Patient education in the management of coronary heart disease (Review)

Brown JPR, Clark AM, Dalal H, Welch K, Taylor RS

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2011, Issue 12

http://www.thecochranelibrary.com

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

TABLE OF CONTENTS

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

[Intervention Review]

Patient education in the management of coronary heart disease

James PR Brown[1], Alexander M Clark[2], Hayes Dalal[3], Karen Welch[4], Rod S Taylor[5]

[1]Anaesthetics Department, Musgrove Park Hospital, Taunton, UK. [2]Faculty of Nursing, University of Alberta, Edmonton, Canada. [3]Peninsula Medical School, Research & Development, Knowledge Spa, Royal Cornwall Hospitals Trust, Truro, UK. [4]KWIC (Karen Welch Information Consultancy), Fareham, Hants, UK. [5]Peninsula College of Medicine and Dentistry, Universities of Exeter & Plymouth, Exeter, UK

Contact address: James PR Brown, Anaesthetics Department, Musgrove Park Hospital, Taunton, Somerset, TA1 5DA, UK. jprb_brum@yahoo.com.

Editorial group: Cochrane Heart Group.
Publication status and date: New, published in Issue 12, 2011.
Review content assessed as up-to-date: 31 August 2010.

Citation: Brown JPR, Clark AM, Dalal H, Welch K, Taylor RS. Patient education in the management of coronary heart disease. *Cochrane Database of Systematic Reviews* 2011, Issue 12. Art. No.: CD008895. DOI: 10.1002/14651858.CD008895.pub2.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Cardiac rehabilitation (CR) is a complex multifaceted intervention consisting of three core modalities: education, exercise training and psychological support. Whilst exercise and psychological interventions for patients with coronary heart disease (CHD) have been the subject of Cochrane systematic reviews, the specific impact of the educational component of CR has not previously been investigated.

Objectives

1. Assess effects of patient education on mortality, morbidity, health-related quality of life (HRQofL) and healthcare costs in patients with CHD.

2. Explore study level predictors of the effects of patient education (e.g. individual versus group intervention, timing with respect to index cardiac event).

Search methods

The following databases were searched: *The Cochrane Library*, (CENTRAL, CDSR, DARE, HTA, NHSEED), MEDLINE (OVID), EMBASE (OVID), PsycINFO (EBSCOhost) and CINAHL (EBSCOhost). Previous systematic reviews and reference lists of included studies were also searched. No language restrictions were applied.

Selection criteria

1. Randomised controlled trials (RCTs) where the primary interventional intent was education.

2. Studies with a minimum of six-months follow-up and published in 1990 or later.

3. Adults with diagnosis of CHD.

Data collection and analysis

Two review authors selected studies and extracted data. Attempts were made to contact all study authors to obtain relevant information not available in the published manuscript. For dichotomous variables, risk ratios and 95% confidence intervals (CI) were derived for each outcome. For continuous variables, mean differences and 95% CI were calculated for each outcome.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Main results

Thirteen RCTs involving 68,556 subjects with CHD and follow-up from six to 60 months were found. Overall, methodological quality of included studies was moderate to good. Educational 'dose' ranged from a total of two clinic visits to a four-week residential stay with 11 months of follow-up sessions. Control groups typically received usual medical care. There was no strong evidence of an effect of education on all-cause mortality (Relative Risk (RR): 0.79, 95% CI 0.55 to 1.13), cardiac morbidity (subsequent myocardial infarction RR: 0.63, 95% CI 0.26 to 1.48, revascularisation RR: 0.58, 95% CI 0.19 to 1.71) or hospitalisation (RR: 0.83, 95% CI:0.65 to 1.07). Whilst some HRQofL domain scores were higher with education, there was no consistent evidence of superiority across all domains. Different currencies and years studies were performed making direct comparison of healthcare costs challenging, although there is evidence to suggest education may be cost-saving by reducing subsequent healthcare utilisation.

This review had insufficient power to exclude clinically important effects of education on mortality and morbidity of patients with CHD.

Authors' conclusions

We did not find strong evidence that education reduced all cause mortality, cardiac morbidity, revascularisation or hospitalisation compared to control. There was some evidence to suggest that education may improve HRQofL and reduce overall healthcare costs. Whilst our findings are generally supportive of current guidelines that CR should include not only exercise and psychological interventions, further research into education is needed.

PLAIN LANGUAGE SUMMARY

Patient education for coronary heart disease

Coronary heart disease (CHD) includes chest pain, heart attacks, and the need for heart surgery and is a major cause of premature death and disability. Education is a common element of care for people with CHD aiming to decrease mortality and morbidity as well as improving quality of life. This review shows that there is not enough information available to fully understand the impact of educational interventions on mortality, morbidity and health-related quality of life of patients with CHD. Nevertheless, our findings broadly support current guidelines that people with CHD should receive comprehensive rehabilitation that includes education. Further research is needed to evaluate the most clinically and cost-effective ways of providing patient education on CHD.

BACKGROUND

Description of the condition

Cardiovascular disease is the largest cause of death globally: in 2004 there were an estimated 7.2 million deaths attributable to coronary heart disease (CHD) (WHO 2010). Low and middle income countries are disproportionally affected and CHD produces a significant economic burden globally (WHO 2010). For example, it is estimated that over a decade (2006 to 2015) China will loose $US 558 billion from national income due to a combination of CHD, stroke and diabetes (WHO 2010). CHD causes significant morbidity and mortality, as a chronic disease it contributes significantly to disability in developed countries. CHD accounts for 11.1% of total disability adjusted life years in European countries (WHO 2008). CHD results in difficulties performing everyday activities such as housework or cooking meals and it can impair sexual function (Racca 2010). This leads to a potentially preventable significantly decreased quality of life (Gravely-Witte 2007). Public health interventions aimed at CHD prevention are important to reduce this burden.

It is widely accepted that the effective management of CHD is multi-modal, including appropriate revascularisation, drug therapy and cardiac rehabilitation (CR). Guidelines for CHD treatment and content of CR are regularly updated to reflect the growing evidence base (Balady 2007; SIGN 2002; Smith 2006).

Description of the intervention

The Scottish Intercollegiate Guidelines Network defines CR as "*the process by which patients with cardiac disease, in partnership with*

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

a multidisciplinary team of health professionals, are encouraged and supported to achieve and maintain optimal physical and psychosocial health (SIGN 2002)." In terms of the timing and target audience for CR, the British Heart Foundation state *"cardiac rehabilitation is a programme of exercise and information sessions.... available to anyone who has a heart attack, coronary angioplasty or heart surgery and starts as soon as you go into hospital for your angioplasty or surgery* (BHF 2011)*."*

Consensus statements from the American Heart Association and the American Association of Cardiovascular and Pulmonary Rehabilitation state that CR programmes *"should offer a multifaceted and multidisciplinary approach...and that programmes that consist of exercise training alone are not considered CR* (Balady 2007)." CR consists of several intervention modalities and can be divided into three broad intervention groupings: exercise training, psychological support and patient education. Exercise and psychological interventions have recently been the subject of Cochrane systematic review updates (Heran 2010; Whalley 2011). Whilst these reviews have considered trials that have included education as a co-intervention, there has been no Cochrane review to date that specifically focused on the impact of the educational component of CR for patients with CHD.

Patient education is defined as *"the process by which health professionals and others impart information to patients that will alter their health behaviours or improve their health status"* (Koongstvedt 2001). There is a substantial variety in the delivery of patient education. It can be classroom or home based, group or individual, tailored or generic. Duration and reinforcement of education also differs between programmes. Some programmes are developed according to validated educational theory and by trained professionals whilst others are delivered by peers.

Why it is important to do this review

Two meta-analyses of education in patients with CHD were published in the 1990s (Dusseldorp 1999; Mullen 1992). The first meta-analysis (Mullen 1992) demonstrated a significant mortality reduction with patient education (weighted average effect size 0.24 standard deviation units, 95% CI: 0.14 to 0.33), which translated into a 19% improvement in mortality. The average effects for morbidity (reinfarction and rehospitalisation) were not found to be significant. However, one RCT was excluded from analysis because it was an outlier as it demonstrated a large positive effect size (Rahe 1979). The second meta-analysis (Dusseldorp 1999) investigated the co-interventions of health education and stress management and concluded that these programmes yielded a mean reduction of 34% in cardiac mortality and a 29% reduction in the risk of reinfarction. There are concerns on several grounds about the applicability of these results to policy formation and the current provision and planning of CR services:

1. The scope of both meta-analyses were education combined with 'psycho-social' interventions. It is not readily possible to establish the independent effect of education.
2. The inclusion of both randomised and non-randomised evidence may have substantially increased the risk of selection bias.
3. Trials enrolled primarily Caucasian and middle-class males. The elderly, women and ethnic minorities were under represented.
4. Usual care for CHD has evolved significantly since these studies were undertaken, transferability of any trial results is of limited value. Routine care has been influenced by the introduction of national guidelines such as the National Service Framework for CHD in the United Kingdom (DofH 2000).
5. Educational interventions are continuously developing to reflect advancing Internet technology (Bailey 2010; Dellifraine 2008; Neubeck 2009).

Several new studies have been completed since the previous systematic reviews of the literature (Clark 2000; Clark 2009; Esposito 2008; Hanssen 2007; Lie 2009; Lisspers 1999; Peikes 2009; Pogosova 2008; Southard 2003; Tingstrom 2005). This new information and the concerns about the existing meta-analyses indicate that an up-to-date review is appropriate. This Cochrane review uses meta-regression to assess the available evidence base for effects of education on patients with CHD and formally explore the heterogeneity and variation in education intervention.

OBJECTIVES

1. To assess the effects of patient education compared with usual care on mortality, morbidity, health-related quality of life (HRQofL) and healthcare costs in patients with CHD.

2. To explore the potential study level predictors of the effects of patient education in patients with CHD (e.g. individual versus group intervention, timing with respect to index event).

METHODS

Criteria for considering studies for this review

Types of studies

To reflect contemporary CHD practice we included randomised controlled trials (RCTs) published after 1990.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Types of participants

We included studies where subjects were adults:

- who had suffered a myocardial infarction (MI),
- who underwent revascularisation (coronary artery bypass grafting (CABG), percutaneous transluminal coronary angioplasty (PTCA) or coronary artery stenting), or
- who had angina pectoris or CHD defined by angiography

We excluded studies of participants who undertook education programmes:

- following heart valve surgery,
- suffered from heart failure,
- were subject to heart transplantation,
- were implanted with either cardiac-resynchronisation therapy or
- defibrillators.

Types of interventions

We identified RCTs where patient education was the primary intention of the intervention with a follow-up period of at least six months. We excluded studies of CR where exercise or psychological intervention were the primary focus for investigation. These later components of CR have been investigated previously in Cochrane systematic reviews (Jolliffe 2001; Rees 2004) and recently updated by the Cochrane reviews of exercise-based rehabilitation (Heran 2010) and psychological interventions for people with CHD (Whalley 2011).

For the purposes of this review, patient education was defined as the following:

(1) Instructional activities organised in a systematic way involving personal direct contact between a health professional and CHD patients with or without significant others: e.g. spouse, family member;

(2) Delivered as an inpatient, outpatient in a community-based intervention setting or programme;

(3) Include some form of structured knowledge transfer about CHD, its causes, treatments or methods of secondary prevention;

(4) Delivered in a face-to-face format, in groups or on a one-to-one basis. We also included alternative interactive methods of educational delivery such as "telehealth" (telephone, e-mail, Internet and teleconference between educator and patient);

We included only study interventions that met all the above criteria.

We excluded general information provision, which is not organised in a systematic way (e.g. written guidance given to a patient on leaving the cardiac care unit or personal communication with a healthcare provider), as we considered this to be usual care.

Given the multifaceted nature of CR we excluded studies where exercise and/or psychological therapies were provided and patient education was not stated to be a primary intervention.

We particularly sought studies designed to assess the independent effect of education (e.g. patient education plus usual care versus usual care alone; patient education, usual care and exercise versus usual care and exercise alone; patient education, usual care and psychological intervention versus usual care and psychological intervention alone).

Types of outcome measures

The aim of the review was to include studies that reported event data (e.g. mortality, cardiovascular events). We excluded alternative outcomes, for instance, changes in smoking, diet, blood pressure or effect of education on patient's knowledge. We elected not to include these outcomes because we considered event rates to be more significant.

Primary outcomes

- Total mortality
  - Cardiovascular mortality
  - Non-cardiovascular mortality
- Total cardiovascular (CV) events
  - Fatal and/or non-fatal myocardial infarction
  - Other fatal and/or non-fatal CV events

Secondary outcomes

- Total revascularisations
  - CABG
  - PTCA with or without stenting
- Hospitalisations
  - Total number of cardiac-related patient admissions in the follow-up period following the intervention
  - Proportion of patients requiring admission in the follow-up period following the intervention
- Validated measures of HRQofL (e.g. Short Form Health Survey SF-36, Sickness Impact Profile, Nottingham Health Profile)
- Withdrawals/drop-outs
- Healthcare costs and cost-effectiveness

We excluded studies that did not report these outcomes.

Search methods for identification of studies

Electronic searches

We searched the following databases: *The Cochrane Library, Issue 3 of 4 2010,* (Cochrane Central Register of Controlled Trials - CENTRAL, Cochrane Database of Systematic Reviews - CDSR,

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Database of Abstracts of Reviews of Effects - DARE, Health Technology Assessment Database - HTA, NHS Economic Evaluation Database - NHSEED); OvidSP Database platform - MEDLINE (including pre-medline in-process & other indexed citations), 1990 to August 2010, and EMBASE, 1990 to August 2010; and EbscoHOST Database platform, PsycINFO, 1990 to August 2010, and CINAHL, 1990 to August 2010. The search strategy was designed with reference to previous systematic reviews of education for the prevention of CHD (Dusseldorp 1999; Mullen 1992) and Cochrane reviews that considered education as an intervention (Deakin 2005; Duke 2009). We searched terms using alternate terminology and spelling to capture all relevant studies conducted throughout the world. The literature search contained a mixture of subject heading index terms and free text to maximise retrieval.

Ongoing trials were identified from searching the following trial registries:

- UK Clinical Research Network Portfolio Database - UKCRN (http://public.ukcrn.org.uk),
- *meta*Register of Controlled Trials (controlled-trials.com/mrct/) (includes clinicaltrials.gov),
- ICTRP WHO International Clinical Trials Registry Platform (apps.who.int/trialsearch/).

All searches were carried out in August 2010.

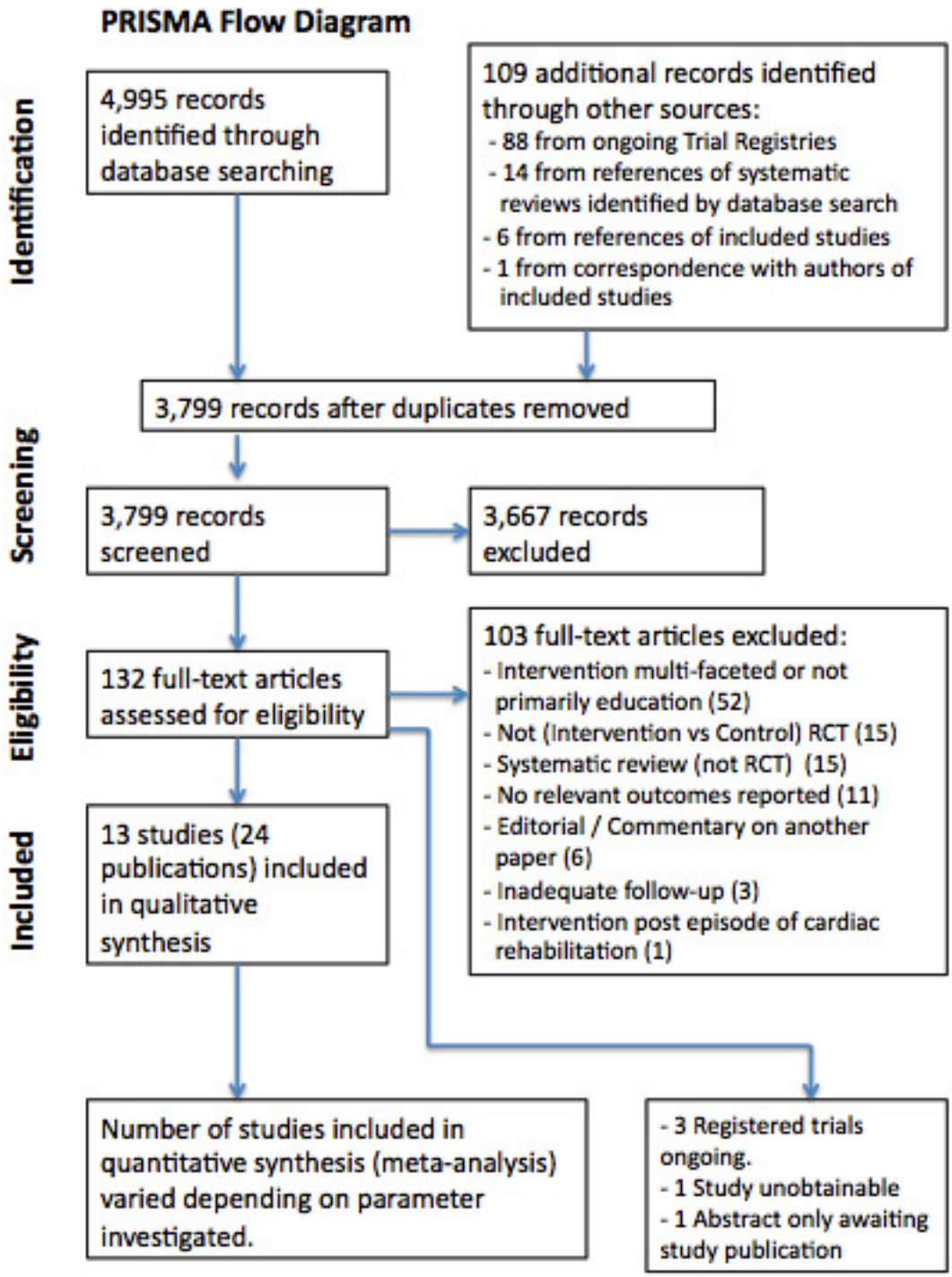
Searches were limited to RCTs, systematic reviews, and meta-analyses. A filter was applied to limit results to human-only trials published in 1990 or later. No language restrictions were imposed. Reference lists of all eligible trials, systematic reviews and meta-analyses were searched for additional studies. Attempts were made to contact all study authors to obtain relevant information not available in the published manuscript.

The strategy designed for CENTRAL was adapted for use with the other databases (Appendix 1).

The reporting of search results was conducted in accordance with PRISMA (Moher 2009). A flow diagram is included, which provides information about the number of studies identified, included and excluded, and the reasons for exclusion Figure 1.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Figure 1.



Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Data collection and analysis

Selection of studies

Titles and abstracts of studies identified by the search strategy were screened by two independent review authors (JB & RST) and obviously irrelevant studies were discarded. The full-text reports of all potentially relevant abstracts were obtained (JB) and assessed independently for eligibility (JB & RST). Any disagreement was resolved by discussion or where agreement was not reached, by consultation with an independent third reviewer (AC or HD). Excluded studies and reasons for exclusion are detailed in the *"Characteristics of Excluded Studies"* table.

Data extraction and management

We used standardised data extraction forms. We extracted details about study design, participants, interventions, outcomes, risk of bias data and results. Due to constraints of time and resources, data extraction was initially carried out by JB and independently checked by RST.

Assessment of risk of bias in included studies

Risk of bias tools were applied as described in the Cochrane Handbook for Systematic Reviews of Intervention (Higgins 2009). Factors that were considered included; the quality of random sequence generation and allocation concealment, description of drop-outs and withdrawals (including analysis by intention-to-treat), blinding (outcome assessment) and selective outcome reporting. Due to constraints of time and resources, assessment of the risk of bias in eligible trials was initially carried out by JB and independently checked by RST.

Data synthesis

Data was processed as described in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins 2009). For dichotomous variables, risk ratios and 95% confidence intervals (CI) were derived for each outcome. For continuous variables, mean differences and 95% CI were calculated for each outcome. Heterogeneity amongst included studies was explored qualitatively (by comparing the characteristics of included studies) and quantitatively (by using the chi-squared test of heterogeneity and I^2statistic). Where appropriate and possible, results from included studies were combined for each outcome to give an overall estimate of treatment effect. Given the degree of clinical heterogeneity seen in participant selection, interventions and comparators across studies, we decided it was appropriate to pool studies using random-effects modelling.

The review did not identify sufficient data to allow stratified meta-analysis at different common follow-up timings (e.g. 6 or 12 months post-randomisation). Instead, we pooled studies at their longest follow-up unless otherwise stated.

The funnel plot and the Egger test were planned to examine small study bias (Egger 1997).

Subgroup analysis and investigation of heterogeneity

We intended to undertake subgroup analysis and stratified meta-analysis, sensitivity analysis and meta-regression in order to examine potential treatment effect modifiers. As stated in the protocol, we intended to test the following a priori hypotheses that there may be differences in the effect of education on total mortality across particular sub groups:

- CHD case mix (myocardial infarction-only trials versus other trials)
- Dose and nature of structured patient education. Assessed on the basis of the number and nature of education sessions e.g. training of who delivers the education, health care professional, specific educational training, feedback or reinforcement given (i.e. literature, audiovisual follow-up material).
- Method of structured educational delivery (one-to-one versus group versus combination)
- Theoretical versus no-theoretical basis to educational intervention
- Involvement of significant others (e.g. spouse, family member) in the education
- Timing of the education following the index event
- Length of the educational intervention
- Follow-up period ($\leq$ 12 months versus >12 months)
- Year of publication (before 2000 versus 2000 or later)
- Measures of study bias (e.g. quality of concealment of randomisation versus not)

However, there was insufficient data to analyse by these sub groupings.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Results of the search

We identified 4,995 records through our electronic database search. We identified 109 additional records through alternate sources: 88 titles of ongoing studies found on trials registries, with two considered of potential future interest to the review (Lear 2008; McGillion 2006); one study protocol was identified from the database search (Hawkes 2009); 14 were drawn from reviewing references of systematic reviews identified by the database search (Bell 1998; Bethell 1990; Chan 2005; Engblom 1997; Enzenhofer 2004; Haskell 1994; Jenny 2001; Koertge 2003; Lisspers 1999; Moore 2002; Ornish 1990; P.RE.COR Group 1991; Vonder 2002; Zutz 2007); six from reviewing references in included studies (Ades 2001; Cundey 1995; Cupples 1994; Janz 1999; Thompson 2000; Thompson 2002); and one from direct correspondence with study authors from included studies (Hanssen, 2009).

After de-duplication, 3,799 abstracts were screened for inclusion, of which 3,667 were excluded. We retrieved 132 full texts and assessed them for eligibility; we then excluded 103 studies. Three trials were still ongoing, one was unavailable to the review authors and one was in abstract pre-publication and could not be assessed. In total, we included 24 papers reporting on 13 studies. Details of the exclusion process and reasons for exclusion are summarised in a PRISMA flow diagram (Figure 1) and in the *"Characteristics of excluded studies"* section.

