Quality improvement report

Achieving national service framework standards for cardiac rehabilitation and secondary prevention

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Abstract

Problem Integrated care for patients who survive a myocardial infarction is lacking. Many patients are not offered cardiac rehabilitation, and secondary prevention is not optimal.

Design 12 month audit of 106 patients who survived an acute myocardial infarction.

Background and setting Carrick Primary Care Trust in Cornwall (population 98 500) and one district general hospital.

Key measures for improvement Proportion of patients who complete a cardiac rehabilitation programme after a myocardial infarction. Proportion of patients with optimal secondary prevention, as measured by smoking status, body mass index, cholesterol <5.0 mmol/l, and blood pressure $<140/85$ mm Hg.

Strategies for change We set up a novel, integrated, and seamless system for cardiac rehabilitation. We employed a cardiac liaison nurse to identify and assess in hospital all patients with suspected acute myocardial infarction. The nurse offered patients the choice of home based rehabilitation with the *Heart Manual* or hospital based rehabilitation. The nurse gave discharge details to the patient's general practice; these were to be included on a practice based register of coronary heart disease.

Effects of change All 106 eligible patients were offered cardiac rehabilitation and were included in a practice based register of coronary heart disease to facilitate long term follow up in primary care. 47 (44%) patients chose home based rehabilitation with the *Heart Manual*, and 41 (87%) of these completed the programme; 35 (33%) patients chose hospital based rehabilitation, and 17 (49%) of these completed the programme. The numbers of patients achieving secondary prevention targets improved significantly: those with serum cholesterol <5.0 mmol/l at discharge increased from 28% at baseline to 75% at 12 months. Optimal care (at least 80-90% uptake of an intervention) was seen with antiplatelet and statin treatments and with smoking cessation. Significantly more patients were prescribed statins at follow up than at baseline (77/106 *v* 80/91, P=0.005).

Lessons learnt National service framework targets for cardiac rehabilitation and secondary prevention can be achieved in patients who survive a myocardial infarction by integrating rehabilitation services (home and hospital) with secondary prevention clinics in primary care. Nurse led clinics in primary care facilitate long term structured care and optimal secondary prevention.

Background

Coronary heart disease is a major health problem in Europe and North America. In the United Kingdom, 150 000 people survive an acute myocardial infarction every year. Cardiac rehabilitation after myocardial infarction is a proven evidence based intervention,[1] the benefits of which have been confirmed in recent systematic reviews.[2 3] The uptake of cardiac rehabilitation, however, is poor.[3] Evidence from randomised control trials and a meta-analysis supports lifestyle and drug interventions in the secondary prevention of coronary heart disease.[4]

The national service framework for coronary heart disease, which was launched in March 2000, sets explicit standards for implementing secondary prevention measures (standard 3) and the provision of effective cardiac rehabilitation (standard 12).[5] In this era of accountability, the challenge for primary care trusts and their practices is to implement the evidence and the national service framework.

Calls have been made for different ways to provide cardiac rehabilitation, which traditionally has been hospital based.[6] Integration of secondary care and primary care services for patients who survive a heart attack has been advocated.[7] The availability of a home based programme to provide cardiac rehabilitation for patients after myocardial infarction (the *Heart Manual*—a step by step guide that directs patients through a structured programme of exercise, stress management, and education)[8] and the effectiveness of secondary prevention clinics in primary care in the Grampian region of Scotland[9] were instrumental in the setting up of a novel, seamless service for patients who survive a heart attack in Carrick, Cornwall.

Carrick Primary Care Trust uses an innovative method to provide cardiac rehabilitation for patients admitted to the Royal Cornwall Hospital, Truro.[10] The primary care trust funds cardiac liaison nurses, who link with primary care nurses trained in the secondary prevention of coronary heart disease. This allows the trust to implement and achieve the standards set for cardiac rehabilitation and secondary prevention in the national service framework.

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A list of general practices that participated is available on bmj.com

