Telehealth interventions for the secondary prevention of coronary heart disease: a systematic review

Neubeck L, Redfern J, Fernandez R, Briffa T, Bauman A, Freedman SB

CRD summary
This review concluded that telemedicine interventions provided effective risk factor reduction and secondary prevention in patients with coronary heart disease. This was generally a well-conducted review and the authors’ conclusions are likely to be reliable.

Authors’ objectives
To evaluate the effect of telemedicine (telehealth) interventions in patients with coronary heart disease (CHD).

Searching
The Cochrane Library, MEDLINE, CINAHL and EMBASE were searched from 1990 to 2008; search terms were not reported. Current Controlled Trials, conference lists, grey literature, and the Internet (using Google) were also searched. Reference lists of possible trials were checked to identify additional studies. Only English-language trials were eligible for inclusion.

Study selection
Randomised controlled trials (RCTs) that evaluated telehealth interventions in patients with CHD and that had a follow-up of at least three months were eligible for inclusion. Telehealth interventions were defined as risk factor modification programmes, delivered by telephone, internet, or teleconferencing, that provided at least 50% of patient-provider contact. Trials were excluded if they were primary prevention, targeted heart failure patients, not delivered by a health care practitioner, or of poor methodological quality (Jadad score below two). The outcomes of interest were mortality (all-cause and cardiac), non-fatal acute coronary events, coronary risk factor levels, quality of life, patient knowledge, economic measures, and cost-effectiveness.

All but two trials were delivered by telephone; two were internet-based. The programme characteristics (including duration and content) varied between trials. Minimal information was provided about the comparison groups. The mean age of participants in the trials ranged from 57 to 64 years and the percentage of men ranged from 57 to 83. Patients were recruited following myocardial infarction, re-vascularisation and acute coronary syndrome; many trials excluded patients with severe co-morbidities. Patient enrolment into the trials varied; the longest time being six months after the event. Follow-up times ranged from three to 48 months.

Two reviewers independently selected the trials.

Assessment of study quality
The quality of the included RCTs was assessed using the Jadad scale and the Consolidated Standards of Reporting Trials (CONSORT). The criteria appeared to be randomisation, concealment of allocation, blinding of outcome assessors, and proportion lost to follow-up.

The authors did not state how many reviewers performed the validity assessment.

Data extraction
Two reviewers independently extracted data using a pre-designed form. Relative risk and 95% confidence interval (CI) data were calculated from the numbers of events in each arm of each study. Mean differences between the groups were calculated for continuous outcomes, with 95% CIs. When the same outcome was reported at different time points, the longest follow-up was used. Any disagreements were resolved by a third reviewer.

Methods of synthesis
Pooled relative risks and weighted mean differences, with corresponding 95% confidence intervals, were calculated using a fixed-effect model. Only medium-term to long-term data (six to 48 months) were used in the meta-analyses of
Results of the review

Eleven RCTs (3,145 patients) were included in the review. Nine trials (3,010 patients) were telephone-based and two (135 patients) were Internet-based. Limited information was provided about trial quality; no trial was double-blind and all RCTs reported adequate concealment of allocation.

All-cause mortality: The telehealth intervention was associated with a non-significant lower risk of death (RR 0.70, 95% CI 0.45 to 1.1; 11 RCTs).

Risk factors: The telehealth intervention was associated with a significantly lower total cholesterol (WMD 0.37 mmol/L, 95% CI 0.19 to 0.56; eight RCTs); a significantly lower low-density lipoprotein cholesterol (WMD 0.41 mmol/L, 95% CI 0.36 to 0.56; four RCTs); a significantly higher high-density lipoprotein cholesterol (WMD 0.05 mmol/L, 95% CI 0.01 to 0.09; seven RCTs); a significantly lower systolic blood pressure (WMD 4.69 mmHg, 95% CI 2.91 to 6.47; five RCTs); and a significantly lower risk of smoking (RR 0.83, 95% CI 0.70 to 0.99; seven RCTs). The telehealth intervention was associated with non-significant lower triglycerides, lower body mass index and better levels of physical activity. No meta-analysis was conducted for physical activity due to the variation in assessment methods.

Significant heterogeneity and moderate heterogeneity were considered present for the outcomes of total cholesterol ($I^2 = 80\%$) and systolic blood pressure ($I^2 = 71\%$). A random-effects model was used for the analysis of total cholesterol.

Psychosocial status, nutritional status, quality of life, and costs were reported in narrative syntheses.

Cost information

One trial (104 patients) reported an estimated net cost saving of US $965 per person for the telehealth intervention. This was due to readmission costs in the usual care group.

Authors' conclusions

Telehealth interventions provided effective risk factor reduction and secondary prevention in patients with CHD. Provision of telehealth could increase the uptake of formal secondary prevention, by those who do not access cardiac rehabilitation, and narrow the current gap between evidence and practice.

CRD commentary

The review question was clear and was supported by specific inclusion criteria. The authors searched relevant databases and reference lists. Language restrictions were imposed, which introduced a risk of language bias. Some attempts were made to locate unpublished material, reducing the potential for publication bias, but this was not investigated and cannot be ruled out. Appropriate methods were used to minimise reviewer error and bias during the selection of trials and extraction of data. It was difficult to assess the quality of the RCTs as only limited information was provided. The methods used to pool data appeared to be appropriate.

This was generally a well-conducted review and the authors' conclusions are likely to be reliable.

Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that further research was needed to answer important questions relating to mode of delivery, hospitalisation rates, event-rates, cost-effectiveness, and the value of telehealth interventions compared with centre-based cardiac rehabilitation.

Funding

Not stated.

Bibliographic details

PubMedID
19407659

DOI
10.1097/HJR.0b013e32832a4e7a

Original Paper URL
http://journals.lww.com/ejcpr/Abstract/2009/06000/Telehealth_interventions_for_the_secondary.3.aspx

Indexing Status
Subject indexing assigned by NLM

MeSH
Coronary Disease /etiology /mortality /prevention & control; Evidence-Based Medicine; Humans; Internet; Odds Ratio; Outcome and Process Assessment (Health Care); Patient Acceptance of Health Care; Quality of Life; Randomized Controlled Trials as Topic; Risk Assessment; Risk Factors; Secondary Prevention /methods; Telemedicine; Telephone; Time Factors; Treatment Outcome; Videoconferencing

AccessionNumber
12009108577

Date bibliographic record published
18/11/2009

Date abstract record published
27/01/2010

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.