Attempts were made to contact the lead authors (or contact author, if different) of all included studies. Responses were received from seven authors responsible for nine of the studies (Clark 1997; Clark 2000; Clark 2009; Cupples 1994; Esposito 2008; Hanssen 2007; Lie 2009; Lisspers 1999; Tingstrom 2005).

Included studies

Six studies were based in the USA (Clark 1997; Clark 2000; Clark 2009; Esposito 2008; Peikes 2009; Southard 2003), two in Norway (Hanssen 2007; Lie 2009) and Sweden (Lisspers 1999; Tingstrom 2005) and one each in the UK (Northern Ireland) (Cupples 1994), France (P.RE.COR Group 1991) and Russia (Pogosova 2008).

Overall, 68,556 participants were included in the trials, with an average age of 61.9 years. Overall, 82% were Caucasian and there was a 58% male preponderance. A range of CHD diagnoses and interventions were identified amongst the included participants (n=3,641): 3% CHD (not further defined), 42% angina, 37% post-MI, 17% post-CABG and 14% post-PTCA patients. These diagnoses and interventions are not mutually exclusive and do not include patients from Esposito 2008 and Peikes 2009. The two largest studies (n=64,915) (Esposito 2008; Peikes 2009) included some patients that were not within the scope of this review (i.e. they considered patients with congestive cardiac failure and diabetes). However, CHD patients contributed 69% and 61%, respectively, to these studies. Where possible, data from the CHD subgroup analysis was used. One study included patients with cardiac failure as well as those with CHD (Southard 2003).

Four studies involved group sessions (Clark 1997; Clark 2000; Pogosova 2008; Tingstrom 2005), five involved individualised education (Cupples 1994; Esposito 2008; Hanssen 2007; Lie 2009; Peikes 2009) and three utilised both session types (Lisspers 1999; P.RE.COR Group 1991; Southard 2003), with one study comparing the two approaches (Clark 2009)). Ten studies involved face-to-face sessions (Clark 1997; Clark 2000; Clark 2009; Cupples 1994; Esposito 2008; Lie 2009; Lisspers 1999; P.RE.COR Group 1991; Pogosova 2008 Tingstrom 2005), three were reliant on telephone contact (Esposito 2008; Hanssen 2007; Peikes 2009) and one involved interactive use of the Internet (Southard 2003). The intensity of the education varied substantially from a total of two visits by a healthcare professional (Lie 2009; P.RE.COR Group 1991) to a four-week residential stay reinforced with 11 months of nurse led follow-up sessions (Lisspers 1999). Description of the educational content of the programs was mostly brief. Table 1 gives a summary of educational intervention details.

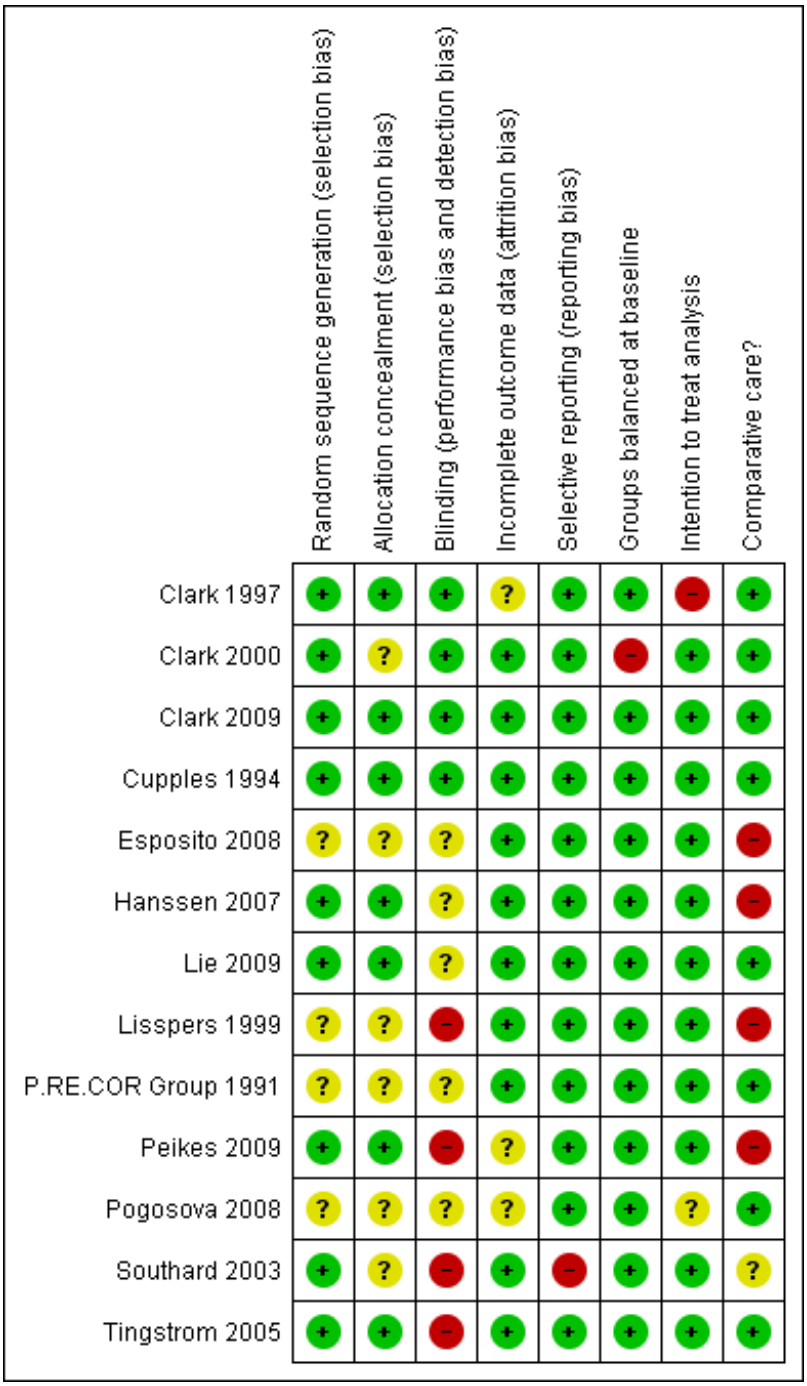
Many studies reported outcomes at several endpoints. Six studies reported at six months (Clark 1997; Esposito 2008; Hanssen 2007; Lie 2009; Pogosova 2008; Southard 2003), nine at 12 months (Clark 1997; Clark 2000; Clark 2009; Esposito 2008; Lisspers 1999; P.RE.COR Group 1991; Peikes 2009; Pogosova 2008; Tingstrom 2005), four at 18 months (Clark 1997;Clark 2009; Esposito 2008; Hanssen 2007), three at 24 months (Clark 2000; Cupples 1994; P.RE.COR Group 1991) and two at 60 months (Cupples 1994; Lisspers 1999).

Risk of bias in included studies

Several studies did not report sufficient methodological detail in order to allow full assessment of potential risk of bias. Risk of bias results are summarised in Figure 2 and Figure 3.

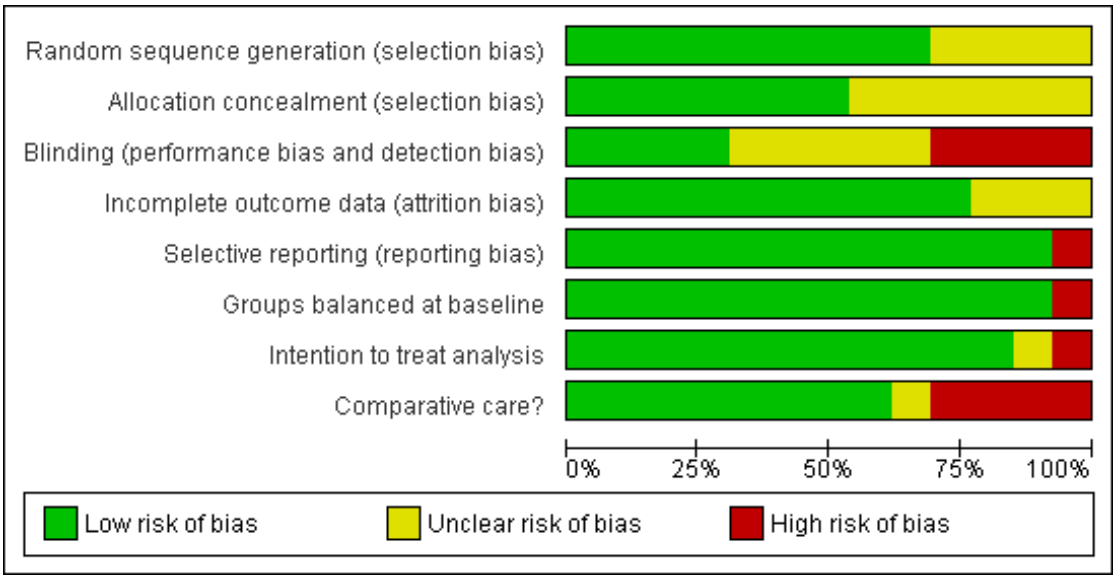
Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Figure 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.



Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Figure 3. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.



Allocation and concealment

Nine studies were judged to provide evidence of adequate random sequence generation (Clark 1997; Clark 2000; Clark 2009; Cupples 1994; Hanssen 2007; Lie 2009; Peikes 2009; Southard 2003; Tingstrom 2005), with seven of these studies reporting adequate concealment (Clark 1997; Clark 2009; Cupples 1994; Hanssen 2007; Lie 2009; Peikes 2009; Tingstrom 2005).

Blinding

Details of random sequence generation, concealment of random allocation and blinding were the most frequent poorly reported parameters. Due to the nature of the educational intervention, it is not possible to blind those providing the education or the participants of the trials, but we investigated evidence as to whether those collecting, assessing or analysing outcome data were blinded to group allocation. Blinding of this nature was confirmed in four studies (Clark 1997; Clark 2000; Clark 2009; Cupples 1994).

Incomplete outcome data

Eight studies clearly stated withdrawal or numbers lost to follow-up; this is detailed in Table 2. Overall 18.5% in the intervention group and 20% in the control group were lost to follow-up. Most authors assessed the subjects lost to follow-up for systematic differences when compared to those completing the study.

Selective reporting

We compared the reported outcomes in the results sections to the outcomes described in the methods of the published paper. No attempt was made to identify original study protocols and compare these to reported outcomes. Only one study demonstrated selective reporting by not reporting the results of a HRQofL measure (Southard 2003).

Baseline balance

Twelve studies had a good balance of their subjects' baseline characteristics between intervention and control groups. Two studies demonstrated a statistically significant imbalance between groups at baseline (Clark 2000; Peikes 2009). In Clark there were differences in baseline disease symptoms and weight (Clark 2000). Peikes highlights 11 differences in 255 baseline characteristics compared between groups, which they qualified with, *"less than the expected number of statistical significant differences than would be observed by chance* (Peikes 2009)*."*

Intention-to-treat analysis

Eleven studies analysed results on an intention-to-treat basis (Clark 2000; Clark 2009; Cupples 1994; Esposito 2008; Hanssen 2007; Lie 2009; Lisspers 1999; P.RE.COR Group 1991; Peikes 2009; Southard 2003; Tingstrom 2005). In most cases, this involved analysing those patients remaining at follow-up according to initial randomisation. Clark did not present intention-to-treat data,

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

but presented patients who had attended at least one of the four intervention sessions (Clark 1997).

Comparative care

Probably the largest source of bias in this review was the potential imbalance in co-interventions received by intervention and control subjects. We specifically sought to investigate the impact of education. However, in addition to education (the primary intervention) in a number of studies participants appeared to receive other interventions such as exercise or psychological therapy. In a number of studies it was often unclear how much of these co-interventions were received by control patients resulting in a performance bias (Esposito 2008; Hanssen 2007; Lisspers 1999; Peikes 2009;Southard 2003).

Effects of interventions

Mortality

Six studies reported all-cause mortality. One study reported deaths at 12 months (Clark 2000), two at 18 months (Clark 2009; Hanssen 2007), four at 24 months (Clark 2000; Cupples 1994; Lisspers 1999; P.RE.COR Group 1991) and two at 60 months (Cupples 1994, Lisspers 1999). No studies demonstrated a significant difference in mortality between education and control. There was weak evidence of a reduction in total mortality at the last reported follow-up: random effects RR: 0.79, 95% CI: 0.55 to 1.13, p=0.20 (Analysis 1.1). Individual causes of mortality were poorly reported across studies.

Cardiac Events

Three studies reported cardiac events, including MI or subsequent revascularisation - CABG or PTCA (Lisspers 1999; Southard 2003; P.RE.COR Group 1991). It was possible to pool the results for two of these studies (Lisspers 1999; P.RE.COR Group 1991). There was weak evidence of a reduction in morbidity with education: for MI, random effects RR: 0.63, 95% CI 0.26 to 1.48, p= 0.29; Analysis 2.1 and for CABG random effects RR: 0.58, 95% CI 0.19 to 1.71, p=0.32; Analysis 3.1).

Southard reported a difference in *"major cardiovascular-related events"* less events occurring in the intervention group (p=0.053)(Southard 2003). These were defined as events needing hospitalisation either as an in-patient or to the emergency room.

Hospitalisations

Six studies reported hospitalisations (Clark 2000; Esposito 2008; Hanssen 2007; Lisspers 1999; Peikes 2009; Southard 2003).

It was possible to pool the results of the four studies that reported the number of patients hospitalised (Esposito 2008; Hanssen 2007; Lisspers 1999; Southard 2003). There was weak evidence of a reduction in hospitalisation with education (random effects RR:0.83, 95% CI 0.65 to 1.07, p=0.16, Analysis 4.1).

Due to the method of reporting hospitalisations in Clark and Peikes it was not possible to include these in the pooled analysis (Clark 2000; Peikes 2009).

Using intention-to-treat analysis Clark found no statistically significant difference in the total number of hospital admissions between intervention and control (Clark 2000). Analysis of the heart-related admissions in those participants who attended at least one intervention session revealed statistically significant reductions in the intervention group: participants in the intervention group had 41% fewer heart-related admissions (p=0.05) and 61% fewer heart-related inpatient days (p=0.02) than in the control group (Clark 2000).

Peikes reported the rate of hospitalisations across 15 different U.S. study sites (Peikes 2009). Overall, there was no clear evidence of effect of intervention, with only two out of 15 sites showing a significant difference in hospital admissions. One reported an increase in admissions in the intervention group and the other reported an increase in the control group. No between-group statistical difference was found in average annualised admission rates 0.91 (intervention) versus 0.95 (control) (p=0.145).

Health-Related Quality of Life

Eleven studies reported HRQofL (Clark 1997; Clark 2000; Clark 2009; Cupples 1994; Esposito 2008; Hanssen 2007; Lie 2009; Lisspers 1999; Pogosova 2008; Southard 2003; Tingstrom 2005). These studies used several generic HRQofL instruments, i.e. SF-36 (Hanssen 2007; Lie 2009; Pogosova 2008; Tingstrom 2005), Nottingham Health Profile (Cupples 1994), Sickness Impact Profile (Clark 1997; Clark 2000) a five-point patient assessment scale of quality of life (Cupples 1994) and two disease-specific HRQofL instruments (Seattle Angina Questionnaire (Lie 2009) and AP-QLQ (Angina Pectoris-Quality of Life Questionnaire) (Lisspers 1999). The wide variation in HRQofL outcomes and methods of reporting meant that we were unable to meta-analyse results across studies. Instead, we undertook a detailed tabulation of the overall and domain HRQofL scores from each of the trials with a particular focus on intervention-control differences at follow-up. In order to provide some level of overall synthesis, we assessed for each study, whether total and domain HRQofL between-group differences were statistically different and, if so, the direction of effect (Table 3; Table 4; Table 5; Table 6; Table 7; Table 8; Table 9; Table 10; Table 11; Table 12; Table 13; Table 14).

Whilst overall we found no consistent difference in HRQofL total or domain score at follow-up between intervention and control, a number of studies demonstrated statistically significant differences in HRQofL domains in favour of intervention (Clark 1997; Clark 2000; Cupples 1994; Lie 2009; Pogosova 2008). Pogosova 2008 demonstrated an improvement in all SF-36 domain scores and Lie 2009 an improvement in the overall mental score in the intervention groups. No studies reported HRQofL scores that favoured the control group.

Although Southard reported Dartmouth COOP Quality of Life scores at trial entry, there were no reports of this outcome at follow-up (Southard 2003). Esposito reported on a HRQofL questionnaire undertaken in a randomly selected subgroup of patients from the overall trial (Esposito 2008). No significant differences were found between the intervention and control groups in a number of measures of mental and physical status, including: *"Primary*

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

condition interfered a lot or somewhat with enjoyment of life in the last 4 weeks" (between-group difference -3.6% [in favour of intervention] p=0.379); *"Beneficiary felt primary condition placed a burden on family in the past 4 weeks"* (between-group difference 0.5% p=0.897); *"Beneficiary felt depressed about living with primary condition in the past 4 weeks"* (between-group difference 1.2% [in favour of control] p=0.766).

Healthcare costs and utilisation

Five studies reported healthcare utilisation and costs (Clark 2000; Cupples 1994; Esposito 2008; Southard 2003; Peikes 2009). No studies reported cost-effectiveness. Given that cost results are presented in different currencies and were incurred in different years it is difficult to directly compare studies. Furthermore, although studies assessed healthcare costs, there was variation in the particular aspects of healthcare costs that were quantified. Components of costs considered included inpatient admissions, primary care visits, emergency attendances, use of drugs, investigations and subsequent procedures performed. To compare studies and gain an overall impression of the differences in healthcare between intervention and control, we undertook a detailed tabulation of the overall and component healthcare costs for each of the included studies Table 15.

Reflecting the different education modalities and intensities of the interventions, the reported cost of provision per patient varied from £49 (Cupples 1994) to US$453 (Southard 2003). The largest trials, investigating the efficiency of the Medicare system in the USA (Esposito 2008; Peikes 2009), did not investigate the cost of providing the intervention but instead reported the charge associated with providing this service negotiated by the company supplying it *(care coordination fee).* A mean of US$196 per month (Peikes 2009) or US$162 per month (Esposito 2008).

Two studies reported an overall average net saving, after subtracting costs of intervention provision. This was US$965 per patient at six-months follow-up (Southard 2003) and US$1420 per patient at 24-months follow up (Clark 2000). One study reported an increase in average net costs of US$52 per patients; six out of the 15 programmes investigated had higher costs for the intervention group (Peikes 2009) . The two remaining trials found no difference in between-group net costs (Cupples 1994; Esposito 2008).

Withdrawal/drop out

Studies failed to report the number of individuals who dropped out because they were unable to complete the intervention. Therefore, we have reported the drop outs at follow-up in Table 2. There was no evidence of a difference between the groups: random effect RR: 1.03, 95% CI 0.83 to 1.27, p=0.80; Analysis 5.1.

Clark reported a combined drop out of 181 patients from both groups. A differential breakdown was not given, but there was *"no appreciable differences in dropout rates between the intervention and control group"* demonstrated (Clark 1997).

Numbers lost to follow-up were unclear in a number of studies (Esposito 2008; Lisspers 1999; Peikes 2009; Pogosova 2008).

Meta-regression and stratified meta-analysis

There was an insufficient number of studies to undertake either meta-regression or stratified meta-analysis.

Small study bias

There was an insufficient number of studies and outcome data to assess small study bias by means of funnel plots.

DISCUSSION

Summary of main results

We included 13 RCTs involving 68,556 participants with CHD where education was the primary interventional intent. The 'dose' of the education intervention varied substantially across studies from a total of two visits from a healthcare professional (Lie 2009, P.RE.COR Group 1991) to a four-week residential stay reinforced with 11 months of nurse-led follow up sessions (Lisspers 1999). Control subjects typically received usual medical care without a formalised education programme.

We found no strong evidence that education reduced all-cause mortality (RR: 0.79, 95% CI: 0.55 to 1.13), cardiac morbidity (subsequent MI [RR: 0.63, 95% CI 0.26 to 1.48], revascularisation [RR: 0.58, 95% CI 0.19 to 1.71]) or hospitalisation (0.83, 95% CI 0.65 to 1.07) compared to control. However, as most studies had a relatively short follow-up, only a few studies reported events. As the event rate was low, our meta-analysis lacks sufficient statistical power to make definitive conclusions on the impact of educational interventions in people with CHD. However, effect size of the summative effects of education on mortality (25% risk reduction) and morbidity (17-42% risk reduction) are clinically important, particularly in the context of the large number of individuals with CHD. These potential clinical benefits alone underline the importance of further trials to increase the power of future meta-analyses.

Although HRQofL was reported by almost all included studies, we were unable to pool findings across studies due to the heterogeneity of measures. Whilst there was some evidence of higher HRQofL in some domain scores, overall there was not consistent evidence of superior HRQofL following education compared to control. Many studies used generic HRQofL measures that are known to lack sensitivity with cardiac treatment, particularly in comparison with disease-specific measures (Oldridge 2003; Taylor 1998).

The intention of including analysis of withdrawal from the intervention was to use it as a surrogate for the 'adverse effects' of the intervention, e.g. the educational intervention was so demanding that it could not be completed by patients. However, withdrawal was not consistently reported across studies.

The different currencies and the year that the study was conducted makes it difficult to directly compare healthcare costs across studies. The cost of the educational intervention varied widely (between GB£49 and US$453 per patient), reflecting the differing

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

intensity and requirements for provision of the interventions investigated. There was some evidence that when compared to usual care, patient education may be cost-saving as a result of a reduction in downstream healthcare utilisation.

Overall completeness and applicability of evidence

In designing this review we decided to narrow the scope in three specific ways:
(1) to those studies published in 1990 or later,
(2) to include only studies where the educational component was the primary intention of the intervention and
(3) to include studies that reported event data (e.g. mortality) as opposed to intermediate outcomes (e.g. blood pressure, exercise tolerance).
We believe these limitations in scope were crucial in allowing us to address the specific research question: what is the 'added value' of patient education in the context of contemporary cardiovascular management? The interpretation of previous systematic reviews of patient education have been potentially confounded by including multi-component rehabilitation interventions, of which education was only an element, and reporting on studies using surrogate outcomes (e.g. health knowledge, blood pressure).
Many of the trials identified and considered in this review process investigated alternative outcomes, for instance, changes in smoking, diet, blood pressure or effect of education on patient's knowledge of CHD disease processes or risk factors.
In spite of the focus of this review, there was considerable heterogeneity of participants and interventions. It could be argued that a benefit of this heterogeneity is that the results are more likely to be applicable to the wider population of CHD patients and clinical practice. It is unusual in practice to find patients with an isolated diagnosis of CHD. Several studies included CHD in combination with diabetes, hypertension or a degree of heart failure (Esposito 2008; Peikes 2009; Southard 2003). Different aspects of the educational intervention may contribute to the composite independent effect of education to varying extents e.g. the impact of teacher efficacy, variability in teacher instructional strategies or teacher experience.
Previous reviews of patient education, and more broadly CR, have identified the paucity of research into outcomes in women and the elderly. However, this review includes several studies with a substantive proportion of women (Clark 2000) and older people (Clark 2009) specifically addressing this disparity. Nevertheless, ethnic minorities remain under-represented (80% of subjects were Caucasian).

