

Outpatient cardiac rehabilitation: are the potential benefits being realised?

ABSTRACT—Objective: to give a comprehensive description of the practice of outpatient cardiac rehabilitation in Scotland.

Design: an identifying survey of 1,270 individuals in hospital, general practice and community sources nationally, followed by computer-assisted telephone interviews about programme characteristics with key personnel from identified cardiac rehabilitation schemes.

Outcome measures: patient provision, referral criteria and programme features.

Results: 65 programmes provided outpatient cardiac rehabilitation for 4,980 patients in one year, representing 17% of the 29,180 patients who survived admission to hospital with coronary heart disease. Cardiac rehabilitation practice varied widely: 53 (82%) programmes included exercise, although only 19 (29%) at the most beneficial level; 40 (62%) included relaxation training, although only three (5%) at a level shown to give benefit; 47 (72%) included education, although only 16 (25%) in a manner with reported benefits in randomised trials.

Conclusions: outpatient cardiac rehabilitation was provided to a minority of patients with coronary heart disease. Programmes varied widely, and were often more limited than those reporting mortality and morbidity benefits in randomised trials. There is a substantial gap between current provision and practice of cardiac rehabilitation and that advocated in published guidelines.

Cardiac rehabilitation can reduce sudden deaths following myocardial infarction in the first year by 37% and the three-year mortality by 20% [1-3]. Patients with angina [4] or heart failure [5] and following cardiac surgery [6] also benefit, and cardiac rehabilitation has been recommended for all these patients [7,8]. Patients themselves value highly the opportunity for cardiac rehabilitation [9]. However, reports indicate that overall provision in the UK is poor [10].

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Equally important is the type of programme being offered. Cardiac rehabilitation is a multifaceted intervention: programmes can include exercise regimens, psychological therapies, education, counselling, group therapy, health promotion and social support [11]. Most of the common interventions have been subject to clinical trials, so their various merits can be assessed. In particular, exercise regimens [1], psychological interventions [12,13] and counselling with education [14,15] have been reported to be beneficial. Recently, consensus guidelines have been published in the UK [7], and evidence-based guidelines have been developed in the USA [8].

It is unknown how far current practice in cardiac rehabilitation reflects established evidence. The study reported here was undertaken to describe comprehensively the practice of cardiac rehabilitation in Scotland.

Methods

Cardiac rehabilitation can be provided in a variety of settings including hospitals, general practice and the community [11]. To identify existing cardiac rehabilitation programmes in Scotland, 1,270 individuals were contacted to identify potential rehabilitation programmes:

- general practitioners from all general practices: 1,088
- charge nurses from all acute medical or cardiac units: 39
- senior medical representatives from all acute medical, cardiology and cardiothoracic surgery departments: 39
- superintendent physiotherapists from all establishments listed as 'acute', 'general', 'medical' or 'rehabilitation' in the Hospitals and Health Services Year Book: 88
- community nursing directors: 16.

The overall response rate was 82% (1,045/1,270), with regional response rates of 71-100%. Sixty-one per cent of respondents (641/1,045) identified 90 possible cardiac rehabilitation programmes at separate addresses, 69 of which were confirmed by telephone contact. Four of these were for inpatients only (during the immediate time following a cardiac event), and 65 included outpatient cardiac rehabilitation.

Computer-assisted telephone interviews were conducted in April 1994 [16] with the lead professional in identified schemes to determine:

- the number of patients treated annually
- referral criteria
- features of programmes
- funding arrangements
- problems for staff and patients.

The numbers of deaths and cardiac arrests (defined as collapse requiring cardiopulmonary resuscitation) were also collected.

Results

Of 65 outpatient cardiac rehabilitation schemes identified, 62 (95%) were open to patients with previous myocardial infarction, 55 (85%) to patients with previous cardiac surgery, 47 (72%) to patients with angina, and 24 (37%) to patients with cardiac failure. Fifty-five (85%) programmes accepted patients of all ages but 10 had upper limits between 65 and 75 years.

Data about total provision of cardiac rehabilitation are presented elsewhere [17]. In summary, about 4,980 new patients attended outpatient cardiac rehabilitation programmes in a year, which represented 17% of the 29,180 persons who survived admissions for ischaemic heart disease during the same year [18]. Thirty-two (49%) of the 65 programmes were hospital-based and accounted for 79% (3,950/4,980) of patient provision.