The problem

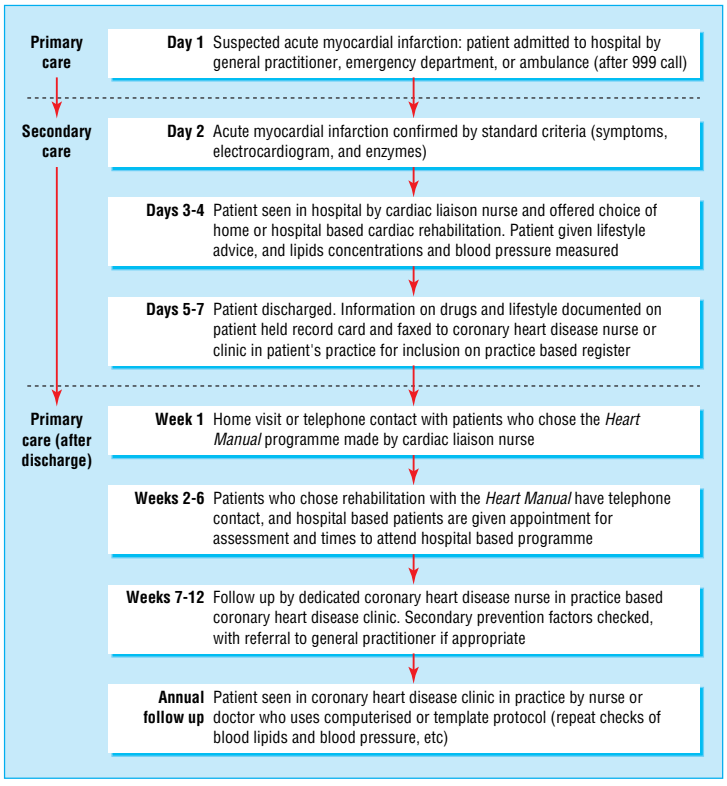
In 1998, a conference organised by the Cornwall and Isles of Scilly Health Authority identified several areas for improvement in local cardiac rehabilitation services.[11] It recommended that coordination of services between primary and secondary care be improved and that a community based rehabilitation service be set up for patients who find it difficult to access hospital facilities. As in many areas in the United Kingdom, provision of cardiac rehabilitation in Cornwall was patchy, with funding available to provide rehabilitation to less than half of patients who survived myocardial infarction. The service provided did not adhere to national guidelines,[12] and we believe that the uptake of cardiac rehabilitation was no different to rates of 14-23% reported in a recent survey in the United Kingdom.[13] Patients were offered only a hospital based rehabilitation programme that had limited places due to lack of funds. No formal link existed between secondary and primary care, so patients discharged after myocardial infarction did not have systematic long term follow up and may have "fallen though the net."

Key measurements for improvement

Our project was set in the former Carrick Primary Care Trust, in Cornwall. The trust had a population of 98 500, one district general hospital, 13 practices, and 63 general practitioners.

The national service framework goal for cardiac rehabilitation states that every hospital should ensure that >85% of patients discharged from hospital with a primary diagnosis of acute myocardial infarction are offered cardiac rehabilitation and that at one year after discharge at least 50% of people should be non-smokers and have a body mass index <30 kg/m^2.[6] Our audit used this goal for cardiac rehabilitation and a selection of standards for secondary prevention to adopt two key measurements for improvement:

- Proportion of patients completing a cardiac rehabilitation programme after myocardial infarction
- Proportion of patients with optimal secondary prevention measured by smoking status, body mass index, cholesterol <5.0 mmol/l, and blood pressure <140/85 mm Hg.



Patient's typical management

Strategies for change

Over a two year period (April 1999-March 2001), all patients admitted to the Royal Cornwall Hospital with a suspected heart attack were identified and assessed by a Grade G cardiac liaison nurse, who was trained as a *Heart Manual* facilitator and was employed for 24 hours a week. The cardiac liaison nurse identified patients by checking a daily printout of cardiac enzyme results (creatinine kinase and troponin I) produced from the hospital's clinical chemistry database. The cardiac liaison nurse collected data to be used to determine appropriate secondary prevention measures, including age, sex, smoking status, body mass index, and serum cholesterol, on admission to hospital.

Patients were offered a choice of home based rehabilitation using the *Heart Manual*[9] or hospital based rehabilitation involving six weekly outpatient classes (exercise, education, counselling, and relaxation) conducted as a group in the hospital. Exclusion criteria for participation in programmes involving the *Heart Manual*[9] were also applied to patients offered hospital based classes.

All patients were assessed individually at the bedside by the liaison nurse, and those who were excluded from formal rehabilitation were given an alternative customised package. This included verbal and written information on chest pain, lifestyle (including exercise, diet, and smoking), drugs (the importance of compliance), general secondary prevention, stress management, coronary heart disease, and return to normal activity. The package was offered before the patient was discharged from hospital.

Practice nurses were trained on secondary prevention of coronary heart disease by Heartsave. Discharge details were faxed to the patient's primary care nurse, who entered them onto the computerised, practice based register of patients with coronary heart disease. Follow up data were collected 12–15 months post-myocardial infarction through a survey of all 13 practices in the primary care trust. Height, weight, and blood pressure were measured by practice nurses. Concentrations of serum total cholesterol and self reported smoking status were taken from practice records. The figure shows a patient's typical management.