Quality of the evidence

The overall methodological quality of the studies included in this review were judged to be moderate to good. Details were often poorly reported and confirmation of methodology had to be sought from authors. Two specific areas of potential risk of bias in this review were assessment bias (lack of outcome blinding) and performance bias (imbalance of co-interventions across intervention and control arms). Few studies provided sufficient details in order to judge if outcomes were assessed by researchers blinded or independent to the trial.
We specifically selected studies on the basis of education being the primary intervention. However, a number of studies appeared to include additional elements (e.g. behaviour modification) in the educational intervention arm, this led to a risk of performance bias.
Whilst the decision to include studies was made independently by two review authors, the decision of study inclusion was ultimately one of judgement based on the description of the intervention provided by the authors. During correspondence the lead author of one included study stated: *"I would not define our program as "patient education" (at least according to the way I define this term) - more as a "behaviour change program".....we ....very much tried to develop active program components which actually and concretely supported the behaviour change process in the short term and for the long-term maintenance"* (Lisspers 1999). We would argue that a key objective of patient education is to change behaviour, i.e. through education, patients learn to understand the reasoning for improved diet, exercise regime and compliance with medication and are, therefore, more likely to modify their behaviour. This objective is consistent with adult learning theory; learning is the outcome of education and can be defined as, *"a relatively permanent change in behaviour as a result of experience, training or practice"* (Reece 2007).

Potential biases in the review process

Although unpublished data was sought during this review, no relevant studies were identified. Lack of consideration of unidentified, unpublished trials with negative findings are a potential bias faced by all systematic reviews. Given the low number of included studies and inconsistent reporting of outcomes, we were unable to judge the degree of publication bias.
CHD patients agreeing to participate in RCTs may not be representative of the general CHD population, they may be more motivated to engage with education and, consequently, make behavioural and lifestyle changes.

Agreements and disagreements with other studies or reviews

In contrast to previous systematic reviews by Mullen 1992 and Dusseldorp 1999, we were unable to demonstrate a statistically significant reduction in either mortality or morbidity in patients with CHD following an educational intervention. We believe the differences in findings may reflect the following factors in previous studies:
(1) their inclusion of studies with multi-dimensional interventions

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

(e.g. education plus psychological interventions) that may have inflated the effect on outcomes compared to education alone,
(2) their inclusion of non-randomised studies, which is likely to increase selection bias and
(3) their inclusion of studies pre-1990 (exclusively in Mullen 1992) and, therefore, a background of CHD usual care that is likely not to be representative of present day practice.

AUTHORS' CONCLUSIONS

Implications for practice

Our findings are consistent with the belief that educational interventions are beneficial for patients with CHD. Further research is needed to determine the most effective and cost-effective format, duration, timing (relative to index event) and methods of education delivery.

In accordance with current evidence and international guidelines for secondary prevention and CR (Balady 2007; DofH 2011; NICE 2007; SIGN 2002; Heran 2010; Whalley 2011), educational interventions for CHD patients should be considered as part of a comprehensive programme that includes exercise and psychological support.

Implications for research

The heterogeneity in the educational interventions seen in the studies included in this review reflects uncertainty about the optimal approach of offering education to CHD patients. Further research is required to assess the relative costs and benefits of differing methods and approaches to delivering educational content in CHD (e.g. group versus individual, face to face or using a self help manual). Research methods should not only include well-designed RCTs, but also qualitative methods so as to better understand the information expectations and needs of patients. Such studies need to be done in the context of a multi-interventional approach to secondary prevention and rehabilitation as well as report sufficient information to allow replication of the interventional approach. Furthermore, future studies should include under-represented groups (i.e. ethnic minorities or those of lower social-economic class).

ACKNOWLEDGEMENTS

Thanks is given to the following individuals for their assistance in translating foreign language papers:

Joey Kwong (Chinese), Nicole Ackermann (German), Marina Karanikolos (Russian), Rune Stensvold (Danish). Additional thanks is given to Jenny Lowe and Sue Whiffen for their assistance in sourcing full copies of publications and also to Danielle Murray for her assistance in proof reading the final draft.

We would like to thank all the authors who provided additional information about their trials.

REFERENCES

References to studies included in this review

Clark 1997 ***{published and unpublished data}***

Clark NM, Janz NK, Becker MH, Schork MA. Impact of self-management education on the functional health status of older adults with heart disease. *The Gerontologist* 1992; **32**:438–443.

* Clark NM, Janz NK, Dodge JA, Schork MA, Wheeler JRC, Laing J. Self-Management of heart disease by older adults. *Research on Aging* 1997;**19**:362–382.

Clark 2000 ***{published and unpublished data}***

* Clark NM, Janz NK, Dodge JA, Schork MA, Fingerlin TE, Wheeler JRC. Changes in functional health status of older women with heart disease: Evaluation of a program based on self-regulation. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences* 2000;**55B**: S117–S126.

Wheeler, JR. Can a disease self-management programme reduce health care costs: the case of older women with heart disease. *Medical Care* 2003;**41**:706–715.

Clark 2009 ***{published and unpublished data}***

* Clark NM, Janz NK, Dodge JA, Lin X, Trabert BL, Kaciroti N. Heart disease management by women: Does intervention format matter?. *Health Education & Behaviour* 2009;**36**:394–409.

Cupples 1994 ***{published data only (unpublished sought but not used)}***

Cupples ME, McKnight A. Five year follow up of patients at high cardiovascular risk who took part in randomised controlled trial of health promotion. *British Medical Journal* 1999;**319**(7211):687–688.

* Cupples ME, McKnight A. Randomised controlled trial of health promotion in general practice for patients at high cardiovascular risk. *British Medical Journal* 1994;**309** (6960):993–996.

Cupples ME, McKnight A, O'Neill C, Normand C. The effect of personal health education on the quality of life of patients with angina in general practice. *Health Education Journal* 1996;**55**(4):75–83.

O'Neill C, Normand C, Cupples M, McKnight A. Cost effectiveness of personal health education in primary care for people with angina in the greater Belfast area of Northern

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Ireland. *Journal of Epidemiology & Community Health* 1996; **50**(5):538–540.

Esposito 2008 *{published data only (unpublished sought but not used)}*
* Esposito D, Brown R, Chen A, Schore J, Shapiro R. Impacts of a disease management program for dually eligible beneficiaries. *Health Care Financing Review* 2008;**30**(1): 27–45.

Hanssen 2007 *{published data only (unpublished sought but not used)}*
* Hanssen TA, Nordrehaug JE, Eide BE, Hanestad BR. Improving outcomes after myocardial infarction: a randomized controlled trial evaluating effects of a telephone follow-up intervention. *European Journal of Cardiovascular Prevention & Rehabilitation* 2007;**14**(3):429–437.
Hanssen TA, Nordrehaug JE, Eide GE, Hanestad BR. Can telephone follow-up after discharge improve life style factors after a myocardial infarction? A randomized controlled trial. 7th Annual Cardiovascular Nursing Spring Meeting of the European Society of Cardiology Council on Cardiovascular Nursing and Allied Professions: changing practice to improve care Manchester, UK 23-24 March 2007. *European Journal of Cardiovascular Nursing* 2007;**6**:S43–4.
Hanssen TA, Nordrehaug JE, Eide GE, Hanestad BR. Does a telephone follow-up intervention for patients discharges with acute myocardial infarction have long-term effects on health-related quality of life? A randomised controlled trial. *Journal of Clinical Nursing* 2009;**18**:1334–1345.
Hanssen TA, Nordrehaug JE, Eide GE, Hanestad BR. Evaluating the effect of a combined reactive and proactive telephone follow-up intervention after acute myocardial infarction. A randomized controlled trial. *European Journal of Cardiovascular Nursing* 2006;**5**:S46.

Lie 2009 *{published data only (unpublished sought but not used)}*
* Lie I, Arnesen H, Sandvik L, Hamilton G, Bunch EH. Health-related quality of life after coronary artery bypass grafting. The impact of a randomised controlled home-based intervention program. *Quality of Life Research* 2009; **18**(2):201–207.

Lisspers 1999 *{published and unpublished data}*
Hofman-Bang C, Lisspers J, Nordlander R, Nygren A, Sundin O, Ohman A, Ryden L. Two-year results of a controlled study of residential rehabilitation for patients treated with percutaneous transluminal coronary angioplasty. A randomized study of a multifactorial programme. *European Heart Journal* 1999;**20**(20): 1465–1474.
* Lisspers J, Sundin O, Hofman-Bang C, Norlander R, Nygren A, Ryden L, Ohman A. Behavioural effects of a comprehensive, mutifactorial program for lifestyle change after percutaneous transluminal coronary angioplasty: A prospective, randomized, controlled study. *Journal of Psychosomatic Research* 1999;**46**(2):143–154.
Lisspers J, Sundin O, Ohman A, Hofman-Bang C, Ryden L, Nygren A. Long-term effects of lifestyle behavior change in coronary artery disease: effects on recurrent coronary events after percutaneous coronary intervention. *Health Psychology* 2005;**24**(1):41–48.

P.RE.COR Group 1991 *{published data only (unpublished sought but not used)}*
P.RE.COR. Group. Comparison of a rehabilitation programme, a counselling programme and usual care after an acute myocardial infarction: results of a long-term randomized trial. *European Heart Journal* 1991;**12**(5): 612–616.

Peikes 2009 *{published data only (unpublished sought but not used)}*
Brown R, Peikes D, Chen A, Schore J. 15-Site randomized trial of coordinated care in medicare FFS. *Health Care Financing Review* 2008;**30**(1):5–25.
* Peikes D, Chen A, Schore J, Brown R. Effects of care coordination on hospitalization, quality of care, and health care expenditures among medicare beneficiaries 15 randomized trials. *Journal of the American Medical Association* 2009;**301**(6):603–618.

Pogosova 2008 *{published data only (unpublished sought but not used)}*
* Pogosova GV, Kalinina AM, Spivak EI, Nazarkina VA. Efficacy of an educational preventive technology in patients with stable angina in ambulatory conditions. *Kardiologiia* 2008;**48**(7):4–9.

Southard 2003 *{published data only (unpublished sought but not used)}*
* Southard BH, Southard DR, Nuckolls J. Clinical trial of an Internet-based case management system for secondary prevention of heart disease. *Journal of Cardiopulmonary Rehabilitation* 2003;**23**(5):341–348.

Tingstrom 2005 *{published and unpublished data}*
* Tingstrom PR, Kamwendo K, Bergdahl B. Effects of a problem-based learning rehabilitation programme on quality of life in patients with coronary artery disease. *European Journal of Cardiovascular Nursing* 2005;**4**(4): 324–330.

References to studies excluded from this review

Ades 2001 *{published data only}*
Ades PA. Cardiac rehabilitation and secondary prevention of coronary heart disease. *The New England Journal of Medicine* 2001;**345**:892–902.

Allen 2010 *{published data only}*
Allen JK, Dennison CR. Randomized trials of nursing interventions for secondary prevention in patients with coronary artery disease and heart failure: systematic review. *Journal of Cardiovascular Nursing* 2010;**25**:207–20.

Allison 2000 *{published data only}*
Allison TG, Farkouh ME, Smars PA, Evans RW, Squires RW, Gabriel SE, et al.Management of coronary risk factors by registered nurses versus usual care in patients with unstable angina pectoris (a chest pain evaluation in the emergency room [CHEER] substudy). *American Journal of Cardiology* 2000;**86**:133–8.

Arthur 2000 *{published data only}*
Arthur HM, Daniels C, McKelvie R, Hirsh J, Rush B. Effect of a preoperative intervention on preoperative and postoperative outcomes in low-risk patients awaiting

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

elective coronary artery bypass graft surgery. A randomized, controlled trial. *Annals of Internal Medicine* 2000;**133**: 253–62.

Bagheri 2007 ***{published data only}***

Bagheri H, Memarian R, Alhani F. Evaluation of the effect of group counselling on post myocardial infarction patients: determined by an analysis of quality of life. *Journal of Clinical Nursing* 2007;**16**:402–6.

Barnason 1995 ***{published data only}***

Barnason S, Zimmerman L. A comparison of patient teaching outcomes among postoperative coronary artery bypass graft (CABG) patients. *Progress in Cardiovascular Nursing* 1995;**10**:11–20.

Barnason 2006 ***{published data only}***

Barnason S, Zimmerman L, Nieveen J, Hertzog M. Impact of a telehealth intervention to augment home health care on functional and recovery outcomes of elderly patients undergoing coronary artery bypass grafting. *Heart & Lung* 2006;**35**:225–33.

Barnason 2009 ***{published data only}***

Barnason S, Zimmerman L, Nieveen J, Schulz P, Miller C, Hertzog M, et al.Influence of a symptom management telehealth intervention on older adults' early recovery outcomes after coronary artery bypass surgery. *Heart and Lung: Journal of Acute and Critical Care* 2009;**38**:364–76.

Barnason 2009a ***{published data only}***

Barnason S, Zimmerman L, Schulz P, Tu C. Influence of an early recovery telehealth intervention on physical activity and functioning after coronary artery bypass surgery among older adults with high disease burden. *Heart & Lung* 2009; **38**:459–68.

Bell 1998 ***{published data only}***

Bell JM. A comparison of a multi-disciplinary home based cardiac rehabilitation programme with comprehensive conventional rehabilitation in post-myocardial infarction patients. University of London 1998.

Benson 2000 ***{published data only}***

Benson G. Review: psychoeducational programmes reduce long term mortality and recurrence of myocardial infarction in cardiac patients... commentary on Dusseldorp E, van Elderen T, Maes S et al. A meta-analysis of psychoeducational programs for coronary heart disease patients. HEALTH PSYCHOL 1999 Sep;18:506-19. *Evidence-Based Nursing* 2000;**3**:80.

Beranova 2007 ***{published data only}***

Beranova E, Sykes C. A systematic review of computer-based software for educating patients with coronary heart disease. [Review]. *Patient Education & Counseling* 2007;**66**: 21–8.

Bethell 1990 ***{published data only}***

Bethell HJ Mullee MA. A Controlled Trial of community based coronary rehabilitation. *British Heart Journal* 1990; **64**:370–5.

Bettencourt 2005 ***{published data only}***

Bettencourt N, Dias C, Mateus P, Sampaio F, Santos L, Adao L, et al.Impact of cardiac rehabilitation on quality of life and depression after acute coronary syndrome. *Revista Portuguesa de Cardiologia* 2005;**24**:687–96.

Bitzer 2002 ***{published data only}***

Bitzer E M, ster-Schenck I U, Klosterhuis H, Dorning H, Rose S. [Developing evidence based guidelines on cardiac rehabilitation - phase 1: a qualitative review]. [German]. *Rehabilitation* 2002;**41**:226–36.

Boulay 2004 ***{published data only}***

Boulay P, Prud'homme D. Health-care consumption and recurrent myocardial infarction after 1 year of conventional treatment versus short- and long-term cardiac rehabilitation. *Preventive Medicine* 2004;**38**:586–93.

Brand 1998 ***{published data only}***

Brand M. Coronary care programme improved food habits but not physical activity or smoking status after acute myocardial infarction [commentary on Carlsson R, Lindberg G, Westin L, et al. Influence of coronary nursing management follow up on lifestyle after acute myocardial infarction. HEART 1997 Mar;77:256-9]. *Evidence-Based Nursing* 1998;**1**:14.

Brugemann 2007 ***{published data only}***

Brugemann J, Poels BJ, Oosterwijk MH, van der Schans CP, Postema K, van Veldhuisen DJ. A randomised controlled trial of cardiac rehabilitation after revascularisation. *International Journal of Cardiology* 2007;**119**:59–64.

Campbell 1998 ***{published data only}***

Campbell NC, Ritchie LD, Thain J, Deans HG, Rawles JM, Squair JL. Secondary prevention in coronary heart disease: a randomised trial of nurse led clinics in primary care. *Heart* 1998;**80**:447–52.

Campbell 1998a ***{published data only}***

Campbell NC, Thain J, Deans HG, Ritchie LD, Rawles JM, Squair JL. Secondary prevention clinics for coronary heart disease: randomised trial of effect on health. *British Medical Journal* 1998;**316**:1434–7.

Cannon 2002 ***{published data only}***

Cannon CP, Hand MH, Bahr R, Boden WE, Christenson R, Gibler WB, et al.Critical pathways for management of patients with acute coronary syndromes: an assessment by the National Heart Attack Alert Program. [Review]. *American Heart Journal* 2002;**143**:777–89.

Cebeci 2008 ***{published data only}***

Cebeci F, Celik SS. Discharge training and counselling increase self-care ability and reduce postdischarge problems in CABG patients. *Journal of Clinical Nursing* 2008;**17**: 412–20.

Chan 2005 ***{published data only}***

Chan DS Chau JP Chang AM. Acute Coronary Syndrome: Cardiac Rehabilitation programs and quality of life. *Journal of Advanced Nursing* 2005;**49**:591–9.

Chen 2005 ***{published data only}***

Chen W, Guo LH, Li YW, Guo SQ, Li Z. Effect of cognitive education on the physical and psychological rehabilitation of patients with coronary heart disease after interventional therapy. *Chinese Journal of Clinical Rehabilitation* 2005;**9**: 1–3.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Clark 2005 *{published data only}*
Clark AM, Hartling L, Vandermeer B, McAlister FA. Meta-analysis: Secondary prevention programs for patients with coronary artery. *Annals of Internal Medicine* 2005;**143**: 659–672+I87.

Clark 2007 *{published data only}*
Clark AM, Hartling L, Vandermeer B, Lissel SL, McAlister FA. Secondary prevention programmes for coronary heart disease: A meta-regression showing the merits of shorter, generalist, primary care-based interventions. *European Journal of Cardiovascular Prevention and Rehabilitation* 2007;**14**:538–46.

Cobb 2006 *{published data only}*
Cobb SL, Brown DJ, Davis LL. Effective interventions for lifestyle change after myocardial infarction or coronary artery revascularization. [Review]. *Journal of the American Academy of Nurse Practitioners* 2006;**18**:31–9.

Costa 2008 *{published data only}*
Costa e Silva, Pellanda L, Portal V, Maciel P, Furquim A, Schaan B. Transdisciplinary approach to the follow-up of patients after myocardial infarction. *Clinics* 2008;**63**: 489–96.

Coull 2004 *{published data only}*
Coull AJ, Taylor VH, Elton R, Murdoch PS, Hargreaves AD. A randomised controlled trial of senior Lay Health Mentoring in older people with ischaemic heart disease: The Braveheart Project. *Age & Ageing* 2004;**33**:348–54.

Cundey 1995 *{published data only}*
Cundey PE Frank MJ. Cardiac Rehabilitation and secondary prevention after a myocardial event. *Clinical Cardiology* 1995;**18**:547–553.

DeBusk 1994 *{published data only}*
DeBusk RF, Miller NH, Superko HR, Dennis CA, Thomas RJ, Lew HT, et al.A case-management system for coronary risk factor modification after acute myocardial infarction. *Annals of Internal Medicine* 1994;**120**:721–9.

Delaney 2008 *{published data only}*
Delaney EK, Murchie P, Lee AJ, Ritchie LD, Campbell NC. Secondary prevention clinics for coronary heart disease: a 10-year follow-up of a randomised controlled trial in primary care. *Heart* 2008;**94**:1419–23.

Dolan 1992 *{published data only}*
Dolan Mullen P, Mains DA, Velez R. A meta-analysis of controlled trials of cardiac patient education. *Patient Education & Counseling* 1992;**19**:143–62.

Dusseldorf 2000 *{published data only}*
Dusseldorf E, van Elderen T, Maes S. Review: Psychoeducational programmes reduce MI recurrence and improve some physical health outcomes: Commentary. *Evidence-Based Medicine* 2000;**5**:83.

Dusseldorp 1999 *{published data only}*
Dusseldorp E, van Elderen T, Maes S, Meulman J, Kraaij V. A meta-analysis of psychoeduational programs for coronary heart disease patients. *Health Psychology* 1999;**18**:506–19.

Engblom 1992 *{published data only}*
Engblom E, Hamalainen H, Lind J, Mattlar C E, Ollila S, Kallio V, et al.Quality of life during rehabilitation after coronary artery bypass surgery. *Quality of Life Research* 1992;**1**:167–75.

Engblom 1994 *{published data only}*
Engblom E, Hamalainen H, Ronnemaa T, Vanttinen E, Kallio V, Knuts L R. Cardiac rehabilitation and return to work after coronary artery bypass surgery. *Quality of Life Research* 1994;**3**:207–13.

Engblom 1996 *{published data only}*
Engblom E, Korpilahti K, Hamalainen H, Puukka P, Ronnemaa T. Effects of five years of cardiac rehabilitation after coronary artery bypass grafting on coronary risk factors. *American Journal of Cardiology* 1996;**78**:1428–31.

Engblom 1997 *{published data only}*
Engblom E, Korpilahti K, Hamalainen H, Ronnemaa T, Puukka P. Quality of life and return to work 5 years after coronary artery bypass surgery. Long-term results of cardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation* 1997;**17**:29–36.

Enzenhofer 2004 *{published data only}*
Enzenhofer M Bludau HB Komm N Wild B Mueller K Herzog W, et al.Improvement of the educational process by computer-based visualization of procedures: randomized controlled trial. *Journal of Medical Internet Research* 2004; **16**:e16.

Eshah 2009 *{published data only}*
Eshah NF, Bond AE. Cardiac rehabilitation programme for coronary heart disease patients: an integrative literature review. [Review]. *International Journal of Nursing Practice* 2009;**15**:131–9.

Espinosa 2004 *{published data only}*
Espinosa Caliani S, Bravo Navas JC, Gomez-Doblas JJ, Collantes Rivera R, Gonzalez Jimenez B, Martinez Lao M, et al.Postmyocardial infarction cardial rehabilitation in low risk patients. Results with a coordinated program of cardiological and primary care. *Revista Espanola de Cardiologia* 2004;**57**:53–9.

Fattirolli 1998 *{published data only}*
Fattirolli F, Cartei A, Burgisser C, Mottino G, Del Lungo F, Oldridge N, et al.Aims, design and enrolment rate of the Cardiac Rehabilitation in Advanced Age (CR-AGE) randomized, controlled trial. *Aging-Clinical & Experimental Research* 1998;**10**:368–76.

Fernandez 2009 *{published data only}*
Fernandez RS, Davidson P, Griffiths R, Juergens C, Stafford B, Salamonson Y. A pilot randomised controlled trial comparing a health-related lifestyle self-management intervention with standard cardiac rehabilitation following an acute cardiac event: implications for a larger clinical trial. *Australian Critical Care* 2009;**22**:17–27.

