale (items listed). Studies were considered high quality when they received a PEDro score of at least 6 out of 10. The overall evidence was then classified according to the best-evidence synthesis method. Any disagreements were resolved by a third reviewer.

Data extraction
Standard mean differences (SMD) with corresponding 95% confidence intervals (CI) were calculated for each available outcome. The authors did not state how many reviewers extracted data.

Methods of synthesis
Data were analysed according to the guidelines of the Cochrane Back Review Group and were summarised using a best-evidence synthesis. Studies were subdivided by frequency of remote contact: frequent telephone contact (more than once a month during the intervention), infrequent telephone contact (once a month or less) and direct remote contact during exercising.

**Results of the review**

Thirty-two studies (5,328 participants) were included: 24 assessed effectiveness, 22 assessed adherence and 14 assessed both of these. Twelve of the 24 effectiveness studies were rated high quality and 12 were rated low quality. PEDro scores ranged from 4 to 7 (median 6).

Sixteen studies (eight high quality and eight low quality) were classified as frequent contact and 12 of these had a non-active comparison group and results were conflicting. Effects on physical capacity measures in the intervention groups were either comparable to or significantly better than those in the control groups. In four studies that compared remote feedback with supervised exercise sessions, remote feedback groups were as effective at enhancing physical capacity as the control group.

Five studies assessed non-frequent remote contact (two high quality and three low quality). Results were consistent in that effects on physical capacity measures were significantly larger in the intervention groups of studies with an inactive control group or comparable in studies with an active control group (supervised exercise).

Three studies assessed direct remote feedback (internet, video or telephone; two high quality and one low quality). Results showed that physical activity declined significantly less with remote feedback than with usual care and there were similar effects on physical capacity measures as for supervised exercise.

Adherence rates ranged between 32.1% and 91% (22 studies). Adherence was higher when providing remote feedback than in the control groups without feedback.

**Authors' conclusions**

Interventions that used frequent, non-frequent or direct remote feedback seemed more effective than treatment as usual and as effective as supervised exercise interventions.

**CRD commentary**

The review question and inclusion criteria were clear. Relevant sources were searched. Language restrictions were used but the authors stated that English abstracts of potentially relevant studies published in non-included languages suggested that these articles were not relevant so they considered it unlikely that articles were overlooked because of language bias. It appeared that study selection and quality assessment were carried out with sufficient attempts to minimise error and bias.

The included studies were of mixed quality (half high and half low quality). The authors noted that there was substantial heterogeneity in frequent-contact studies. Study details were provided adequately. Given the careful review methodology the authors' conclusions appear reliable.

**Implications of the review for practice and research**

**Practice:** The authors stated that remote feedback was a promising strategy in an older population getting increasingly used to modern technology.

**Research:** The authors stated a need for more evidence on any benefits of theory-based remote feedback strategies. More research was needed on feasibility and cost-effectiveness of the use of modern technology in home-based physical activity programmes for older adults.

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