The project was managed by a general practice coordinator. One general practice ran a pilot of the programme, and then it was rolled out to the whole primary care trust after extensive discussions with general practitioners, the primary care trust's board, local cardiologists, and the hospital based rehabilitation team.

Each *Heart Manual* costs £22. The total cost of the project was estimated at <£60 000; when this figure is compared with the costs of statins and interventional

cardiological techniques, it is relatively small. For example, the Carrick Primary Care Trust spent £930 000 on statins in the 2001-2 financial year.

Effects of change

We took a detailed audit of the 179 patients who suffered a myocardial infarction in 2000-1. Of these, 46 (26%) patients died; 17 (9%) patients were >85 years, had significant comorbidity, and were considered not suitable for rehabilitation; and 10 (6%) patients had transferred out of the practice, moved out of the area, or had not been seen by their practice since they were discharged from hospital. At 12 months, therefore, follow up data were available for 106 patients. Eighty two (77%) patients were male, the mean age was 66 years, and 32 (30%) patients were <60 years.

Rehabilitation—The patient's log within the *Heart Manual* was used to measure adherence to the home based programme. Attendance at four or more rehabilitation classes in the hospital was regarded as a marker of good compliance and of completion. Forty seven (44%) patients chose rehabilitation with the *Heart Manual* and 41 (87%) of these completed the programme; 35 (33%) chose hospital based rehabilitation and 17 (49%) of these completed the programme. In total, 24 (23%) patients were suitable only for the alternative package.

Secondary prevention—All four secondary prevention outcome measures had improved at 12 month follow up (table 1). The largest change was recorded in the number of patients with total cholesterol <5 mmol/l, which increased from 30 (28%) to 69 (75%). In 71 (72%) patients, blood pressure was at or lower than the desirable 140/85 mm Hg at follow up. An increase in the use of all prophylactic drugs and a statistically significant increase in statin use was seen between discharge and follow up (table 2). This seems to contradict the accepted wisdom that drug use "falls off" after discharge into primary care.

Lessons learnt

Traditionally, cardiac rehabilitation programmes have been run from outpatient departments in hospital. With a combination of the self help manual for use at home (the *Heart Manual*)[9] and the proven effectiveness of nurse led coronary heart disease clinics in primary care,[10] comprehensive cardiac rehabilitation can be provided in the community.

Identification of potential recipients of cardiac rehabilitation remains a problem for some primary care trusts. Daily printouts of cardiac enzyme data from the hospital's database of clinical chemistry results allowed early and accurate identification of patients with acute myocardial infarction. The cardiac liaison nurse made sure that all patients were assessed before discharge and were referred to a nurse at their own general practice.

We gave patients the choice of home based or hospital based rehabilitation and thus offered a more patient friendly service. As far as we are aware, this is not commonplace. The large proportion of patients who elected for (47%) and completed (87%) home based rehabilitation reflects the importance of tailoring service provision to the local context.

Table 1 Modifiable risk factors at discharge and follow up in 106 patients who survived a myocardial infarction in Carrick Primary Care Trust, the United Kingdom's cohort of EUROASPIRE II[15] and the national service framework's targets. Values are numbers (percentages) unless otherwise specified

Variable	Non-smokers	Body mass index <30 kg/m²	Total cholesterol <5 mmol/l	Blood pressure <140/85 mm Hg
Carrick:				
Discharge (n=106)	71 (67)	77 (73)	30 (28)	73 (69)
Follow up	84/95 (88)	82/100 (82)	69/92 (75)	71/98 (72)
United Kingdom's cohort of EUROASPIRE II (n=362)*	298/362 (82)	221/359 (62)	158/340 (47)	171/359 (48)†
National service framework target (%)	50	50	‡	‡

*EUROASPIRE II included patients with myocardial infarction, coronary revascularisation, and myocardial ischaemia.
†EUROASPIRE II set a target of <140/90 mm Hg.
‡No specific target set by national service framework.

A brief survey showed that those aged >60 years and the self employed tended to prefer home based rehabilitation. No significant sex differences were noted between the two groups. Peer support and discipline were the main reasons for patients opting for group based rehabilitation in hospital. Distance from hospital and parking problems were factors that favoured the use of the *Heart Manual*. Provision of a home based service in rural communities, such as Cornwall, where access to hospital may not be easy because of lack of transport, may increase the uptake of cardiac rehabilitation.