Frasure-Smith 1997 *{published data only}*
Frasure-Smith N, Lesperance F, Prince RH, Verrier P, Garber RA, Juneau M, et al.Randomised trial of home-based

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

psychosocial nursing intervention for patients recovering from myocardial infarction. *Lancet* 1997;**350**:473–9.

Fredericks 2009 ***{published data only}***
Fredericks S. Timing for delivering individualized patient education intervention to Coronary Artery Bypass Graft patients: An RCT. *European Journal of Cardiovascular Nursing* 2009;**8**:144–50.

Fredericks 2009a ***{published data only}***
Fredericks S, Ibrahim S, Puri R. Coronary artery bypass graft surgery patient education: a systematic review. [Review]. *Progress in Cardiovascular Nursing* 2009;**24**:162–8.

Froelicher 1994 ***{published data only}***
Froelicher ES, Kee LL, Newton KM, Lindskog B, Livingston M. Return to work, sexual activity, and other activities after acute myocardial infarction. *Heart & Lung* 1994;**23**: 423–35.

Gao 2007 ***{published data only}***
Gao WG, Hu DY, Ma WL, Tang CZ, Li J, Hasimu B, et al.Effect of health management on the rehabilitation of patients undergoing coronary artery bypass graft. *Journal of Clinical Rehabilitative Tissue Engineering Research* 2007;**11**: 4874–8.

Ghali 2004 ***{published data only}***
Ghali JK. A community-based disease management program for post-myocardial infarction reduces hospital readmissions compared with usual care. *Evidence-Based Healthcare* 2004; **8**:119–21.

Goodman 2008 ***{published data only}***
Goodman H Parsons A Davison J Preedy M Peters E Shuldham C. A randomised controlled trial to evaluate a nurse led programme of support and lifestyle management for patients awaiting cardiac surgery: ' Fit for surgery: Fit for life' Study. *European Journal of Cardiovascular Nursing* 2008;**7**:189–95.

Harbman 2006 ***{published data only}***
Harbman P. Review: secondary prevention programmes with and without exercise reduced all cause mortality and recurrent myocardial infarction. *Evidence-Based Nursing* 2006;**9**:77.

Haskell 1994 ***{published data only}***
Haskell W Alderman E Fair J Maron D Mackey S Superko R, et al.Effects of intensive multiple risk factor reduction on coronary atherosclerosis and clinical cardiac events in men and women with coronary artery disease. The Stanford Coronary Risk Intervention Project (SCRIP). *Circulation* 1994;**89**:975–90.

Hedback 1993 ***{published data only}***
Hedback B, Perk J, Wodlin P. Long-term reduction of cardiac mortality after myocardial infarction: 10-year results of a comprehensive rehabilitation programme. *European Heart Journal* 1993;**14**:831–5.

Hedback 2001 ***{published data only}***
Hedback B, Perk J, Hornblad M, Ohlsson U. Cardiac rehabilitation after coronary artery bypass surgery: 10-year results on mortality, morbidity and readmissions to hospital. *Journal of Cardiovascular Risk* 2001;**8**:153–8.

Heidarnia 2005 ***{published data only}***
Heidarnia A, Dehdari T, Ghofranipour F, Kazemnejad A, Heidarnia M. The effect of health education on health related quality of life in patients with coronary artery bypass surgery. *Medical Journal of the Islamic Republic of Iran* 2005; **18**:319–26.

Hobbs 2002 ***{published data only}***
Hobbs FD. Does pre-operative education of patients improve outcomes? The impact of pre-operative education on recovery following coronary artery bypass surgery: a randomized controlled clinical trial. *European Heart Journal* 2002;**23**:600–1.

Jackson 2009 ***{published data only}***
Jackson AM, Gregory S, McKinstry B. Self-help groups for patients with coronary heart disease as a resource for rehabilitation and secondary prevention-what is the evidence?. [Review]. *Heart & Lung* 2009;**38**:192–200.

Janz 1999 ***{published data only}***
Janz NK Clark NM Dodge JA Schork MA Mosca L Fingerlin TE. The impact of a disease management program in the symptom experiences of older women with heart disease. *Women & Health* 1999;**30**:1–24.

Jenny 2001 ***{published data only}***
Jenny NYY Fai TS. Evaluating the effectiveness of an interactive multimedia computer-based patient education program in cardiac rehabilitation. *Occupational Therapy Journal of Research* 2001;**21**:260–75.

Johansen 2003 ***{published data only}***
Johansen S, Baumbach LA, Jorgensen T, Willaing I. [The effect of psychosocial rehabilitation after acute myocardial infarction. A randomized controlled trial]. [Danish]. *Ugeskrift for Laeger* 2003;**165**:3229–33.

Khunti 2007 ***{published data only}***
Khunti K, Stone M, Paul S, Baines J, Gisborne L, Farooqi A, et al.Disease management programme for secondary prevention of coronary heart disease and heart failure in primary care: A cluster randomised controlled trial. *Heart* 2007;**93**:1398–405.

Koertge 2003 ***{published data only}***
Koertge J Weidner G Elliott-Eller M, et al.Improvement in medical risk factors and quality of life in women and man with coronary artery disease in the multi centre lifestyle demonstration project. *American Journal of Cardiology* 2003;**91**:1316–22.

Lindsay 2009 ***{published data only}***
Lindsay S, Smith S, Bellaby P, Baker R. The health impact of an online heart disease support group: a comparison of moderated versus unmoderated support. *Health Education Research* 2009;**24**:646–54.

Mayou 2002 ***{published data only}***
Mayou RA, Thompson DR, Clements A, Davies CH, Goodwin SJ, Normington K, et al.Guideline-based early rehabilitation after myocardial infarction. A pragmatic randomised controlled trial. *Journal of Psychosomatic Research* 2002;**52**:89–95.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

McGillion 2004 *{published data only}*
McGillion M, Watt-Watson J, Kim J, Yamada J. A systematic review of psychoeducational intervention trials for the management of chronic stable angina. [Review]. *Journal of Nursing Management* 2004;**12**:174–82.

McGillion 2008 *{published data only}*
McGillion MH, Watt-Watson J, Stevens B, LeFort SM, Coyte P, Graham A. Randomized controlled trial of a psychoeducation program for the self-management of chronic cardiac pain. *Journal of Pain & Symptom Management* 2008;**36**:126–40.

McGillion 2008a *{published data only}*
McGillion MH Croxford R Watt WJ Lefort S Stevens B Coyte P. Cost of illness for chronic stable angina patients enrolled in a self-management education trial. *Canadian Journal of Cardiology* 2008;**24**:759–64.

Moore 2002 *{published data only}*
Moore SM Dolansky. An audio-taped information programme after coronary artery bypass surgery improved physical functioning in women and psychological distress in men. *Evidence Based Nursing* 2002;**5**:17–9.

Mosca 2010 *{published data only}*
Mosca L, Christian AH, Mochari-Greenberger H, Kligfield P, Smith SC Jr. A randomized clinical trial of secondary prevention among women hospitalized with coronary heart disease. *Journal of Women's Health* 2010;**19**:195–202.

Mullen 1992 *{published data only}*
Mullen P D, Mains D A, Velez R. A meta-analysis of controlled trials of cardiac patient education. *Patient Education & Counseling* 1992;**19**:143–62.

Murchie 2003 *{published data only}*
Murchie P, Campbell NC, Ritchie LD, Simpson JA, Thain J. Secondary prevention clinics for coronary heart disease: four year follow up of a randomised controlled trial in primary care. *British Medical Journal* 2003;**326**:84.

Murchie 2004 *{published data only}*
Murchie P, Campbell NC, Ritchie LD, Deans HG, Thain J. Effects of secondary prevention clinics on health status in patients with coronary heart disease: 4 year follow-up of a randomized trial in primary care. *Family Practice* 2004;**21**: 567–74.

Neubeck 2009 *{published data only}*
Neubeck L, Redfern J, Fernandez R, Briffa T, Bauman A, Freedman S B. Telehealth interventions for the secondary prevention of coronary heart disease: a systematic review. [Review]. *European Journal of Cardiovascular Prevention & Rehabilitation* 2009;**16**:281–9.

Niebauer 1997 *{published data only}*
Niebauer J Hambrecht R Velich T Hauer K Marburger C Kaulberer B, et al.Attenuated progression of coronary artery disease after 6 years of multifactorial risk intervention. *Circulation* 1997;**96**:2534–41.

Nisbeth 2000 *{published data only}*
Nisbeth O, Klausen K, Andersen L B. Effectiveness of counselling over 1 year on changes in lifestyle and coronary heart disease risk factors. *Patient Education & Counseling* 2000;**40**:121–31.

Nordmann 2001 *{published data only}*
Nordmann A, Heilmbauer I, Walker T, Martina B, Battegay E. A case-management program of medium intensity does not improve cardiovascular risk factor control in coronary artery disease patients: the Heartcare I trial. *American Journal of Medicine* 2001;**110**:543–50.

Oldenburg 1995 *{published data only}*
Oldenburg B, Martin A, Greenwood J, Bernstein L, Allan R. A controlled trial of a behavioral and educational intervention following coronary artery bypass surgery. *Journal of Cardiopulmonary Rehabilitation* 1995;**15**:39–46.

Ornish 1990 *{published data only}*
Ornish D, Scherwitz LW, Billings JH, Armstrong WT, Ports TA, et al.Can life style changes revere coronary heart disease? The Lifestyle heart Trial.. *Lancet* 1990;**336**:129–133.

Ornish 1998 *{published data only}*
Ornish D, Scherwitz LW, Billings JH, Brown SE, Gould KL, Merritt TA, et al.Intensive lifestyle changes for reversal of coronary heart disease. *Journal of American Medical Association* 1998;**280**:2001–7.

Paez 2006 *{published data only}*
Paez KA, Allen JK. Cost-effectiveness of nurse practitioner management of hypercholesterolemia following coronary revascularization. *Journal of the American Academy of Nurse Practitioners* 2006;**18**:436–44.

Parry 2009 *{published data only}*
Parry MJ, et al.Cardiac Home Education and Support Trial (CHEST): A Pilot Study. *Canadian Journal of Cardiology* 2009;**25**(12):e393–398.

Raftery 2005 *{published data only}*
Raftery JP, Yao GL, Murchie P, Campbell NC, Ritchie LD. Cost effectiveness of nurse led secondary prevention clinics for coronary heart disease in primary care: follow up of a randomised controlled trial. *British Medical Journal* 2005; **330**:707.

Redfern 2009 *{published data only}*
Redfern J, Briffa T, Ellis E, Freedman SB. Choice of secondary prevention improves risk factors after acute coronary syndrome: 1-Year follow-up of the CHOICE (Choice of Health Options in prevention of Cardiovascular Events) randomised controlled trial. *Heart* 2009;**95**: 468–75.

Robertson 2003 *{published data only}*
Robertson K, Kayhko K, Kekki P. A supportive-education home follow-up programme for post MI patients. *Journal of Community Nursing* 2003;**17**:4–6.

Rubenfire 2008 *{published data only}*
Rubenfire M. [Commentary on] Efficacy of in-hospital multidimensional interventions of secondary prevention after acute coronary syndrome: a systematic review and meta-analysis. *ACC Cardiosource Review Journal* 2008;**17**: 17–8.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Sherrard 2000 *{published data only}*
Sherrard H. Counselling after a myocardial infarction improved mood for patients and their partners and decreased patient functional limitations [commentary on Johnston M, Foulkes J, Johnston DW, et al. Impact on patients and partners of inpatient and extended cardiac counselling and rehabilitation: a controlled trial. PSYCHOSOM MED 1999 Mar/Apr;61:255-33]. *Evidence-Based Nursing* 2000;**3**: 21.

Shuldham 2001 *{published data only}*
Shuldham CM. Pre-operative education for the patient having coronary artery bypass surgery. [Review]. *Patient Education & Counseling* 2001;**43**:129–37.

Shuldham 2002 *{published data only}*
Shuldham CM, Fleming S, Goodman H. The impact of pre-operative education on recovery following coronary artery bypass surgery. A randomized controlled clinical trial. *European Heart Journal* 2002;**23**:666–74.

Sinclair 2005 *{published data only}*
Sinclair AJ, Conroy SP, Davies M, Bayer AJ. Post-discharge home-based support for older cardiac patients: a randomised controlled trial. *Age & Ageing* 2005;**34**:338–43.

Thompson 2000 *{published data only}*
Thompson DR, Lewin RJ. Coronary Disease: management of the post-myocardial infarction patient: rehabilitation and cardiac necrosis. *Heart* 2000;**84**:101–5.

Thompson 2002 *{published data only}*
Thompson DR, Quinn T, Stewart S. Effective nurse-led interventions in heart disease. *International Journal of Cardiology* 2002;**83**:233–7.

Tranmer 2004 *{published data only}*
Tranmer JE, Parry MJ. Enhancing postoperative recovery of cardiac surgery patients: a randomized clinical trial of an advanced practice nursing intervention. *Western Journal of Nursing Research* 2004;**26**:515–32.

Turner 2008 *{published data only}*
Turner DA, Paul S, Stone MA, Juarez-Garcia A, Squire I, Khunti K. Cost-effectiveness of a disease management programme for secondary prevention of coronary heart disease and heart failure in primary care. *Heart* 2008;**94**: 1601–6.

Vale 2003 *{published data only}*
Vale MJ, Jelinek MV, Best JD, Dart AM, Grigg LE, Hare DL, et al.Coaching patients On Achieving Cardiovascular Health (COACH): a multicenter randomized trial in patients with coronary heart disease. *Archives of Internal Medicine* 2003;**163**:2775–83.

van Elderen 1994 *{published data only}*
van Elderen T, Maes S, Seegers G. Effects of a post-hospitalization group health education programme for patients with coronary heart disease. *British Journal of Clinical Psychology* 1994;**9**:317–30.

van Elderen 2001 *{published data only}*
van Elderen T, Dusseldorp E. Lifestyle effects of group health education for patients with coronary heart disease. *Psychology and Health* 2001;**16**:327–41.

Vonder 2002 *{published data only}*
Vonder MI Daub B Black B Warburton D Haykowsky M. Benefits of cardiac rehabilitation in the ninth decade of life in patients with coronary heart disease. *American Journal of Cardiology* 2002;**90**:645–8.

Wallner 1999 *{published data only}*
Wallner S, Watzinger N, Lindschinger M, Smolle K H, Toplak H, Eber B, et al.Effects of intensified lifestyle modification on the need for further revascularization after coronary angioplasty. *European Journal of Clinical Investigation* 1999;**29**:372–9.

Williams 2009 *{published data only}*
Williams B, Pace AE. Problem based learning in chronic disease management: a review of the research. [Review]. *Patient Education & Counseling* 2009;**77**:14–9.

Zalesskaya 2005 *{published data only}*
Zalesskaya JV, Noruzbaeva AM, Lunegova OS, Mirrakhimov EM. Evaluation of the economic efficiency of educational programs for patients with coronary heart disease and dyslipidemia. *Prevention and Control* 2005;**1**:297–304.

Zhao 2009 *{published data only}*
Zhao Y, Wong FK. Effects of a postdischarge transitional care programme for patients with coronary heart disease in China: a randomised controlled trial. *Journal of Clinical Nursing* 2009;**18**:2444–55.

Zutz 2007 *{published data only}*
Zutz A Ignaszewski A Bates J Lear SA. Utilization of the internet to deliver cardiac rehabilitation at a distance: a pilot study. *Telemedicine Journal & e-Health* 2007;**13**:323–30.

References to studies awaiting assessment

Wang 2007 *{published data only}*
Wang W. Effects of home-based cardiac rehabilitation on health-related quality of life and psychological status in Chinese patients recovering from acute myocardial infarction. Chinese University of Hong Kong (Hong Kong). Chinese University of Hong Kong (Hong Kong), 2007:434.

Williamson 2008 *{published data only}*
Williamson K. An individualized telephone educational intervention for patients following coronary artery bypass graft surgery during the first three weeks after discharge: using Orem's Self-Care Deficit Nursing Theory in Interventional Research. *Self-Care, Dependent-Care & Nursing* 2008;**16**:54–5.

References to ongoing studies

Hawkes 2009 *{published data only}*
Hawkes AL, Atherton J, Taylor CB, Scuffham P, Eadie K, Miller NH, et al.Randomised controlled trial of a secondary prevention program for myocardial infarction patients ('ProActive Heart'): study protocol. Secondary prevention program for myocardial infarction patients. *BMC Cardiovascular Disorders* 2009;**9**:16.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Lear 2008 *{published data only}*

Lear SA. Randomized trial of a cardiac rehabilitation program delivered remotely through the internet. ClinicalTrials.gov 2008:Identifier NCT00683813.

McGillion 2006 *{published data only}*

McGillion MH. A clinical trial of a self-management education program for people with chronic stable angina. http://clinicaltrials.gov/show/nct00350922.

Additional references

Bailey 2010

Bailey JV, Murray E, Rait G, Mercer CH, Morris RW, Peacock R, Cassell J, Nazareth I. Interactive computer-based interventions for sexual health promotion. *Cochrane Database of Systematic Reviews* 2010, Issue 9. [DOI: 10.1002/14651858.CD006483.pub2.]

Balady 2007

Balady GJ, Williams MA, Ades PA, Bittner V, Comoss P, Foody JM, et al.AHA/AACVPR Scientific Statement; Core Components of Cardiac Rehabilitation/Secondary Prevention Programs: 2007 Update. *Circulation* 2007;**115**: 2675–2682.

BHF 2011

British Heart Foundation. Cardiac Rehabilitation. http://www.bhf.org.uk/heart-health/recovery/cardiac-rehabilitation.aspx Accessed July 2011.

Deakin 2005

Deakin TA, McShane CE, Cade JE, Williams R. Group based training for self-management strategies in people with type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews* 2005, Issue 2. [DOI: 10.1002/14651858.CD003417.pub2]

Dellifraine 2008

Dellifraine JL, Dansky KH. Home-based telehealth: a review and meta-analysis. *Journal of Telemedicine and Telecare* 2008;**14**(2):62–66.

DofH 2000

Department of Health. Modern Standards and Service Models. Coronary Heart Disease. National Service Framework.. http://www.dh.gov.uk/prod˙consum˙dh/groups/dh˙digitalassets/@dh/@en/documents/digitalasset/dh˙4057526.pdf 2000 Accessed Jan 17th 2011.

DofH 2011

Department of Health. Commissioning a cardiac rehabilitation service. Reabling people with coronary heart disease. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browsable/DH˙117504 Accessed 17th Jan 2011.

Duke 2009

Duke SAS, Colagiuri S, Colagiuri R. Individual patient education for people with type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews* 2009, Issue 1. [DOI: 10.1002/14651858.CD005268.pub2]

Egger 1997

Egger M, Davey Smith G, Schneider M, Minder C. Bias in meta-analysis detected by a simple graphical test.. *British Medical Journal* 1997;**315**:629–34.

Gravely-Witte 2007

Gravely-Witte S, De Gucht V, Heiser W, Grace SL, Van Elderen T. The impact of angina and cardiac history on health-related quality of life and depression in coronary heart disease patients. *Chronic Illness* 2007;**3**:66–76.

Hanssen, 2009

Hanssen, TA, Nordrehaug JE, Eide GE, Hanestad BR. Does a telephone follow-up intervention for patients discharges with acute myocardial infarction have long-term effects on health-related quality of life? A randomised controlled trial. *Journal of Clinical Nursing* 2009;**18**:1334–1345.

Heran 2010

Heran BS, Chen JHM, Ebrahim S, Moxham T, Oldridge N, Rees K, Thompson DR, Taylor RS. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database of Systematic Reviews* 2010, Issue 7. [DOI: 10.1002/14651858.CD001800.pub2.]

Higgins 2009

Higgins JPT, Altman DG (editors). Chapter 8: Assessing risk of bias in included studies. Higgins JPT, Green S, editors(s). Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.2 (updated September 2009) The Cochrane Collaboration, 2009. Available from www.cochrane–handbook.org.

Jolliffe 2001

Jolliffe JA, Rees K, Taylor RRS, Thompson DR, Oldridge N, Ebrahim S. Exercise-based rehabilitation for coronary heart disease. *Cochrane Database of Systematic Reviews* 2001, Issue 1. [DOI: 10.1002/14651858.CD001800]

Koongstvedt 2001

Koongstvedt PR. *The Managed Health Care Handbook*. Fourth. Aspen Publishers, 2001.

Moher 2009

Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine* 2009;**6**(7): e1000097.

NICE 2007

National Institute for Health and Clinical Excellence. (NICE). Secondary prevention in primary and secondary care for patients following a myocardial infarction.. www.nice.org.uk/CG48 2007.

Oldridge 2003

Oldridge N. Assessing health-related quality of life: it is important when evaluating the effectiveness of cardiac rehabilitation?. *Journal of Cardiopulmonary Rehabilitation.* 2003;**23**:26–8.

Racca 2010

Racca V, Spezzaferri R, Modica M, Mazzini P, Jonsdottir J, De Maria R, Ferratini M. Functioning and disability in

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ischaemic heart disease. *Disability and Rehabilitation* 2010; **32(S1)**:S42–49.

Rahe 1979

Rahe RH, Ward HW, Hayes V. Brief group therapy in myocardial infarction rehabilitation: Three to four year follow-up of a controlled trial. *Psychosomatic Medicine* 1979; **41**:229–242.

Reece 2007

Reece I, Walker S. In: Clues D, Charlton M editor(s). *Teaching, training and learning. A practical guide*. 6th Edition. Tyne and Wear: Business Education Publishers, 2007:207.

Rees 2004

Rees K, Bennett P, West R, Davey Smith G, Ebrahim S. Psychological interventions for coronary heart disease. *Cochrane Database of Systematic Reviews* 2004, Issue 2. [DOI: 10.1002/14651858.CD002902.pub2]

SIGN 2002

Scottish Intercollegiate Guidelines Network. 57. Cardiac Rehabilitation. A National Clinical Guideline 2002.

Smith 2006

Smith SC Jr, Allen J, Blair SN, Bonow RO, Brass LM, Fonarow GC, et al.AHA/ACC Guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular disease: 2006 Update: Endorsed by the national heart, lung, and blood institute. *Circulation* 2006;**113**:2363–2372.

Taylor 1998

Taylor RS, Kirby BJ, Burdon D, Caves R. The assessment of recovery in post-myocardial infarction patients using three generic quality of life measures.. *Journal of Cardiopulmonary Rehabilitation* 1998;**18**:139–44.

Whalley 2011

Whalley B, Rees K, Davies P, Bennett P, Ebrahim S, Liu Z, West R, Moxham S, Thompson DR, Taylor RS. Psychological interventions for coronary heart disease. *Cochrane Database of Systematic Reviews* 2011, Issue 8. [DOI: 10.1002/14651858.CD002902.pub3]

WHO 2008

World Health Organization. The global burden of disease: 2004 update. WHO 2008.

WHO 2010

WHO. Factsheet No 317. http://www.who.int/mediacentre/factsheets/fs317/en/index.html Accessed March 2010.

* *Indicates the major publication for the study*

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Clark 1997

Methods	RCT
Participants	**N Randomised:** 636 (Intervention (Rx) and control group N not reported) **Trial Recruitment period:** N/A **When Randomised: Not Reported (N/R)** **Recruitment from:** Review of outpatient cardiology clinics in four hospitals in Southern Eastern Michigan **CV Diagnosis (% of Patients (pts)):** **Post (Myocardial infarction) MI**: 45% **Angina:** 57% **Post CABG:** 32% **Post PTCA**: 25% These groups are not mutually exclusive. **Mean Age:** 69.6 yrs (60-93) **Percentage male:** 59% **Percentage white:** 88% **Inclusion criteria:** >60 yrs; diagnosed cardiac disease (arrhythmia, angina, MI, valvular disease); treated daily by at least one heart medication; seen by a physician at least once every six months **Exclusion criteria:** *"If physicians felt that they wouldn't be able to benefit fully for the program due to medical reasons (e.g. terminal illness, memory loss, significant hearing loss)"*
Interventions	**Description / Content:** Take PRIDE **Teaching Modalities:** Videotape, guidebook, group teaching. **Who taught by:** Health educator **Dose:** **Duration** 4 weeks **No of sessions** 4 **Length of session** 2 hours **Involvement of Family:** N/R **Time of start after event**: six months to 20 yrs after initial diagnosis **Follow up further reinforcement** N/R **Theoretical basis for intervention** Yes *P*roblem Identification, *R*esearching one's routine, *I*dentifying a management goal, *D*eveloping a plan to reach it, *E*xpressing one's reactions and *E*stablishing rewards for making progress.
Outcomes	HRQofL- Sickness Impact Profile Withdrawal from Rx & control group
Follow up	6, 12 and 18 months

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Clark 1997 (*Continued*)

Control	**Usual care consisted of:** *"Seeing their physicians at the intervals specified by the particular physician and receiving any information or communications that would be provided as part of routine care in that setting."*
Country	USA
Notes	Patients with arrhythmias and CCF also included. The following paper produced from the results of the same trial were used to inform the data collected: Clark 1992

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	*'Use of random number table"*
Allocation concealment (selection bias)	Low risk	*"As the numbers were generated, each was placed in a sealed envelope. They were stored in a locked drawer in my office. As participants completed their baseline interview I was given their names and opened the next envelope in the numerical sequence."* Correspondence with author J. Dodge.
Blinding (performance bias and detection bias) All outcomes	Low risk	*"Data collectors and data analysts were blinded. The health educators who delivered the intervention obviously knew who had been randomized to the intervention, but had no involvement with the collection of quantitative evaluation data at baseline or follow-up."* Correspondence with author J. Dodge.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	455 out of 636 had complete data at 18/12. *"No appreciable difference in dropout rates between the intervention and control groups were found."* Similarity of demographic details of those loss to follow up not discussed
Selective reporting (reporting bias)	Low risk	All outcomes listed in the methods are reported in the results
Groups balanced at baseline	Low risk	*"There were no baseline differences between the experimental and control groups".*
Intention to treat analysis	High risk	*"Data analyses reported....participants who attended at least one of the four sessions."*
Comparative care?	Low risk	Other than the stated intervention both groups appeared to have been treated similarly

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Clark 2000

Methods	RCT
Participants	**N Randomised:** 571 (n Rx 309; n control 262) - 55:45 allocation ratio **Trial Recruitment period:** Not Reported **When Randomised** on agreeing to participate in study. Median of 13 yrs since initial cardiac diagnosis (Range 6 months - 20 years) **Recruitment from:** Physician practices affiliated with six medical centers in Southeastern Michigan **CV Diagnosis (% of pts):** **Post MI** 39% **Angina** 45% **Post CABG** 26% **Post PTCA** 29% These groups are not mutually exclusive. **Mean Age:** 71.9 yrs (Range 60-93) **Percentage male:** 0% **Percentage white:** 87% **Inclusion criteria:** >60; Female; Cardiac disease treated daily with at least one medication; Cardiac disease can be arrhythmia, angina, MI or valvular disease **Exclusion criteria:** *"If physicians felt they could not benefit fully from the program due to medical reason (e.g. terminal illness or significant hearing loss)"*
Interventions	**Description / Content:** Specific information related to heart disease in women signs and symptoms of heart disease, effective communication with clinicians **Teaching Modalities:** Classroom group sessions (Groups 6-8 women). Workbook for use at home on the intervening days. Handouts summarising classroom sessions, daily self-monitoring logs. Weekly telephone call during program period **Who taught by:** Trained health educators and peer leaders (selected graduates from the program that received extra training) **Dose:** **Duration** 4 weeks **No of sessions** weekly (4) **Length of session** 2-2.5hrs **Involvement of Family:** N/R **Time of start after event** N/A **Follow up further reinforcement** letter 3 months after program and a telephone call 6 months after **Theoretical basis for intervention** Yes - PRIDE *P*roblem Identification, *R*esearching one's routine, *I*dentifying a management goal, *D*eveloping a plan to reach it, *E*xpressing one's reactions and *E*stablishing rewards for making progress.
Outcomes	Total Mortality HRQofL - Sickness Impact Profile Adverse Events (Withdrawal from Rx group) Hospitalisations (number of admissions, number of inpatient days, hospital inpatient charges) (Wheeler 2003) Cost-effectiveness (Wheeler 2003)

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Clark 2000 (*Continued*)

Follow up	12 months and 24 months (economic data (Wheeler 2003)).
Control	Usual care was determined by individual responsible physicians who were not aware of group allocation
Country	USA
Notes	The following paper produced from the results of the same trial were used to inform the data collected: Wheeler 2003

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	*"...women were assigned, by use of random number tables* (Clark 2000)*"*
Allocation concealment (selection bias)	Unclear risk	Not Reported
Blinding (performance bias and detection bias) All outcomes	Low risk	*"Interviewers were blind to women's participation in the program.* (Clark 2000)*"*
Incomplete outcome data (attrition bias) All outcomes	Low risk	Table detailing withdrawals
Selective reporting (reporting bias)	Low risk	Outcomes in methods reported in results
Groups balanced at baseline	High risk	Demographically similar but statistically significant differences in baseline disease symptoms and weight
Intention to treat analysis	Low risk	Data was analysed in two different phases, one "*an analysis of all women randomized"* the other "*all program women who attended one or more program sessions* (Clark 2000)*"*
Comparative care?	Low risk	*"In an effort to assure similar care to both the program and the control groups, no feedback about individual participants was provided to medical or nursing staff. The clinical staff had no knowledge of which patients had agreed to participate in research* (Clark 2000)*."*

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Clark 2009

Methods	RCT - 3 groups
Participants	**N Randomised:** 575 (n Rx Self Directed: 201; n Rx Group Format: 190; n control: 184) **Trial Recruitment period:** N/A - list compiled from physicians patient rota. **When Randomised:** After collecting baseline data. **Recruitment from:** Five hospital sites in Southeastern Michigan. **CV Diagnosis (% of pts):** **Post MI** 42% **Angina** 38% **Post CABG -** N/R **Post PTCA -** N/R These groups are not mutually exclusive. **Mean Age:** 72.8 **Percentage male:** 0% **Percentage white:** 82.8% **Inclusion criteria:** >60 years; diagnosed cardiac condition (arrhythmia, angina, MI, congestive heart failure, valvular disease); treated by daily heart medication; seen by a physician in the last year; living within 1 hr drive of the study site **Exclusion criteria:** If not able to fully participate because of medical reasons.
Interventions	**Description / Content:** Content of the materials used in both groups was identical. Both 6 units **Teaching Modalities - Self Directed:** Single orientation session then: **Dose:** **Duration** program at home in six weeks The self directed group also have an instructional video tape that gives examples of group discussions **Teaching Modalities - Group:** 6-8 women. **Dose:** **Duration** 6 sessions **No of sessions** weekly **Length of session** 2-2.5 hrs Both groups received weekly telephone calls from a heath educator during the study period **Who taught by:** Trained health educators and peer leaders **Involvement of Family**: N/R **Time of start after event** N/A **Follow up further reinforcement.** 3 monthly - both groups receive news letter 6 months - Group attend a reunion. Self directed participants receive an in depth telephone call **Theoretical basis for intervention:** Yes, described in separate paper.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Clark 2009 (*Continued*)

Outcomes	Total Mortality HRQofL - Sickness Impact Profile (SIP) Withdrawal from treatment
Follow up	12 and 18 months
Control	*"see their physician on the routine schedule and receive any information that would normally be provided as part of regular care in the practice."*
Country	USA
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	*"...complied using,...book of random numbers."*
Allocation concealment (selection bias)	Low risk	*"Sealed opaque and sequentially numbered envelopes."*
Blinding (performance bias and detection bias) All outcomes	Low risk	*"Those assessing outcomes were blinded to the group allocation unless the participant happened to reference program participation during the follow-up telephone interviews or at the physical assessment visit."* Correspondence with author, J. Dodge.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Clear description of withdrawals from trial given.
Selective reporting (reporting bias)	Low risk	Sickness Impact Profile numerical scores were not individually reported as no significant difference was found. These were subsequently made available through correspondence with the author, J Dodge
Groups balanced at baseline	Low risk	Described in table one. "*no significant differences among study conditions....."*
Intention to treat analysis	Low risk	*"Analyses were carried out using the women as they were randomized to each of the three study conditions"*
Comparative care?	Low risk	*"In an effort to ensure similar care to all participants, no feedback about individual study participants was provided to health care personnel at the study sites."*

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Cupples 1994

Methods	RCT
Participants	**N Randomised:** 688 (n Rx 342 n control 346) **Trial recruitment period:** Data collected between 1990 and 1993. **When randomised:** Not reported **Recruitment from:** 18 General Practices in Greater Belfast **CV Diagnosis (% of pts):** **Angina 100%** **Mean age:** Rx 62.7 Control 63.6 **Percentage male:** 59% **Percentage white:** Not reported **Inclusion criteria:** ≥6 month history of angina diagnosed by classical history. **Exclusion criteria:** No other severe illness
Interventions	**"Personal health education intervention"** **Description / Content:** *"Patients in the intervention group were given practical relevant advice regarding cardiovascular risk factors. They were reviewed at four monthly intervals and given appropriate health education* (Cupples 1994)*."* *"Visited by a health visitor, whose brief was discuss ways of living more easily with their disease and ways in which risks of further events might be reduced* (O'Neill 1996)." *"The education involved giving information which was tailored to the individuals' coronary risk factors and the use of medication* (Cupples 1996)*."* **Teaching modalities:** Individual one to one visits **Who taught by:** health visitor **Dose:** **Duration** 2 years **No of sessions** 6 visits (every 4 months for 2 years) **Length of session** Not Reported **Involvement of Family:** No **Time of start after event** N/A **Follow up further reinforcement:** Not following 2 year intervention **Theoretical basis for intervention** none stated
Outcomes	Total Mortality Cardiovascular related mortality Hospitalisations recorded as part of cost analysis (not independently reported) (O'Neill 1996) HRQofL (Nottingham Health Profile Questionnaire) (Cupples 1996) Adverse Events (Withdrawal from Rx group) Cost Analysis (O'Neill 1996)
Follow up	Patients reviewed at 2 years (Cupples 1994; O'Neill 1996) and 5 years (Cupples 1999)
Control	**Usual care consisted of:** Had the same screening interview as the intervention group but once randomised to control had no further intervention
Country	Northern Ireland, UK.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Cupples 1994 (*Continued*)

Notes	The following papers produced from the results of the same trial were used to inform the data collected: Cupples 1996; Cupples 1999; O'Neill 1996

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	*"generated by a computer program using permuted blocks* (Cupples 1996)."
Allocation concealment (selection bias)	Low risk	*"The health visitor opened an opaque, sealed, and numbered envelope containing the allocation* (Cupples 1994)."
Blinding (performance bias and detection bias) All outcomes	Low risk	*"After 2 years both groups were reviewed by a research worker who had not previously been involved with the subjects* (Cupples 1994)." At five year follow-up: *"nurse (performing interview) was blind to trial group allocation* (Cupples 1999)."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Detailed report of drop outs and losses to follow up reported Cupples 1994 Yes Cupples 1996 No O'Neill 1996 No Cupples 1999 No
Selective reporting (reporting bias)	Low risk	All relevant outcomes listed in methods were reported in methods
Groups balanced at baseline	Low risk	*"No significant differences were found between the two groups at baseline* (Cupples 1994)."
Intention to treat analysis	Low risk	*"We also analysed the data in an intention to treat basis, with baseline or adjusted values being substituted for missing data, but this did not alter the conclusions* (Cupples 1999)."
Comparative care?	Low risk	Both groups received same usual care and only difference between groups was the educational intervention

Esposito 2008

Methods	RCT
Participants	**N Randomised**: 46,606 (n Rx - 33,267 n Control - 13,339) **Trail Recruitment period:** All Florida Medicare beneficiaries enrolled in Medicaid as of March 2006 who met eligibility criteria

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

	When Randomised "*When eligible beneficiaries are identified."* **Recruitment from:** Medicare database **CV Diagnosis (% of pts):** 69% Coronary Artery Disease (Not further defined) 10% in combination with heart failure 19% in combination with diabetes 12% with all three diagnoses **Mean Age:** 68.4 yrs **Percentage male:** 34% **Percentage white:** 55% **Inclusion criteria:** Enrolled in Medicare and receiving Medicard benefits; have congestive cardiac failure, diabetes or coronary artery disease **Exclusion criteria:** Psychiatric inpatient therapy of more than 14 consecutive days in the prior 12 months; long term nursing home residence
Interventions	**Description / Content:** The education component: "*Nurse case managers provided education to patients on the recognition of signs and symptoms of their disease; how to monitor vital signs; the cause of diseases; how to better adhere to diet, exercise, and medication regimes; and strategies to cope with chronic illness. When providing education to patients, nurses use pre-designed scripts. Geared towards educating patients on how to attain clinical goals."* **Teaching Modalities: "***The intervention is primarily telephonic, but also had an in-person component."* **Who taught by:** Individually assigned "*nurse care manager"* **Dose:** **Duration** - 18 months **No of sessions -** patients has 1.1 contacts per active month, on average. **Length of session-** N/R **Involvement of Family:** - N/R **Time of start after event -** N/A **Follow up further reinforcement** - Intervention continued until end of follow up period **Theoretical basis for intervention** - N/R
Outcomes	Hospitalisations - Emergency and inpatient use HRQofL [Survey of selected 613 enrollees only and claims based quality of care measures] Cost Analysis
Follow up	6 months, 1 yr and 18 months
Control	**Usual care consisted of:** Not Reported
Country	USA
Notes	Analysed 1st and second 6 month periods, first year and 18 months. Population based study that only a relatively small proportion of those assigned to the intervention group actually actively continued to participate in. Therefore treatment

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Esposito 2008 (*Continued*)

	effect may be difficult to statistically demonstrate

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not reported
Allocation concealment (selection bias)	Unclear risk	Not reported
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Not reported
Incomplete outcome data (attrition bias) All outcomes	Low risk	Divided patients in to mediated - those that fully engaged with the intervention and instructional - those that were less that fully engaged but did not opt out. Breakdown of mediated patients demonstrated in a table
Selective reporting (reporting bias)	Low risk	Primary outcomes stated in methods were reported in the results
Groups balanced at baseline	Low risk	Detailed table (Table 4) of pre-enrollment characteristics showed no statistically significant differences seen. Authors reported that there was a difference in that the treatment group utilised health services 5% more in 2 year run up period to the trial (not statistically significant)
Intention to treat analysis	Low risk	*"intention of treat study design."*
Comparative care?	High risk	Education only part of the intervention: *"intervention components include patient assessment, care planning, routine nurse monitoring, patient self-monitoring, education, care co-ordination, and service arrangement."* Physicians were alerted to "*important changes in patients' health."*

Hanssen 2007

Methods	RCT
Participants	**N Randomised: 288** (n Rx: 156 n control: 132) **Trail Recruitment period:** Sept 2001 to Sept 2005 **When Randomised:** After hospitalisation of at least 2 days **Recruitment from:** 413 patients in Haukeland University Hospital, Bergen, Norway **CV Diagnosis (% of pts):** **Post Myocardial Infarction** 100% **Mean age:** 60 **Percentage male:** 81%

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

	Percentage white: Not reported **Inclusion criteria:** All patients with confirmed Acute MyocardiaI Infarction (AMI) and admitted to the hospital **Exclusion criteria:** Severe co-existing chronic disabling disease; Nursing home resident; unable to receive telephone calls; unable to fill in questionnaires; if expected to have CABG in that admission; In the first year of the study >80 yr olds were excluded, after the first year they were included
Interventions	**Description / Content:** *" structured intervention encompassing telephone follow up and an open telephone line"* *"to provide patients with information, education and support on the basis of individual needs. To provide patients with information about what are common questions after AMI and encourage elaboration on the issues if desired. One issue was addressed in each call."* (Detailed list of topics covered itemised in paper) **Teaching Modalities:** Telephone follow up **Who taught by:** *"nurses with interests and experience in counselling and providing information to patients with ischaemic heart disease."* **Dose:** **Duration** 6 months (could stop earlier if requested) but encouraged to have at least the first 5 months intervention **No of sessions weekly** first 4 weeks, then weeks 6,8,12 and 24. 8 sessions in total **Length of session** as long as required (mean telephone call 6.88 mins (SD 3.89)) **Involvement of Family:** [telephone] ***"Lines were open to patients and relatives/relations"*** **Time of start after event:** On discharge following the event **Follow up further reinforcement:** none **Theoretical basis for intervention:** *"intervention was developed on the basis of the Lazarus and Folkmans theory on stress, appraisal and copy, principles about patient education, findings from previous research and according to guideline recommendations."*
Outcomes	HRQofL (SF36) Rehospitalisation Mortality
Follow up	6 and 18 months
Control	**Usual care consisted of:** *"Managed in accordance with current clinical practice. One visit to a physician at the outpatient clinic 6-8 weeks after discharge, and subsequent visits to the patient's general practitioner. "*
Country	Norway

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Hanssen 2007 (*Continued*)

Notes	The following paper produced from the results of the same trial were used to inform the data collected: Hanssen 2009

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	*"A simple randomization procedure using a computer-generated list of random numbers"*
Allocation concealment (selection bias)	Low risk	*"..group allocation in sealed opaque envelopes prepared by the researcher."*
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Not clear from as to whether researchers were blinded to group allocations
Incomplete outcome data (attrition bias) All outcomes	Low risk	CONSORT diagram of trial flow reported with details of drop out and loss to follow up
Selective reporting (reporting bias)	Low risk	Outcomes in methods reported in results.
Groups balanced at baseline	Low risk	*"No statistically differences were found"* in baseline characteristics
Intention to treat analysis	Low risk	Although intention to treat analysis not explicitly stated, the groups were analysed according to original random allocation
Comparative care?	High risk	Intervention included both education and counselling - psychological based intervention *"Providing emotional support and alternative coping strategies"*. Which was not received by control group

Lie 2009

Methods	RCT
Participants	**N Randomised:** 203 (**n Rx:** 101 & **n control** 102) **Trial Recruitment period:** August 2003 to 2004 **When Randomised:** Not stated **Recruitment from:** All N=502 elective CABG admitted to a single hospital **CV Diagnosis (% of pts):** Post CABG 100% **Mean Age:** 62 **Percentage male:** 89.5% **Percentage white:** Not stated **Inclusion criteria:** All elective CABG patients 18-80 yrs **Exclusion criteria:**

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

	More than 3 hrs driving distance
Interventions	*"A psychoeducative intervention"* **Description / Content:** Structured information and psychological support for the topics of angina symptoms, medications, sexuality, anxiety, and depression. Material developed for the study **Teaching Modalities:** Home based, 2 x 1-hr home visits at 2 & 4 post CABG. **Who taught by: "***Masters prepared critical care nurse with 12 years experience"* **Dose:** **Duration** 4 weeks **No of sessions** 2 (at 2 and 4 weeks) **Length of session** 1 hr **Involvement of Family:** Not stated **Time of start after event**: Post CABG 2 and 4 weeks **Follow up further reinforcement:** No **Theoretical basis for intervention:** None stated
Outcomes	HRQofL - SF-36 and Seattle Angina Questoinnaire (SAQ)
Follow up	6-months post CABG
Control	**Usual care consisted of:** *"Patients in the intervention group and the control group received standard discharge care that involved a non-standardised short talk with the nurse/doctor."*
Country	Norway
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	*"Statistician made the randomisation codes by using a computer program."*
Allocation concealment (selection bias)	Low risk	*"a secretary created sealed opaque envelopes containing individual codes with sequential numbers."*
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	Clear table demonstrating patients excluded and the attrition. All accounted for at the end of the trial Minimal incomplete data from responses in each group in both questionnaires e.g. "*number of respondents for each subscale and each measurement point ranged between 74 and 92 for each group"*

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Lie 2009 (*Continued*)

Selective reporting (reporting bias)	Low risk	All stated outcomes SAQ and SF-36 at 6 months reported
Groups balanced at baseline	Low risk	Baseline characteristics "*did not differ significantly between groups*".
Intention to treat analysis	Low risk	ITT not explicitly stated. Reported patient flow chart suggests that groups analysed according to original random allocation
Comparative care?	Low risk	*"Patients in the intervention group and the control group received standard discharge care that involved a non-standardised short talk with the nurse/doctor."*

Lisspers 1999

Methods	RCT
Participants	**N Randomised:** 87 (n Rx 46; n control 41) **Recruitment period:** Recruited Feb 1993 and Dec 1995. **When Randomised:** not reported **Recruitment from:** 151 consecutive referrals to cardiology outpatients of 1 hospital **CV Diagnosis (% of pts):** **Post PTCA** 100% **Average (SD) Age:** 53 (7) **Percentage male:** 75% **Percentage white:** not reported **Inclusion criteria:** *"at least one coronary stenosis suitable for PTCA and at least one additional clinically insignificant coronary artherosclerotic lesion that could be evaluated by quantitative computerized angiography* Hofman-Bang 1999*";* employed; able to perform bike test **Exclusion criteria:** Abscence of other disease that would prevent completion of programme**;** age >65; unemployed
Interventions	**Description / Content:** 4 week residential stay, which was focused on health education and the achievement of behaviour change. During the first year of follow-up, a maintenance programme included regular contacts with a nurse...The second year did not contain any active intervention **Teaching Modalities:** 4 weeks residential stay (group of 5-8) Seminars/Lectures/Discussion /Skills (e.g. food preparation/ relaxation) Then 11 month structured maintenance programme. Nurse led. **Who taught by:** Individualisation of material by trained nurse (*"personal coach* (Lisspers 1999)*"*) **Dose:** **Duration** -12 months **No of sessions** - Not reported **Length of session** - 4 weeks then not reported **Involvement of Family:** Not reported **Time of start after event** Not reported