A considerable number of patients (23%) were not suitable for formal rehabilitation classes or the *Heart Manual* programme. The most common reason for this was comorbidity, which usually was associated with advanced age. We offered these patients a customised package so they were able to benefit from some aspects of rehabilitation. Importantly, the details of all of these patients were given to their primary care nurses, and we showed that the long term use of preventive drugs in the community increased when care was shared between secondary and primary care. Together with improvements in patients' status of modifiable risk factors, our data compare favourably with that from the EUROASPIRE II survey.[15]

Our audit confirms that integration of rehabilitation services with secondary prevention clinics in primary care allows national service framework targets for cardiac rehabilitation in patients who survive a myocardial infarction to be achieved.

Next steps

The national service framework goal for cardiac rehabilitation states that one year after discharge at least 50% of people should be non-smokers and should have a body mass index <30 kg/m². Our results show that these targets had been met before patients had

Table 2 Drugs taken at discharge (n=106) and follow up (n=91) by patients who survived myocardial infarction and received cardiac rehabilitation. Values are numbers (percentages)

Drug	Discharge	Follow up	P value*
Antiplatelet drug	95 (90)	86 (95)	0.20
Beta blocker	64 (60)	58 (64)	0.56
Angiotensin converting enzyme inhibitor	47 (44)	52 (57)	0.07
Statin	77 (73)	80 (88)	0.005

*Comparison of two independent proportions (exact two sided P value).

Key learning points

- The hospital's clinical chemistry database was useful for identifying patients with acute myocardial infarction
- Cardiac liaison nurses bridged the gap between primary and secondary care and helped improve the care of patients who survived a myocardial infarction
- Home based cardiac rehabilitation with the *Heart Manual* was popular with patients and may increase the uptake of cardiac rehabilitation in rural communities
- National service framework targets for coronary heart disease were met by integrating cardiac rehabilitation services with nurse led secondary prevention clinics in primary care

started their rehabilitation programmes, with 67% being non-smokers and 73% having a body mass index <30 kg/m^2. A more challenging target would be a body mass index <25 kg/m^2 at one year, as recommended by recent American guidelines,[14] and a target for smoking cessation based on baseline findings. Our study shows how to create the "integrated hospital and community based clinical strategy for prevention of coronary heart disease" advocated by EUROASPIRE II.[15]

The national service framework has to be implemented by 2010, and our results show that targets for rehabilitation and secondary prevention can be achieved relatively quickly when primary and secondary care link together to provide a seamless service. Our scheme is being adopted by neighbouring primary care trusts. We currently are conducting a randomised trial to compare clinical outcomes and costs for home based and hospital based cardiac rehabilitation.

Further information

- The Heart Manual Office, Astley Ainslie Hospital, Edinburgh EH9 2HL (heart.manual@lpct.scot.nhs.uk)
- Heartsave, Institute of Health Sciences, Oxford OX3 7LF (info@heartsave.org.uk)
- Further information about this seamless service can be obtained from:
www.nhsbeacons.org.uk
www.cardiacrehabilitation.org.uk
www.eguidelines.co.uk

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Contributors: HMD conceived the original idea for an integrated cardiac rehabilitation and secondary service. HMD and PHE conceived and wrote the paper. HMD collated data from the cardiac liaison nurse and general practices. PHE and HMD analysed the data. HMD is guarantor for this study.

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One hundred years ago

Doctors in British fiction

The progress of the medical profession in the public esteem may to a great extent be gauged by the position occupied by its members in contemporary fiction, and especially in the novels of the day. The modern novel was the creation of the eighteenth century, which saw the physicians Radcliffe and Mead, Cheselden the surgeon, and the Hunters wax and wane. Yet although Mead and Arbuthnot and others were distinguished among the leaders of literary taste and culture, no medical man is given a prominent place by the novelists of the century if we except Smollett, who being himself a Doctor of Medicine and a naval surgeon, naturally wrote of that which he did know. His sketches of his professional brethren are not very flattering, but then Smellfungus was irascible and somewhat atrabilious. These pen and ink pictures suggest the caricatures of Rowlandson or Gilray, while the brief but graphic descriptions of Fielding are as sober and restrained as Leech's or Du Maurier's drawings in *Punch*. Some of Smollett's doctors are skilful, some ignorant. Some are honourable gentlemen like Morgan, others lying cowardly curs like MacShane, in whose description Smollett betrays a dislike to the Irish generally; but be they apothecaries, examiners at Surgeons' Hall, spa physicians, or naval surgeons and their mates, they are all drawn with bold strokes of broad satire, as are the non-medical characters in his novels. (*BMJ* 1903;i:40)