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

	Follow up further reinforcement yes for 1 year ("regular follow-up contacts between the patient and his/her personal coach for verbal feedback, problem-solving, and replanning discussions when needed (Lisspers 1999)"). **Theoretical basis for intervention stated** no
Outcomes	Total Mortality, Total CV Events, non fatal MI Total Revascularisations (both CABG and PTCA) Hospitalisations HRQofL: Angina Pectoris Quality of Life Questionnaire (AP-QLQ)
Follow up	12, 24, 30 and 60 months
Control	**Usual care consisted of:** PTCA, one outpatient visit. Then referral to family physician
Country	Sweden
Notes	In direct communication with the author he would describe the program as a *"behaviour change program"* primarily and he viewed patient education as *"secondary and supportive to behavior change procedures."* The following papers produced from the results of the same trial were used to inform the data collected: Hofman-Bang 1999; Lisspers 2005

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Not Reported.
Allocation concealment (selection bias)	Unclear risk	Not Reported
Blinding (performance bias and detection bias) All outcomes	High risk	Not reported in the paper but from direct communication with the author it was confirmed that those analysing the results were not blinded to the group allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	*"Two patients in the intervention and four in the control group were excluded soon after randomization at their own request leaving 87 subjects as the final patient population* Hofman-Bang 1999*."*
Selective reporting (reporting bias)	Low risk	All stated rehabilitation and secondary prevention endpoints in methods documented in results
Groups balanced at baseline	Low risk	Patient characteristics table and statistical comparison included. Apart from beta-blocker usage, groups not different

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Lisspers 1999 (*Continued*)

Intention to treat analysis	Low risk	Intention to treat (ITT) not stated in the test but calculations stated in the results appear to be analysed according to original allocation worked out on an ITT basis
Comparative care?	High risk	As well as education: intervention group received stress management, exercise, smoking habits and dietary advice

P.RE.COR Group 1991

Methods	RCT
Participants	**N Randomised:** 182 (intervention ("rehabilitation": n=60; n control I ("counselling programme" n= 61 control II ("usual care"): 61) **Trial Recruitment period:** Feb 1981 to May 1984 **When Randomised:** 30-60 days post MI **Recruitment from:** 1308 patients with suspected MI **CV Diagnosis (% of pts):** **Post MI** 100% **Age:** Mean Age Control: 51, Intervention: 51 **Percentage male:** 100% **Percentage white:** Not reported **Inclusion criteria:** MI < 65 yrs **Exclusion criteria:** Contraindicaton to exercise: recent stroke, disability lower limbs, uncontrolled heart failure, severe rhythm disturbances, SBP > 250 mmHg, severe angina pectoris, severe hypotension, chest pain or low HR on exercise
Interventions	**Description/Content:** Education/counselling: Recommendations on cardiovascular risk factors and exercise-control CVS risk factors **Teaching Modalities:** One group session Plus individual session with Cardiologist - full medical and personal adjusted recommendations **Who taught by:** (the group session) Cardiologist, psychiatrist, nutritionist & physiotherapist **Dose:** **Duration** Not reported **No of sessions** one **Length of session** Not reported **Involvement of Family: "***spouse/partner encouraged to attend"* **Time of start after event** Not reported **Follow up further reinforcement -** no **Theoretical basis for intervention stated-** no

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

P.RE.COR Group 1991 (*Continued*)

Outcomes	Total Mortality Cardiovascualar mortality Other cardiovascular events Total Revascularisations (CABG)
Follow up	12 & 24 months
Control	**Usual care consisted of:** *"Referral to private practitioner and/or cardiologist"*
Country	France
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Not reported
Allocation concealment (selection bias)	Unclear risk	Not reported
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Not reported
Incomplete outcome data (attrition bias) All outcomes	Low risk	Reasons for exclusions pre-randomisation given. "*Exclusion of women and men above the age of 65 alone contributed to almost 60% of all reasons for non-eligibility...the reasons for non-inclusion in the other patients were either inability to perform the exercise test or major ECG abnormalities."* *"No patient was lost to follow-up"* but number actually completing interventions not reported. Results for all those randomised, reported for non-fatal events and mortality outcomes
Selective reporting (reporting bias)	Low risk	All outcomes listed in methods reported in results.
Groups balanced at baseline	Low risk	*"No statistically significant differences were observed among the treatment groups for any of the tested variable."*
Intention to treat analysis	Low risk	*"The analysis followed the intention-to-treat principle; patients were counted in the groups in which they were allocated"*
Comparative care?	Low risk	Intervention and control group received identical care other than the intervention stated

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Peikes 2009

Methods	RCT
Participants	**N Randomised:** 18,402 n Rx 9,427, n control 8,975 **Trial Recruitment period:** April 2002 and June 2005 **When Randomised** **Recruitment from: "**Eligible-fee for service Medicare patients...who volunteers to participate" **CV Diagnosis (% of pts):** 61% CHD, 48% congestive heart failure **Age** Not Reported **Percentage male:** 45% **Percentage white:** 85% **Inclusion and Exclusion criteria:** "Each program was allowed to define within broad boundaries its own target population and exclusion criteria, and designed its intervention accordingly." 10/15 sites required a hospital admission within the previous year, 4/15 sites excluded <65 yrs old & 14/15 excluded "*terminal illness and conditions that affected their ability to learn self management*"
Interventions	**Description / Content:** *"Nurses provided patient education and monitoring."* The Interventions varied and are described in detail in Brown 2008. "*All but 1 of the programs educated patients to improve adherence to medication, diet, exercise, and self-care regimens, mostly through the nurses conveying factual information."* **Teaching Modalities:** **Who taught by:** Care co-ordinator. Licensed or registered nurses (4 programs required a BSc level qualification in nursing studies) **Dose:** **Duration:** on average 30 months eligibility (range 18-31 months) **No of sessions:** 11 programs: 1-2.5 times / month: 3 programs 4-8 times / month. Other programs did not record contact frequency **Length of session:** Not Reported **Involvement of Family:** Not Reported **Time of start after event** Not Reported **Follow up further reinforcement:** N/A **Theoretical basis for intervention:** Not Reported
Outcomes	Hospitalisations HRQofL Cost Analysis - monthly Medicare expenditure
Follow up	At least 1 year. Mean F/U 51 months.
Control	Not reported.
Country	USA
Notes	The following paper produced from the results of the same trial were used to inform the data collected:

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Peikes 2009 (*Continued*)

	Brown 2008	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomly generated concealed 4-digit "strings".
Allocation concealment (selection bias)	Low risk	Randomised assignment was returned via the trial Web site.
Blinding (performance bias and detection bias) All outcomes	High risk	*"Because of the nature of the intervention, no individuals were blinded to which group participants were randomized."* Peikes 2009
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	*"Observations are weighted by the number of months in the follow-up period that the same member meets eligibility requirements."* Peikes 2009. A full breakdown of periods that patients were eligible is not given
Selective reporting (reporting bias)	Low risk	All outcomes stated in the methods are reported in the results
Groups balanced at baseline	Low risk	*"Across all of the 15 programs and the baseline characteristics the treatment and control groups differed significantly on only 11 of the 255 comparisons at the p<0.05 level, less than the expected number of statistical significant differences that would be observed by chance."* Peikes 2009
Intention to treat analysis	Low risk	*"Effects were calculated using .... an intention to treat design."* Peikes 2009
Comparative care?	High risk	*"7 of the programs used behaviour change models. 14 programs attempted to improve communication between patients and physicians."* Peikes 2009 Education was not the only intervention that the treatment groups received

Pogosova 2008

Methods	RCT
Participants	**N Randomised: 100** (n Rx = 50 & n control = 50) **Trial Recruitment period:** NR (total study period: March 2004 - January 2006) **When Randomised** NR **Recruitment from:** Ambulatory patients of the Moscow polyclinic Nr112 (n=100) with stable angina of 1-3 functional class, aged between 47-65 **CV Diagnosis (% of pts):** **Post MI** = 52% in Rx; 48% in control

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

	Angina = all **Post CABG** = 14% in Rx; 8% in control **Post PTCA** = 18% Rx; 14% in control (transluminal balloon angioplasty) **Age:** Mean 59.9 (SD 0.4) **Percentage male:** 60% in Rx; 58% in control **Percentage white:** NR **Inclusion criteria:** Diagnosis of CHD, stable angina, age <65 **Exclusion criteria:** acute coronary syndromes and acute cerebrovascular disorders in 6 months before selection; patients with severe somatic disorders (life-threatening arrhythmia, heart failure (3-4 functional class), kidney or liver failure; decompensated diabetes, severe bronchial asthma), psychiatric disorders and alcoholic, narcotic and prescription drug addictions
Interventions	**Description / Content:** A course at the *"Health school for CHD patients"*; Structured programme of 6 sessions (90 min each, twice a week), during which 1 or 2 risk factors were discussed. Evaluation of knowledge about the disease and risk factors after the course. **Teaching Modalities:** NR **Who taught by:** NR **Dose:** twice a week **Duration:** 3 weeks N**o of sessions:** 6 sessions **Length of session:** 90 min **Involvement of Family:** NR **Time of start after event** **Follow up further reinforcement** NR **Theoretical basis for intervention:** Organisation of Health Schools for CHD patients in practical health-care setting. Organisational-methodical letter. Appendix 2. M 2003
Outcomes	HRQofL: SF-36
Follow up	6 and 12 months post randomisation
Control	Usual care (for all patients) consisted of 3 visits during a 12 months follow-up 1^{st} visit - evaluating inclusion criteria, giving informed consent, randomisation, evaluation of knowledge about the disorder and risk factors; clinical examination; blood test for lipids and glucose; psychological survey 2 and 3^{rd} visits - 6 and 12 months after the start of the study; consisted of clinical examination (blood test for lipids and glucose), evaluation of knowledge and psychological survey
Country	Russia
Notes	
Risk of bias	

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Pogosova 2008 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not reported
Allocation concealment (selection bias)	Unclear risk	Not reported
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Not reported
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Likely, description of the results in text indicates missing data but no breakdown given
Selective reporting (reporting bias)	Low risk	All outcomes are accounted for in the results in either table, graphical or text format
Groups balanced at baseline	Low risk	Groups at baseline were comparable.
Intention to treat analysis	Unclear risk	Not reported
Comparative care?	Low risk	Control group received standard care only.

Southard 2003

Methods	RCT
Participants	**N Randomised:** 104 (**n Rx:** 53**; n control:** 51) **Trail Recruitment period:** 10 months **When Randomised:** **Recruitment from:** 46 Outpatient facilities throughout SW Virginia) or through news paper adverts (number of patients screened prior to randomization not reported) **CV Diagnosis (% of pts): "***diagnosed coronary heart disease, congestive heart failure or both"* Breakdown not reported. **Mean age:** 62 **Percentage male:** 75% **Percentage white:** 97% **Inclusion criteria:** Diagnosis of CHD or CHF or both Approval of either primary care physician or cardiologist Needs access to the Internet **Exclusion criteria:** None reported
Interventions	**Description / Content:** Log in on to the site at least once a week for 30 mins, communicating with a case manager through a secure form of e-mail, completing education modules assigned by the case manager, and entering data into progress graphs. They had

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

	the opportunity to use an on-line discussion group. There were material incentives for active participation. Also dietary input **Teaching Modalities:** *"interactive, multiple choice, self tests followed by feedback."* **Who taught by:** *"Case Managers"* and dieticians **Dose:** **Duration**: 6 months **No of sessions:** one/week **Length of session:** at least 30 mins **Involvement of Family:** Not stated **Time of start after event:** Not relevant **Follow up further reinforcement:** No **Theoretical basis for intervention:** None stated
Outcomes	Total CV Events (fatal / none fatal MI and other fatal / nonfatal CV event Total Revascularisations (PTCA) Hospitalisations HRQofL - Dartmouth COOP Qof L Cost Analysis
Follow up	6 months post randomisation
Control	Usual care (details not explicitly stated)
Country	USA
Notes	n.b. included heart failure not just CHD patients; percentage with just heart failure not clear; the breakdown table shows "multiple diagnoses" Included a proportion of patients who had previously received cardiac rehabilitation

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	*"Randomly assigned to SI or UC on the basis of a computer-generated random number." "study population was stratified on the basis of minority status, participation in cardiac rehabilitation, and acute status* (time since event*)"*
Allocation concealment (selection bias)	Unclear risk	Not reported
Blinding (performance bias and detection bias) All outcomes	High risk	Case managers collected number of outcomes (height, weight, blood pressure) at follow up and were not blind to intervention or control
Incomplete outcome data (attrition bias) All outcomes	Low risk	"Of the 104 subjects randomized to the study, 6-month follow-up data was obtained on 100. Four subjects were lost to follow up evaluation." Details of drop outs /loss to follow up reported

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Southard 2003 (*Continued*)

Selective reporting (reporting bias)	High risk	Dartmouth COOP Quality of life taken at entry and exit. Results reported on entry but not at exit
Groups balanced at baseline	Low risk	Table of demographics and baseline outcome values presented and baseline statistical analysis did not demonstrate any differences
Intention to treat analysis	Low risk	Although not explicitly stated, there groups appear to have been analysed according to initial random allocation
Comparative care?	Unclear risk	Not clear whether intervention group received same usual care as control arm

Tingstrom 2005

Methods	RCT
Participants	**N Randomised:** 207 **(n Rx** 104 **& n control** 103) **Trail Recruitment period:** Not reported **When Randomised:** Not reported **Recruitment from**: 427 consecutive patients from 2 participating hospitals **CV Diagnosis (% of pts):** **Post MI** n=84 (40.5%) **MI &/or Post CABG** n=46 (22%) (just CABG 46 MI & CABG **MI &/or Post PTCA**- n=77 (37%) just PCI 77 MI with PCI **Age:** 59 (SD 7) **Percentage male:** 74% **Percentage white:** Not Specified **Inclusion criteria:** Recent CAD; MI &/or PTCA &/or CABG **Exclusion criteria:** Planned CABG; senility; psychiatric medication; expected poor prognosis within a year; deficient in Swedish; participation in other studies
Interventions	**Description / Content:** Problem based learning rehabilitation ***"real life situations or scenarios were presented to the group...consisted of pictures, press cuttings, or short texts about exercise, food, drugs, smoking and cholesterol."*** Planned curriculum programme explicitly stated. **Teaching Modalities:** Groups of 6-8 people. **Who taught by:** *" Tutor - member of rehabilitation team, trained to take the role of the facilitator"* **Dose:** (weekly for the first month, every other week for the next month and the spread over the year) **Duration**: 1 year **No of sessions:** 13 group sessions **Length of session** 1.5hrs **Involvement of Family:** Not Stated **Time of start after event:** Not Stated

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

	Follow up further reinforcement **Theoretical basis for intervention:** Yes, Schmidt seven step model of problem solving.
Outcomes	HRQofL - Ladder of Life, Self-Rated Health, SF-36, Cardiac Health Profile Withdrawal from intervention group
Follow up	12-months post-randomisation
Control	**Usual care consisted of:** *"Standard treatment from the rehabilitation team.... The standard treatment included visits to a nurse and physician during the study period. All patients were also offered the possibility of taking part in physical exercise groups, smoking cessation groups and individual counselling by a dietician."*
Country	Sweden
Notes	High attendance rate to the educational sessions. Mean 9.4 (median 11) out of 13 sessions

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Not reported in the study itself but from communication with the author it was confirmed that sealed envelopes were randomly organised by a person outside of the research team
Allocation concealment (selection bias)	Low risk	Not reported in the study. However, from communication with the author a sealed envelope method was utilised
Blinding (performance bias and detection bias) All outcomes	High risk	Not reported in the study. Confirmed by communication with author
Incomplete outcome data (attrition bias) All outcomes	Low risk	QUORUM trial flow diagram reported with exclusions and attrition documented and reasons given
Selective reporting (reporting bias)	Low risk	All stated outcomes in methods are reported in results at pre and post tests. Although the self rated health score was not reported in detail
Groups balanced at baseline	Low risk	Table of baseline characteristics showed no statistically differences
Intention to treat analysis	Low risk	Confirmed by communication with the author. *"For all analyses intention to treat was used."*

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Tingstrom 2005 (*Continued*)

Comparative care?	Low risk	*"both groups were offered standard treatment by the rehabilitation team..."*

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Ades 2001	Identifed from Lie 2009. Review not a RCT
Allen 2010	Systematic Review: 21 references identified and reviewed as being of potential interest to this review
Allison 2000	Education not primary aim of intervention. (Risk Factor intervention clinic)
Arthur 2000	Performance bias, intervention included exercise as well as education
Bagheri 2007	Education not primary aim of intervention. (Psychological Counselling)
Barnason 1995	*"quasi-experimental"* investigating patient satisfaction with teaching.
Barnason 2006	Performance bias: education only part of the intervention.
Barnason 2009	Education not primary aim of intervention: symptom management intervention (pain management / incremental physical exercise.)
Barnason 2009a	Performance bias: education only part of the intervention.
Bell 1998	Identified from Clark 2007. Not RCT.
Benson 2000	A review of a meta-analysis Dusseldorp 1999
Beranova 2007	Systematic Review: 2 references identified and reviewed as being of potential interest to this review
Bethell 1990	Identified from Clark 2005. Education not primary aim of intervention (Exercise based intervention)
Bettencourt 2005	Not education: exercise intervention.
Bitzer 2002	Not a RCT.
Boulay 2004	Performance bias, intervention included exercise as well as education. Not a RCT compared with historical controls
Brand 1998	Performance bias, intervention included exercise as well as education
Brugemann 2007	Education not primary aim of intervention. Psychological - *"Rational Emotive behavioural therapy"*.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

(*Continued*)

Campbell 1998	Education not primary aim of intervention (nurse intervention clinic)
Campbell 1998a	Education not primary aim of intervention (nurse intervention clinic)
Cannon 2002	Review of implementation of Acute Coronary Syndrome patient pathway. Not an intervention
Cebeci 2008	No relevant outcomes - self care questionnaires.
Chan 2005	Identified from Eshah 2009. Not RCT: Prospective pre-test / post-test design.
Chen 2005	No specified follow-up period.
Clark 2005	Systematic Review: 45 references identified and reviewed as being of potential interest to this review
Clark 2007	Systematic Review: 35 references identified and reviewed as being of potential interest to this review
Cobb 2006	Systematic Review: 3 references identified and reviewed as being of potential interest to this review
Costa 2008	Education not primary aim of intervention - multidisciplinary interventional clinic
Coull 2004	Entrance into study after cardiac rehabilitation.
Cundey 1995	Identifed from Hanssen 2007. Review not an RCT
DeBusk 1994	Education not primary aim of intervention. Nurse led intervention
Delaney 2008	Education not primary aim of intervention - a nurse led intervention clinic
Dolan 1992	Duplicate of Mullen 1992; Systematic Review: 0 references identified (all pre1990)
Dusseldorf 2000	Commentary on a meta-analysis: Dusseldorp 1999
Dusseldorp 1999	Systematic Review: 12 references identified and reviewed as being of potential interest to this review
Engblom 1992	Performance bias: Intervention multifactorial involves exercise and psychological therapy
Engblom 1994	Performance bias: Intervention multifactorial involves exercise and psychological therapy
Engblom 1996	Performance bias: Intervention multifactorial involves exercise and psychological therapy
Engblom 1997	Performance bias: Intervention multifactorial involves exercise and psychological therapy
Enzenhofer 2004	Identified from Beranova 2007. Not relevant outcomes.
Eshah 2009	Systematic Review: 8 references identified and reviewed as being of potential interest to this review

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

(*Continued*)

Espinosa 2004	Education not primary aim of intervention- Performance bias
Fattirolli 1998	Education not primary aim of intervention: Exercise intervention
Fernandez 2009	Intervention cognitive behavioural therapy compared with standard cardiac rehabilitation (including education)
Frasure-Smith 1997	Education not primary aim of intervention: Individualised psychological intervention
Fredericks 2009	Individualised educational intervention in CABG patients: Study designed to investigate the time of delivery of education - both groups received the same intervention
Fredericks 2009a	Systematic Review: 7 references identified and reviewed as being of potential interest to this review
Froelicher 1994	Not relevant outcomes (patients recruited between 1977 and 79)
Gao 2007	Not education, exercise is the primary focus post CABG.
Ghali 2004	Commentary: paper excluded education not primary intervention
Goodman 2008	Follow-up period only 3 months post discharge from CABG.
Harbman 2006	Commentary on meta-analysis Clark, A.M., et al., Meta-analysis: Secondary prevention programs for patients with coronary artery. Annals of Internal Medicine, 2005. 143(9): p. 659-672+I87
Haskell 1994	Identified from Clark 2007. Education not primary aim of intervention
Hedback 1993	Education not primary aim of intervention - Performance bias
Hedback 2001	Education not primary aim of intervention - Performance bias
Heidarnia 2005	Not RCT *"experimental design"*
Hobbs 2002	Editorial referring to Shuldham 2002, Pre-CABG education. No relevant outcomes investigated.
Jackson 2009	Systematic Review: 0 references identified
Janz 1999	Identified from Clark 2009. No relevant outcomes.
Jenny 2001	Identifed from Beranova 2007. Outcomes; Effectiveness of education package in promoting learning only
Johansen 2003	Not education, psycho-social intervention, post MI.
Khunti 2007	Education not primary aim of intervention. Nurse led clinic.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

(*Continued*)

Koertge 2003	Identified from Eshah 2009. Education not primary aim of intervention (diet and stress management and social support)
Lindsay 2009	Education not primary aim of intervention: computer support group - comparison of moderated and unmoderated access
Mayou 2002	Education not primary aim of intervention
McGillion 2004	Systematic Review: 0 references identified
McGillion 2008	Education not primary aim of intervention: Psychological intervention - cognitive behavioural therapy
McGillion 2008a	Education not primary aim of intervention-Psychological intervention
Moore 2002	Identified from Fredericks 2009. Education not primary aim of intervention. Symptom management program using audiotapes
Mosca 2010	No relevant outcomes
Mullen 1992	Duplicate of Dolan 1992; Systematic Review: 0 references identified (all pre1990)
Murchie 2003	Education not primary aim of intervention: secondary prevention clinic
Murchie 2004	Education not primary aim of intervention: secondary prevention clinic
Neubeck 2009	Systematic Review: 11 references identified and reviewed as being of potential interest to this review
Niebauer 1997	Identified from Clark 2007. Education not primary aim of intervention (exercise and low fat diet)
Nisbeth 2000	Education not primary aim of intervention: psychological intervention
Nordmann 2001	Education not primary aim of intervention: case management - not relevant outcomes (only risk factor modification)
Oldenburg 1995	Education not primary aim of intervention: psychological intervention
Ornish 1990	Identified from Clark 2007. Education not primary aim of intervention
Ornish 1998	Education not primary aim of intervention: lifestyle regime
Paez 2006	Education not primary aim of intervention: nurse managed cholesterol control program
Parry 2009	No relevant outcomes
Raftery 2005	Education not primary aim of intervention
Redfern 2009	Non-standard RCT design with non-randomised control group.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

(*Continued*)

Robertson 2003	Not RCT. *"True experimental post-test only, control group design, including the process of randomisation."*
Rubenfire 2008	Commentary on a Systematic Review, subsequently reviewed and demonstrated: 9 references identified and reviewed as being of potential interest to this review
Sherrard 2000	Education not primary aim of intervention, combined with psychological counselling and no relevant outcomes
Shuldham 2001	Systematic Review: 0 references identified
Shuldham 2002	pre-CABG education. No relevant outcomes investigated.
Sinclair 2005	Follow-up only 100 days.
Thompson 2000	Identified from Hanssen 2007. Review not an RCT
Thompson 2002	Identified from Hanssen 2007. Review not an RCT
Tranmer 2004	Education not primary aim of intervention, telephone nurse management
Turner 2008	Cost analysis of Khunti 2007; Education not primary aim of intervention
Vale 2003	Education not primary aim of intervention: Program is a risk factor targeted prompting of treatment
van Elderen 1994	No relevant outcomes.
van Elderen 2001	Not RCT -*" quasi-experimental pre-test / post test control group design."*
Vonder 2002	Identified from Eshah 2009. Not RCT: Retrospective Study
Wallner 1999	Dietary intervention, Education not primary aim of intervention
Williams 2009	Systematic Review: 0 references identified.
Zalesskaya 2005	No relevant outcomes.
Zhao 2009	Education not primary aim of intervention-Performance bias
Zutz 2007	Identified from Neubeck 2009. No relevant outcome measures

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Characteristics of studies awaiting assessment *[ordered by study ID]*

Wang 2007

Methods	
Participants	
Interventions	
Outcomes	
Notes	Unable to gain access to paper.

Williamson 2008

Methods	RCT
Participants	Post CABG patients. n=88
Interventions	Weekly, individualized, telephone, educational intervention.
Outcomes	Difficult to ascertain from abstract alone
Notes	Abstract only

Characteristics of ongoing studies *[ordered by study ID]*

Hawkes 2009

Trial name or title	Randomised controlled trial of secondary prevention program for myocardial infarction patients ('ProActive Heart')
Methods	RCT
Participants	Post MI patients recruited from Brisbane Hospitals.
Interventions	6 month telephone delivered secondary prevention program
Outcomes	SF-36, Cost-effective analysis
Starting date	December 2007
Contact information	
Notes	Hawkes 2009

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Lear 2008

Trial name or title	Randomised Trial of Cardiac Rehabilitation Program Delivered Remotely through the Internet
Methods	RCT
Participants	Men and Women > 18. Diagnosed Ischaemic Heart Disease. Aim to recruit 74 patients from consecutive inpatient admissions with acute coronary syndrome or revascularisation procedure
Interventions	4 month interactive Internet based CR program. Input from nurse, dietitian and exercise specialist
Outcomes	Healthcare utilisation at 16 months
Starting date	
Contact information	Dr S.C. Lear. slear@providencehealth.bc.ca
Notes	clinicaltrials.gov identifier NCT00683813

McGillion 2006

Trial name or title	A Psychoeducation Trial for People with Chronic Stable Angina
Methods	RCT
Participants	CHD for at least 6 months
Interventions	Supportive and educational self-management program (Chronic Angina Self-Management Program (CASMP)
Outcomes	HRQofL (SF-36 and SAQ)
Starting date	9/2003
Contact information	Dr MH McGillion, University of Toronto, Toronto, Ontario, Canada M5T 1P8
Notes	clinicaltrails.gov identifier NCT00350922

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

DATA AND ANALYSES

Comparison 1. Total Mortality

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Total mortality at the end of the follow up period	6	2330	Risk Ratio (M-H, Random, 95% CI)	0.79 [0.55, 1.13]

Comparison 2. Cardiovascular Events

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Myocardial Infarction at the end of the follow up period	2	209	Risk Ratio (M-H, Random, 95% CI)	0.63 [0.26, 1.48]

Comparison 3. Revascularisations

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patients requiring Coronary Artery Bypass Grafting (CABG) at end of follow-up period	2	209	Risk Ratio (M-H, Random, 95% CI)	0.58 [0.19, 1.71]

Comparison 4. Hospitalisations

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Cardiac Hospitalisations at end of follow up period	4	12905	Risk Ratio (M-H, Random, 95% CI)	0.83 [0.65, 1.07]

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Comparison 5. All cause withdrawal / drop-out at follow-up

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 All cause withdrawal / drop-out at follow-up	8	2862	Risk Ratio (M-H, Random, 95% CI)	1.03 [0.83, 1.27]

Analysis 1.1. Comparison 1 Total Mortality, Outcome 1 Total mortality at the end of the follow up period.

Review: Patient education in the management of coronary heart disease

Comparison: 1 Total Mortality

Outcome: 1 Total mortality at the end of the follow up period

Study or subgroup	Intervention n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Clark 2000	14/309	8/261		15.1 %	1.48 [0.63, 3.47]
Clark 2009	9/391	8/184		12.9 %	0.53 [0.21, 1.35]
Cupples 1994	47/342	65/346		50.5 %	0.73 [0.52, 1.03]
Lisspers 1999	1/46	6/41		2.9 %	0.15 [0.02, 1.18]
P.RE.COR Group 1991	5/61	4/61		7.5 %	1.25 [0.35, 4.43]
Hanssen 2007	7/156	7/132		11.1 %	0.85 [0.30, 2.35]
Total (95% CI)	**1305**	**1025**		**100.0 %**	**0.79 [0.55, 1.13]**

Total events: 83 (Intervention), 98 (Control)

Heterogeneity: $Tau^2 = 0.04$; $Chi^2 = 5.96$, df = 5 (P = 0.31); $I^2 = 16\%$

Test for overall effect: Z = 1.29 (P = 0.20)

Test for subgroup differences: Not applicable

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Analysis 2.1. Comparison 2 Cardiovascular Events, Outcome 1 Myocardial Infarction at the end of the follow up period.

Review: Patient education in the management of coronary heart disease

Comparison: 2 Cardiovascular Events

Outcome: 1 Myocardial Infarction at the end of the follow up period

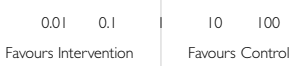
Study or subgroup	Experimental n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Lisspers 1999	0/46	2/41		8.2 %	0.18 [0.01, 3.62]
P.RE.COR Group 1991	7/61	10/61		91.8 %	0.70 [0.29, 1.72]
Total (95% CI)	**107**	**102**		**100.0 %**	**0.63 [0.26, 1.48]**

Total events: 7 (Experimental), 12 (Control)

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.74$, df = 1 (P = 0.39); $I^2 = 0.0\%$

Test for overall effect: Z = 1.07 (P = 0.29)

Test for subgroup differences: Not applicable



Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Analysis 3.1. Comparison 3 Revascularisations, Outcome 1 Patients requiring Coronary Artery Bypass Grafting (CABG) at end of follow-up period.

Review: Patient education in the management of coronary heart disease

Comparison: 3 Revascularisations

Outcome: 1 Patients requiring Coronary Artery Bypass Grafting (CABG) at end of follow-up period

Study or subgroup	Experimental n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Lisspers 1999	3/46	6/41		68.1 %	0.45 [0.12, 1.67]
P.RE.COR Group 1991	2/61	2/61		31.9 %	1.00 [0.15, 6.87]
Total (95% CI)	**107**	**102**		**100.0 %**	**0.58 [0.19, 1.71]**

Total events: 5 (Experimental), 8 (Control)

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.46$, df = 1 (P = 0.50); $I^2 = 0.0\%$

Test for overall effect: Z = 0.99 (P = 0.32)

Test for subgroup differences: Not applicable

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Analysis 4.1. Comparison 4 Hospitalisations, Outcome 1 Cardiac Hospitalisations at end of follow up period.

Review: Patient education in the management of coronary heart disease

Comparison: 4 Hospitalisations

Outcome: 1 Cardiac Hospitalisations at end of follow up period

Study or subgroup	Intervention n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Esposito 2008	432/8821	184/3605		55.2 %	0.96 [0.81, 1.14]
Hanssen 2007	26/156	32/132		20.9 %	0.69 [0.43, 1.09]
Lisspers 1999	19/46	21/41		21.3 %	0.81 [0.51, 1.27]
Southard 2003	2/53	7/51		2.6 %	0.27 [0.06, 1.26]
Total (95% CI)	**9076**	**3829**		**100.0 %**	**0.83 [0.65, 1.07]**

Total events: 479 (Intervention), 244 (Control)

Heterogeneity: $Tau^2 = 0.02$; $Chi^2 = 4.42$, df = 3 (P = 0.22); I^2 =32%

Test for overall effect: Z = 1.42 (P = 0.16)

Test for subgroup differences: Not applicable

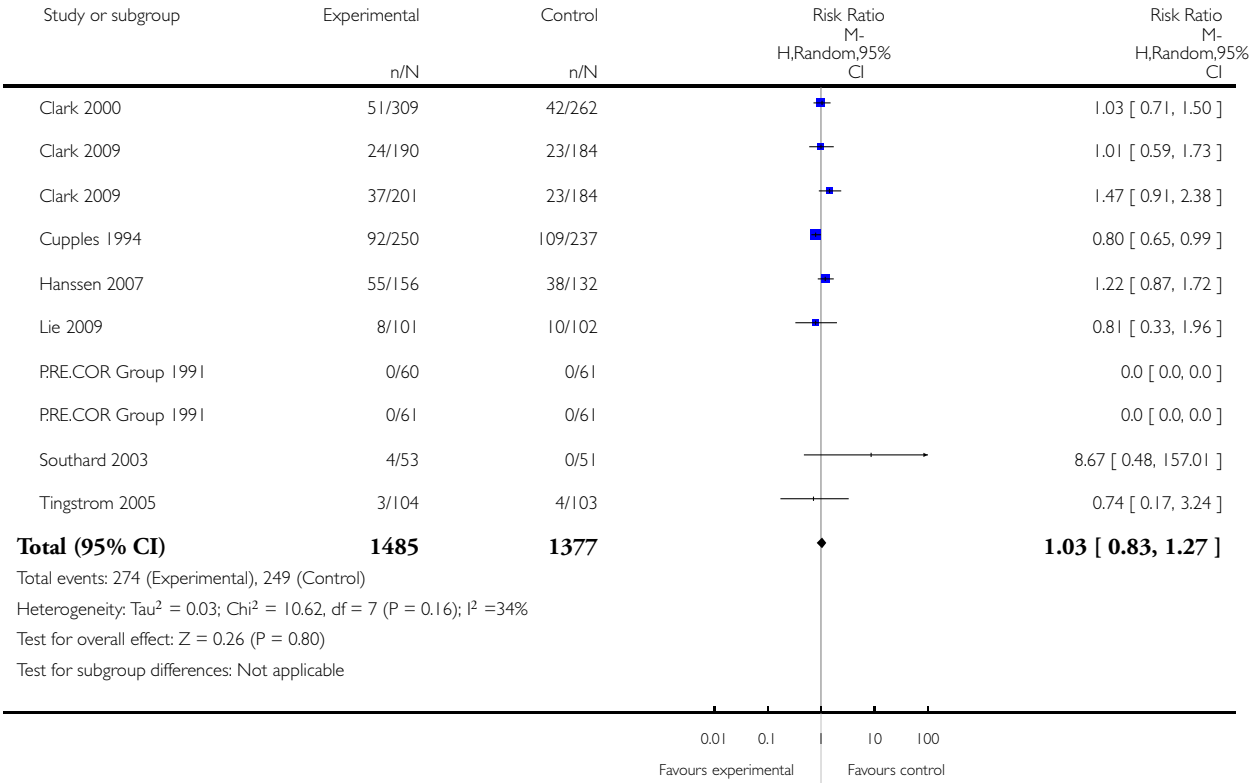
Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Analysis 5.1. Comparison 5 All cause withdrawal / drop-out at follow-up, Outcome 1 All cause withdrawal / drop-out at follow-up.

Review: Patient education in the management of coronary heart disease

Comparison: 5 All cause withdrawal / drop-out at follow-up

Outcome: 1 All cause withdrawal / drop-out at follow-up



ADDITIONAL TABLES

Table 1. Summarising educational content of programs in included studies

	Description of Intervention	Theoretical Basis	Tailored	Duration	One to One	Group	Face to Face	Telephone	Internet	Notes
Clark 1997	*PRIDE	Y	Y	Once a week for 4 weeks		Y	Y			Taught by health educator.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 1. Summarising educational content of programs in included studies (*Continued*)

										Videotape and workbook aids.
Clark 2000	*PRIDE	Y	Y	Once a week for 4 weeks		Y	Y			Taught by health educator. Videotape and workbook aids.
Clark 2009	*PRIDE	Y	Y	Once a week for 6 weeks	Y	Y	Y			3 groups (self-directed and group intervention and a control)
Cupples 1994	Practical tailored advice on cardiovascular risk factors and appropriate health education	N/S	Y	3 times a year for 2 years	Y		Y			Delivered at home by health visitor
Esposito 2008	Predesigned scripts to provide education on various aspects of care, geared to personalised clinical goals	N/S	Y	Average 1.1 contacts a month for 18 months	Y		Y	Y		Nurse case manager, primarily by telephone but also face to face
Hanssen 2007	Individualised education from a menu of topics	Y	Y	6 months (8 sessions in total)	Y			Y		Structured element and an on-call element

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 1. Summarising educational content of programs in included studies (*Continued*)

	to be covered									
Lie 2009	A psychoeducative intervention. Structured information and psychological support	N/S	N/S	2 visits (1 hour each)	Y		Y			Critical care nurse, home based.
Lisspers 1999	Health education and achievement of behavioural change.	N/S	Y	4 week residential then 11 month one to one individual sessions	Y	Y	Y			Trained nurses (personal coaches) . Seminars, lectures, discussion and skills sessions
P.RE.Cor Group 1991	Education and counselling on management of cardiovascular risk factors and exercise	N/s	Y	1 group session, 1 individual session with cardiologist	Y	Y	Y			Multidisciplinary input to group. Cardiologist tailors therapy
Piekes 2009	Variable - nurse provision of patient education.	N/s	N/S	1-2.5 times a month for an average of 30 months	Y			Y		15 different programs, majority telephone, one-to-one
Pogosova 2008	Structured program	Y	N/S	6 Sessions (twice a week, 90		Y	Y			

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 1. Summarising educational content of programs in included studies (*Continued*)

	addressing different risk factors in each session			mins)						
Southard 2003	Modular internet sessions, Interactive multiple choice and self tests followed by feedback	N/S	N/S	Once a week for 6 months (at least 30 mins)	Y	Y			Y	Communication with case manager and on-line discussion group
Tingstrom 2005	Problem based rehabilitation to teach a planned curriculum	Y	N/S	13 sessions over 1 year		Y	Y			Trained Facilitator

PRIDE = **P**roblem Identification, **R**esearching one's routine, **I**dentifying a management goal, **D**eveloping a plan to reach it, **E**xpressing one's reactions and **E**stablishing rewards for making progress.
Y = Yes
N/S = Not Stated

Table 2. Table: All-cause withdrawal / drops out at follow-up

Study		Number Randomised	Number Lost at Follow-up*	Notes
Clark 2000	Intervention	309	51	36 withdrew, 14 died, 1 data missing
	Control	262	42	33 withdrew, 8 died, 1 data missing
Clark 2009	Intervention	201	37	Self-directed program 33 withdrew, 4 died
	Intervention	190	24	Group format 19 withdrew, 5 died

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 2. Table: All-cause withdrawal / drops out at follow-up (*Continued*)

	Control	184	23	15 withdrew, 8 died
Cupples 1994	Intervention	250	92	45 defaulted, 47 died 21 defaulted at 2 yrs
	Control	237	109	44 defaulted, 65 died 25 defaulted at 2 yrs
Hanssen 2007	Intervention	156	55	40 withdrew, 7 died, 8 missing data
	Control	132	38	21 withdrew, 7 died, 10 missing data
Lie 2009	Intervention	101	8	6 withdrew, 2 medical exclusions
	Control	102	10	5 withdrew, 5 medical exclusions
P.RE.COR 1991	Intervention	60	0	Comprehensive cardiac rehabilitation
	Intervention	61	0	Counseling program without exercise
	Control	61	0	
Southard 2003	Intervention	53	4	*Reasons for drop out stated;* Relocation, dietary intervention instead, psychiatric diagnosis, loss of interest
	Control	51	0	
Tingstrom 2005	Intervention	104	3	Out of the 7 lost to follow-up 2 died and 5 did not attend
	Control	103	4	
Combined Results	**Intervention**	**1485**	**274**	**18.5%**
	Control	**1132**	**226**	**20.0%**

* All causes of drop out from follow up included (including mortality)

Table 3. Table summarising HRQofL data: *Specific HRQofL Measures 1*

Seattle Angina Questionnaire					
Lie 2009 (6 months)	**Absolute mean (SD) outcome values at follow-up**				**Comparison**
	Rx	**p-value**	**Control**	**p-value**	

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 3. Table summarising HRQofL data: *Specific HRQofL Measures 1* (*Continued*)

Physical Limitation	86.4(15.6)	p<0.001	83.2(18.7)	p<0.001	Rx=Control
Angina Frequency	91.7(16.6)	p<0.001	90.8(18.9)	p<0.001	Rx=Control
Treatment Satisfaction	89.2(15.4)	NS	88.0(16.1)	NS	Rx=Control
Disease Perception	77.8(20.2)	p<0.001	73.9(24.2)	p<0.001	Rx=Control

Table 4. Table summarising HRQofL data: *Specific HRQofL Measures 2*

AP-QLQ (Angina Pectoris - Quality of Life Questionnaire)				
Lisspers 1999 (24 Months)	**Mean (SD) score at follow-up**		**Between group p-value**	**Comparison**
	Rx	**Control**		
QLQ (Total)	4.7(0.8)	4.3(1.0)	NS	Rx=Control
Somatic symptoms	4.8(1.0)	4.3(1.1)	NS	Rx=Control
Physical Activity	4.8(1.0)	4.1(1.2)	NS	Rx=Control
Emotional Distress	4.8(0.8)	4.6(1.1)	NS	Rx=Control
Life Satisfaction	4.2(1.0)	3.9(1.2)	NS	Rx=Control

Figures quoted represent an absolute score on a self-rating scale.

Table 5. Table summarising HRQofL data: *Generic HRQofL Measures 1*

SF-36* (Short Form 36 item survey)			
	Between group difference in mean change from baseline (95% CI) at follow-up	**Between group p-value**	**Comparison**
Hanssen 2007 (6 months)			
Overall Physical	-2.33 (-4.54,-0.12)	0.039	Rx=Control
Physical Functioning	-1.16 (-3.28,0.95)	0.28	Rx=Control

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 5. Table summarising HRQofL data: *Generic HRQofL Measures 1* (*Continued*)

Role Physical	-1.84 (-5.32,1.64)	0.299	Rx=Control
Bodily Pain	-1.74 (-4.54,1.05)	0.22	Rx=Control
General Health	-0.36 (-2.64,1.91)	0.752	Rx=Control
Overall Mental	1.07 (-1.71,3.86)	0.447	Rx=Control
Vitality	-0.07 (-2.23,2.10)	0.951	Rx=Control
Social Functioning	0.36 (-2.96,3.67)	0.832	Rx=Control
Role Emotional	0.78 (-3.29,4.84)	0.706	Rx=Control
Mental Health	0.4 (-1.81,2.60)	0.723	Rx=Control
Hanssen 2007 (18 months)			
Overall Physical	-1.44 (-3.89,1.02)	0.25	Rx=Control
Physical Functioning	-0.79 (-3.06,1.48)	0.491	Rx=Control
Role physical	-0.94 (-4.76,2.88)	0.627	Rx=Control
Bodily Pain	-0.77 (-4.00,2.47)	0.641	Rx=Control
General Health	0.25 (-2.15,2.64)	0.838	Rx=Control
Overall Mental	1.65 (-1.35,4.65)	0.28	Rx=Control
Vitality	0.58 (-1.95,3.12)	0.65	Rx=Control
Social Functioning	0.55 (-3.95,2.85)	0.751	Rx=Control
Role Emotional	2.59 (-1.58,6.77)	0.221	Rx=Control
Mental Health	0.31 (-2.11,2.73)	0.8	Rx=Control

* Negative baseline-follow-up difference favours intervention and positive favours control.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 6. Table summarising HRQofL data: *Generic HRQofL Measures 2*

SF-36* (Short Form 36 item survey)				
Tingstrom 2005 (12 months)	**Mean change from baseline (SD)**		**Between group p-value+**	**Comparison**
	Rx	**Control**		
Physical Functioning	3.6 (17.6)	4.4 (15.1)	0.749	Rx=Control
Role Physical	38.2 (46.9)	33.8 (42.4)	0.504	Rx=Control
Bodily Pain	5.69 (31.1)	6.18 (29.1)	0.911	Rx=Control
General Health	1.4 (15.9)	1.8 (16.3)	0.862	Rx=Control
Vitality	5.3 (22.7)	4.9 (21.8)	0.921	Rx=Control
Social Functioning	9.7 (24)	9.1 (25.3)	0.869	Rx=Control
Role Emotional	15.8 (48.1)	16.5 (41.1)	0.913	Rx=Control
Mental Health	2.9 (16.6)	4.2 (17.8)	0.566	Rx=Control

*Positive values indicate improvement in HRQofL from baseline
+p-values are calculated on the difference between groups at pre-test and on the mean change (post test minus pre-test).

Table 7. Table summarising HRQofL data: *Generic HRQofL Measures 3*

SF-36 (Short Form 36 item survey)			
Pogosova 2008 (12 months)	**Mean change from baseline p-value**		**Comparison**
	Control	**Rx**	
Overall Physical	p>0.05	p≤0.05	**Favours Rx**
Physical Functioning	p>0.05	p≤0.05	**Favours Rx**
Bodily Pain	p>0.05	p≤0.05	**Favours Rx**
Overall Mental	p>0.05	p≤0.05	**Favours Rx**
Vitality	p>0.05	p≤0.05	**Favours Rx**
Social Functioning	p>0.05	p≤0.05	**Favours Rx**

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 7. Table summarising HRQofL data: *Generic HRQofL Measures 3* (*Continued*)

Mental Health	p>0.05	p≤0.05	**Favours Rx**

There were no significant changes demonstrated in the control group but no statistical comparison of the mean change between the groups was reported.

Table 8. Table summarising HRQofL data: *Generic HRQofL Measures 4*

SF-36 (Short Form 36 item survey)					
Lie 2009 (6 months)	**Absolute mean (SD) outcome values at follow-up**				**Comparison**
	Rx	**p-value**	**Control**	**p-value**	
Overall Physical	47.4 (9.6)	p<0.001	47 (10)	p<0.001	Rx=Control
Physical Functioning	82.2 (19.2)	p<0.001	82.3 (19.8)	p<0.001	Rx=Control
Role Physical	64 (41.2)	p<0.001	57.2 (43.3)	p<0.001	Rx=Control
Bodily Pain	77.2 (22.3)	p<0.001	78.5 (25.2)	p<0.001	Rx=Control
General Health	69.9 (23.3)	NS	65.7 (27.2)	NS	Rx=Control
Overall Mental	52.1 (10.7)	p<0.05	50.5 (10.8)	NS	**Favours Rx**
Vitality	61.9 (23.9)	p<0.001	60.5 (21.6)	p<0.001	Rx=Control
Social Functioning	86.3 (21.4)	p<0.001	84.3 (21.9)	p<0.001	Rx=Control
Role Emotional	73.3 (38.2)	p<0.01	67.4 (41.6)	p<0.01	Rx=Control
Mental Health	81.9 (17.3)	p<0.001	78.5 (21)	p<0.01	Rx=Control

Table 9. Table summarising HRQofL data: *Generic HRQofL Measures 5*

Nottingham Health Profile+				
Cupples 1994 (24 months)	**Mean change from baseline (SD) at follow-up**			**Comparison**
	Rx	**Control**	**Between group p-value**	

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 9. Table summarising HRQofL data: *Generic HRQofL Measures 5* (*Continued*)

Emotional Reaction	-0.79 (19.52)	-1.91 (21.31)	0.52	Rx=Control
Energy	-3.88 (33.97)	-6.52 (35.87)	0.33	Rx=Control
Physical Mobility	-1.49 (16.17)	-6.19 (18.12)	0.003	**Rx>Control**
Pain	-1.23 (20.5)	-2.7 (23.46)	0.92	Rx=Control
Sleep	-1.67 (26.22)	-0.1 (24.95)	0.38	Rx=Control
Social Isolation	1.42 (16.96)	-3.01 (21.27)	0.08	Rx=Control

+ Higher scores reflect poorer quality of life

Table 10. Table summarising HRQofL data: *Generic HRQofL Measures 6*

Nottingham Health Profile+			
Cupples 1994 (60 months)	**Mean difference (95% CI) between groups in change from baseline at follow-up**	**Between group p-value**	**Comparison**
Emotional Reaction	-2.1 (-7.5,3.3)	NS	Rx=Control
Energy	-4.7 (-13.2,3.7)	NS	Rx=Control
Physical Mobility	-1.3 (-6.3,3.6)	<0.05	**Rx>Control**
Pain	-3.4 (-9.2,2.3)	<0.05	**Rx>Control**
Sleep	-2.4 (-9.3,4.5)	NS	Rx=Control
Social Isolation	0.0 (-4.3,4.3)	NS	Rx=Control

+ Higher scores reflect poorer quality of life
The value quoted is the mean difference (CI) between groups from baseline to follow-up
p-value related to t-tests (two tailed)

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 11. Table summarising HRQofL data: *Generic HRQofL Measures 7*

Sickness Impact Profile+++				
	Absolute mean outcome values at follow-up++			**Comparison**
	Rx	**Control**	**Between group p-value**	
Clark 1997 (12 months)				
Total Score	7.26	8.09	NS	Rx=Control
Psychosocial Dimension	5.52	7.05	≤0.05	**Rx>Control**
Physical Dimension	5.89	6.00	NS	Rx=Control
Clark 1997 (18 months)				
Total Score	7.93	7.41	NS	Rx=Control
Psychosocial Dimension	6.05	6.23	NS	Rx=Control
Physical Dimension	6.40	5.25	NS	Rx=Control

++ for mean scores at follow-up (adjusted for baseline scores)
+++lower score higher HRQofL

Table 12. Table summarising HRQofL data: *Generic HRQofL Measures 8*

Sickness Impact Profile				
Clark 2000 (12 months)	**Absolute means at follow-up++**			**Comparison**
	Rx	**Control**	**Between group p-value**	
Psychosocial Dimension	5.15	5.91	0.144	Rx=Control
Physical Dimension	7.09	7.66	0.05	**Rx>Control**

Means were adjusted to take account of baseline values.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 13. Table summarising HRQofL data: *Generic HRQofL Measures 9*

Sickness Impact Profile					
	Absolute means (SD) at follow-up				Comparison
	Rx group	Rx self directed	Control	Between group p-value	
Clark 2009 (12 months)					
Total Score	8.13 (8.63)	9.79 (10.17)	9.49 (9.46)	NS	Rx=Control
Psychosocial Dimension	5.84 (8.02)	7.31 (10.74)	6.75 (9.39)	NS	Rx=Control
Physical Dimension	8.07 (9.63)	9.46 (10.11)	9.85 (10.79)	NS	Rx=Control
Clark 2009 (18 months)					
Total Score	8.44 (9.13)	8.98 (10.29)	9.64 (9.45)	NS	Rx=Control
Psychosocial Dimension	5.74 (9.68)	6.16 (8.20)	7.17 (10.40)	NS	Rx=Control
Physical Dimension	8.27 (10.02)	8.98 (9.33)	9.65 (10.19)	NS	Rx=Control

n.b. the analysis of this data was reported in the paper but the individual results were not. These have been obtained by direct contract with the author.

Table 14. Table summarising HRQofL data: *Generic HRQofL Measures 9*

Patients' Assessment of their Quality of Life on a five-point scale						
Cupples 1994 (24 months)	**Initial scores (% of patients)**		**Follow-up Scores (% of patients)**		**Between group p-value**	**Comparison**
	Rx	**Control**	**Rx**	**Control**	p<0.03	**Rx>Control**
Poor	6.3	5.3	6.9	8.3		
Fair	27.8	23.3	18.9	21.7		
Average	35	39	33.1	33.7		
Good	22.7	22.7	29.3	25.3		

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 14. Table summarising HRQofL data: *Generic HRQofL Measures 9* (*Continued*)

Very Good	8.2	9.7	11.7	11		

n.b. for Table 13 the between group p value represents the overall "comparison of change in individuals' assessment for intervention and control groups" the significant difference being in favour of the intervention group.

For all tables summarising HRQofL Data (Tables 2-13)

Rx: Intervention

NS: No significant difference demonstrated

Rx=Control: no significant difference (p>0.05) in HRQof L between the intervention and the control groups at follow-up.

Rx>Control: significant difference (p≤0.05) in HRQofL in favour of the intervention group at follow-up.

Control>Rx: significant difference (p≤0.05) in HRQofL in favour of the control group at follow-up.

Favours Rx: Available evidence favours the intervention group but direct statistical comparison between intervention and control groups was not reported.

Favours Control: Available evidence favours the control group but direct statistical comparison between intervention and control groups was not reported**.**

Table 15. Table: Cost summary of intervention & comparison of health care costs incurred by intervention & control groups during follow-up period

Variable	**Clark 2000**	**Cupples 1994**	**Esposito 2008**				**Southard 2003**	**Peikes 2009**
Follow-up	24 months	24 months	6 months	7-12 months	12 months	18 months	6 months	25 months
Year of Costs	2000	NR	2005-6				NR	2002-2005
Currency	US$	GBP£	US$				US$	US$
Mean cost of cardiac rehabilitation program per patient								
Total Costs	$187	£49.72	$162				$453	$196
Costs Considered	Personnel, Instructional Materials, Telephone Supplies, Ongoing Staff Training	Direct Costs by Health Visitors (Staff Time) , Travel Costs.	Average monthly fee paid to the program per member				Nurse Salary Overheads Subscription Costs	Average monthly fee paid to the program per member
Comments	Participating site overheads were not measured,	Costs of the health visitor also included time spent						Cost varied between the included 15 studies. Ne-

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 15. Table: Cost summary of intervention & comparison of health care costs incurred by intervention & control groups during follow-up period (*Continued*)

	a "conservatively high" estimate of these was taken to double the cost of the Rx to $374	recording data collection for the study						go-tiated locally with center of Medicare and Medicaid Services. (Range $50-$444)
Mean total healthcare costs per patient								
Total Cost (Intervention)	$3300 (calc)	£1801	$1627	$2356	$2288	$1793	$635	$1283 *
Total Cost (Control)	$6500	£1812	$1632	$2464	$2372	$1818	$2053	$1314 *
Between Group Difference	$1800*	£9.60	$5	$107	$84	$25	$1418	$144 (80% CI 99 to 188)
p value	NR	NS	0.895	0.077	0.132	0.365	NR	<0.001
Cost Saving per pt (when cost of intervention taken into account$)	$1610 or $1420 if estimated overheads are included.	£40	-$157	-$55	-$78	-$137	$965	-$52
Additional Healthcare Costs Considered	Number of Admissions (Heart Related), Number of inpatient days, In patient cost. Emergency Dept costs	Prescription of drugs, visits to the GP, Visits to hospital as inpatients and outpatients, all tests investigations and treatments carried out	Medicare Medical Claims				Cardiovascular related emergency room visits and hospitalisations	

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 15. Table: Cost summary of intervention & comparison of health care costs incurred by intervention & control groups during follow-up period (*Continued*)

Comments	Expenditure was calculated from differences in % utilisation of hospital services. i.e. Hospital charges for participants were on average 49% lower and the average annual expenditure was $6500 * There was a calculated saving of a hospital charge of $3200, the ratio of payments to charges was 0.56 therefore $1800 actual saving.	There was a difference in the drug usage at baseline which is not accounted for in these figures although this would make minimal impact to the results. The intervention group were more costly for drugs, procedures and service use	Claims quoted are per member per month.		*Expenditure/ pt/month enrolled Overall costs were increased by 11% when the care coordination fees were taken into account
Summary Difference Between Groups	**Favours Rx**	Rx=Control	Rx=Control (for all time periods studied)	**Favours Rx**	**Favours Control**

§ = Negative mean difference indicates a net cost of the intervention group
NR = Not Recorded
NS = Not Significant

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

APPENDICES

Appendix 1. Search strategies

THE COCHRANE LIBRARY (CENTRAL/ CDSR / DARE / HTA/ NHSEDD)

#1 MeSH descriptor Myocardial Infarction explode all trees
#2 MeSH descriptor Angina Pectoris explode all trees
#3 MeSH descriptor Coronary Disease explode all trees
#4 MeSH descriptor Myocardial Revascularization explode all trees
#5 myocardial infarct*
#6 angina pectoris
#7 angor pectoris
#8 stenocardia*
#9 coronary artery bypass*
#10 CABG
#11 aortocoronary bypass*
#12 coronary NEAR/3 angioplast*
#13 PTCA
#14 coronary NEAR/2 dilatation*
#15 coronary NEAR/2 disease*
#16 coronary artery stent*
#17 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16)
#18 MeSH descriptor Health Education, this term only
#19 MeSH descriptor Telemedicine, this term only
#20 (patient* NEAR/6 (educat* or communicat* or interacti* or inform* or advi*))
#21 (educat* NEAR/6 (intervention* or rehabilation* or program*))
#22 (education NEAR/6 (service* or group* or program* or session*))
#23 education NEAR/6 prevent*
#24 ((rehabilitati* or educat*) NEAR/6 (literature or audiovisual or av or audio-visual or Internet or web* or telecare or telemedicine or telephone* or phone* or teleconference* or telehealth or transtelephonic* or podcast* or email* or e-mail* or mp3*))
#25 ((educat* or intervent*) NEAR/6 (communit* or famil* or spouse* or nurs*))
#26 MeSH descriptor Patient Education as Topic, this term only
#27 (#18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26)
#28 (#17 AND #27)

MEDLINE SEARCH STRATEGY (OVID)

1 Myocardial Infarction/
2 Coronary Artery Bypass/
3 Angina Pectoris/
4 Angioplasty, Transluminal, Percutaneous Coronary/
5 Coronary Disease/pc, rh, th [Prevention & Control, Rehabilitation, Therapy]
6 (PTCA or CABG).tw.
7 “coronary heart disease”.tw.
8 “angina pectoris”.tw.
9 or/1-8
10 Patient Education as Topic/
11 Health Education/
12 Psychotherapy, Group/
13 Health Promotion/
14 Telemedicine/
15 Counseling/
16 “Continuity of Patient Care”/
17 Self Care/
18 behavior therapy/ed, mt

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

19 (behavio?r* adj5 intervention*).tw.
20 (lifestyle* adj5 (intervention* or education*)).tw.
21 Health Knowledge, Attitudes, Practice/
22 Preventive Health Services/
23 Secondary Prevention/
24 risk reduction behavior/
25 Inpatients/ed [Education]
26 Outpatients/ed [Education]
27 consumer participation/
28 "cardiac rehabilitation".tw.
29 (rehabilitat* adj5 (service* or group* or program* or session* or educat*)).tw.
30 *rehabilitation/
31 audiovisual aids/
32 "patient information".tw.
33 "patient education".tw.
34 "education* intervention*".tw.
35 (behavio?r* adj5 educat*).tw.
36 (educat* adj5 rehabilitation).tw.
37 (program* and (literature or audiovisual or "av" or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
38 (rehabilitation and (literature or audiovisual or "av" or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
39 (instruction* and (literature or audiovisual or "av" or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
40 (teach* and (literature or audiovisual or "av" or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
41 (learn* and (literature or audiovisual or "av" or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
42 (educat* and (literature or audiovisual or "av" or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
43 ("public health" adj (intervention* or program* or scheme*)).tw.
44 "education* program*".tw.
45 psychoeducation*.tw.
46 educat*.tw.
47 (program* and (risk adj1 reduc*)).tw.
48 (patient* adj3 (instruct* or teach* or taught or learn* or knowledge)).tw.
49 "community based intervention*".tw.
50 or/10-49
51 Randomized Controlled Trials as Topic/
52 randomized controlled trial.pt.
53 controlled clinical trial.pt.
54 Controlled Clinical Trial/
55 placebos/
56 random allocation/
57 Double-Blind Method/
58 Single-Blind Method/
59 (random* adj2 allocat*).tw.
60 placebo*.tw.
61 ((singl* or doubl* or trebl* or tripl*) adj (blind* or mask*)).tw.
62 Research Design/
63 ((random* or control*) adj5 (trial* or stud*)).tw.
64 randomly.ab.
65 (randomized or randomised).ab.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

66 meta analysis as topic/
67 meta analysis.pt.
68 meta analy*.tw.
69 metaanaly*.tw.
70 meta analysis/
71 academic* review*.tw.
72 meta regress*.tw.
73 (systematic* adj (review* or overview* or synthes*)).tw.
74 (quantitative* adj (review* or overview* or sythes* or pool*)).tw.
75 research synthes*.tw.
76 (pool* adj4 result*).tw.
77 (pool adj4 estimate*).tw.
78 hand search*.tw.
79 manual search*.tw.
80 data extraction.ab.
81 (cochrane or medline or pubmed or embase or cinahl or psychinfo or pyschlit or "science citation index").tw.
82 or/51-81
83 9 and 50 and 82
84 (letter or editorial or comment).pt.
85 83 not 84
86 limit 85 to yr="1990 -Current"

EMBASE SEARCH STRATEGY (OVID)

1 heart infarction/
2 Coronary Artery Bypass Graft/
3 Angina Pectoris/
4 Transluminal Coronary Angioplasty/
5 Coronary Artery Disease/
6 (PTCA or CABG or "coronary artery stenting").tw.
7 ("MI" or "myocardial infarction").tw.
8 "coronary heart disease".tw.
9 "angina pectoris".tw.
10 or/1-8
11 secondary prevention/
12 10 and 11
13 heart infarction/rh or Coronary Artery Bypass Graft/rh or Angina Pectoris/rh or Transluminal Coronary Angioplasty/rh or Coronary Artery Disease/rh
14 12 or 13
15 Patient Education/
16 Health Education/
17 Telemedicine/
18 Patient Counseling/
19 Telehealth/
20 Self Care/
21 (behavio?r* adj5 intervention*).tw.
22 (lifestyle* adj5 (intervention* or education*)).tw.
23 Preventive Health Service/
24 "cardiac rehabilitation".tw.
25 (rehabilitat* adj5 (service* or group* or program* or session* or educat*)).tw.
26 heart rehabilitation/
27 rehabilitation center/
28 *rehabilitation/
29 health program/
30 community program/

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

31 audiovisual aids/
32 “patient information”.tw.
33 “patient education”.tw.
34 “education* intervention*”.tw.
35 (educat* adj5 rehabilitation).tw.
36 (program* adj5 (literature or audiovisual or “av” or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
37 (rehabilitation adj5 (literature or audiovisual or “av” or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
38 (education* adj5 (literature or audiovisual or “av” or Internet or website* or telecare or telemedicine or telephone or phone or teleconference or telehealth or transtelephonic* or podcast*)).tw.
39 “education* adj3 program*”.tw.
40 psychoeducation*.tw.
41 (program* and (risk adj1 reduc*)).tw.
42 “community based intervention*”.tw.
43 or/15-42
44 Randomized Controlled Trial/
45 Controlled study/
46 placebo/
47 controlled clinical trial/
48 random allocation/
49 Double Blind Procedure/
50 Single Blind Procedure/
51 (random* adj2 allocat*).tw.
52 placebo*.tw.
53 ((singl* or doubl* or trebl* or tripl*) adj (blind* or mask*)).tw.
54 ((random* or control*) adj5 (trial* or stud*)).tw.
55 randomly.ab.
56 (randomized or randomised).ab.
57 meta analysis/
58 meta analy*.tw.
59 metaanaly*.tw.
60 meta analysis/
61 academic* review*.tw.
62 “systematic review”/
63 (systematic* adj (review* or overview* or synthes*)).tw.
64 (quantitative* adj (review* or overview* or sythes* or pool*)).tw.
65 hand search*.tw.
66 manual search*.tw.
67 (cochrane or medline or pubmed or embase or cinahl or psychinfo or pyschlit or “science citation index”).ab.
68 or/44-67
69 14 and 43 and 68
70 10 and (15 or 16 or 17 or 19 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39)
71 68 and 70
72 69 or 71
73 *heart infarction/ or *Coronary Artery Disease/ or *Angina Pectoris/ or *Transluminal Coronary Angioplasty/
74 “coronary heart disease”.ti,ab.
75 73 or 74
76 43 and 68 and 75
77 72 or 76
78 limit 77 to yr=“1990 -Current”

PsycINFO SEARCH STRATEGY (EBSCO)

S1 TX “coronary heart disease”

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

S2 TX “coronary disease”
S3 TX myocardial infarct*
S4 TX angina pectoris
S5 TX stenocardia*
S6 TX coronary artery bypass*
S7 TX CABG or TX PCTA
S8 TX coronary N3 angioplast*
S9 TX myocardial revasculari*
S10 TX coronary artery revascularization or TX coronary artery revascularisation
S11 TX coronary revascularization or TX coronary revascularisation
S12 TX CHD
S13 DE “Heart Disorders” OR DE “Angina Pectoris” OR DE “Coronary Thromboses” OR DE “Myocardial Infarctions”
S14 TX aortocoronary bypass*
S15 S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14
S16 DE “Telemedicine”
S17 DE “Health Education”
S18 DE “Rehabilitation Education”
S19 TX cardiac rehabilitat*
S20 TX patient* educat*
S21 TX patient* information
S22 TX information provi*
S23 DE “Intervention” or DE “Early Intervention” OR DE “Family Intervention” OR DE “Group Intervention”
S24 DE “Lifestyle Changes” OR MM “Health Behavior
S25 DE ”Educational Counseling“
S26 S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23 or S24 or
S27 TX (audiovisual or av or audio-visual or Internet or web* or telecare or telemedicine or telephone* or phone* or teleconference* or telehealth or transtelephonic* or podcast* or email* or e-mail* or mp3*)
S28 TX educat*
S29 S27 and S28
S30 S26 or S29
S31 S15 and S30
S32 DE ”Between Groups Design“
S33 TX (random or randomly or randomised or randomized)
S34 TX controlled trial*
S35 TI (trial or trials or study or studies)
S36 S32 or S33 or S34 or S35
S37 S31 and S36
S38 PY 1990-2010
S39 S37 and S38

CINAHL SEARCH STRATEGY (EBSCO)

S1 (MH ”Myocardial Infarction“)
S2 (MH ”Coronary Disease+“)
S3 (MH ”Coronary Artery Bypass“)
S4 (MH ”Angioplasty, Transluminal, Percutaneous Coronary“)
S5 (MH ”Angina Pectoris“)
S6 TX coronary revasculari?ation
S7 TX CABG
S8 TX PTCA
S9 TX ”coronary heart disease“
S10 TX coronary N5 stent*
S11 TX ”angina pectoris“
S12 S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11
S13 (MH ”Rehabilitation“) or (MH ”Cardiac Rehabilitation) (Saba CCC)“)

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

S14 (MH "Rehabilitation Patients") or (MH "Rehabilitation, Cardiac") or (MH "Rehabilitation, Community-Based")
S15 (MH "Rehabilitation Nursing")
S16 (MH "Rehabilitation Centers")
S17 TX rehabil*
S18 (MH "After Care")
S19 TX (multidisciplinary N5 intervention*)
S20 TX (multidisciplinary N5 program*)
S21 TX "secondary prevention"
S22 S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21
S23 S12 and S22
S24 (MH "Patient Education+")
S25 TX patient* N5 educat*
S26 TX inpatient* N5 educat*
S27 TX outpatient* N5 educat*
S28 TX (audiovisual or AV or telemedicine or telecare or telehealth or transtelephonic or teleconferenc* or telephon* or phone or phoning or phones or podcast
S29 (MH "Audiovisuals")
S30 TX educat*
S31 psychoeducat*
S32 TX (Internet or website)
S33 S24 or S25 or S26 or S27 or S28 or S29 or S30 or S31 or S32
S34 S23 and S33
S35 (MH "Clinical Trials+")
S36 (MH "Double-Blind Studies") or (MH "Single-Blind Studies") or (MH "Triple-Blind Studies")
S37 (MH "Random Assignment") or (MH "Simple Random Sample") or (MH "Stratified Random Sample") or (MH "Systematic Random Sample")
S38 (MH "Placebos")
S39 TX randomi?ed controlled trial
S40 TX random* N5 trial*
S41 (MH "Systematic Review") or (MH "Cochrane Library")
S42 (MH "Meta Analysis")
S43 S35 or S36 or S37 or S38 or S39 or S40 or S41 or S42
S44 S34 and S43

CONTRIBUTIONS OF AUTHORS

All authors were involved in the conception and design of the protocol and the review. KW developed and ran the search strategy. JB and RST undertook the study selection, data extraction and risk of bias assessment. JB wrote the first draft of the protocol and review text. All authors contributed to the review and editing of subsequent draft versions. The final manuscript was approved by all authors.

DECLARATIONS OF INTEREST

None declared.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- NIHR, UK Cochrane Collaboration Programme Grant, UK.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

In the protocol we stated that we planned to use meta-regression and stratified meta-analyses to explore heterogeneity and to compare and investigate the different modalities of education delivery as well as to investigate particular subgroups of CHD patients. However, as outlined in the report of this review, there was insufficient data to undertake such analyses.

NOTES

Searches were completed in August 2010 after submission and finalisation of the revised protocol to Cochrane Heart Group. The protocol was published in December 2010.

INDEX TERMS

Medical Subject Headings (MeSH)

*Coronary Disease [economics; mortality; rehabilitation]; *Health Care Costs; *Health Status; *Patient Education as Topic; *Quality of Life; Health Services Needs and Demand [utilization]; Myocardial Infarction [prevention & control]; Randomized Controlled Trials as Topic

MeSH check words

Adult; Humans; Middle Aged

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.