The key components of cardiac rehabilitation programmes (Table 1) were:

- exercise
- relaxation therapies
- psychological interventions
- education (provided as one-to-one counselling or in group sessions).

Exercise

Exercise sessions were included in 53 (82%) schemes, but their programmes varied considerably. Frequency varied from once every four weeks to three times per

week (mean 1.4, median 1); in 34 (64%) of the 53 programmes exercise sessions were held less than twice per week. Duration of exercise was 15–120 min (mean 53 min, median 50 min). This includes warm-up and cool-down periods; when these were deducted, exercise lasted 5–45 min (mean 21, median 20). The shortest exercise programme was three weeks, and the longest unlimited (median attendance 10 weeks). Most programmes used similar types of exercise, the commonest being:

- walking (41/53, 77%)
- callisthenics (44/53, 83%)
- steps (45/53, 85%)
- cycling (41/53, 77%).

The majority of programmes (33/53, 62%) used symptoms or rating scales of perceived exertion (eg Borg's scale) [19] rather than heart rate as a guide to exercise intensity. ECG monitoring was not used. A defibrillator was present in 20 (38%) exercise programmes, in a further 14 (26%) there was a defibrillator elsewhere in the hospital, and in 19 (36%) programmes, all community-based, there was no on-site defibrillator.

Information about cardiac arrests and deaths during or immediately after exercise was provided by 50 programmes for a mean of four years (range 0.1–18 years). Seven cardiac arrests were reported, with six successful resuscitations and one death. An estimated 21,600 patients exercised for approximately 265,200 hours during this time, so the incidence rate for cardiac arrest was 26 per million patient-hours of exercise (one per 37,888 patient-hours) and for death 3.8 per million patient-hours of exercise (one per 265,214 patient-hours).

Relaxation and psychological therapies

Relaxation sessions were included in 40 (62%) of all 65 programmes, but the courses and their frequency varied, the latter being between once every 12 weeks

Table 1. Components of cardiac rehabilitation programmes and patient provision

Programme component	Hospital				Community			
	Programmes (n=32)		Provision (n=3,949)		Programmes (n=33)		Annual provision (n=1,030)	
	No.	%	No.	%	No.	%	No.	%
Exercise sessions	30	94	3,664	93	23	70	421	41
Relaxation sessions	22	69	2,948	75	18	55	457	44
Psychological interventions	4	13	434	11	0	0	0	0
Education sessions:								
group	21	66	2,993	76	11	33	313	30
one-to-one	8	25	794	20	8	24	479	47

and twice per week (mean 1.2 per week, median 1 per week), and less than once a week in eight (20%) of the 40 programmes. The length of a session varied from 5–90 min (median 15 min), although only three programmes had sessions lasting longer than 30 min. The length of the course varied between one session and unlimited (median attendance 10 weeks). Only four programmes included any other psychological therapy.

Education sessions

Forty-seven (72%) programmes provided education sessions, four of them only for inpatients. The 43 outpatient programmes dealt with 3,891 patients. Education was provided on a one-to-one basis or in groups. Sixteen of the outpatient programmes (1,177 patients) routinely provided education in one-to-one counselling sessions; four had a single session and two had unlimited follow up (median 32 days). Frequency of counselling varied from twice a week to once every three months (mean 2.2 per month, median 1.5 per month). Professionals involved in counselling included nurses or health visitors (13 programmes), physiotherapists (3), doctors, dietitians, pharmacists and occupational therapists (1 programme each). Five programmes (430 patients) used the Lothian Heart Manual [13].

Patient education was routinely provided by group sessions in 32 outpatient programmes (3,306 patients), the course length varying from one session (2) to unlimited (11 programmes) (median length 6 weeks). Their frequency varied from twice a month to three times a year (mean 2.9 per month, median 4 per month). Speakers included dietitians (21 programmes), nurses (15), physiotherapists (15), pharmacists (10), and doctors (6).

Twenty-nine (45%) of all the programmes (1,745 patients) had separate group time for interaction and discussion, varying from a single session (2 programmes) to unlimited sessions (16). Their frequency was 1–10 times per month (mean 4 per month, median 4 per month), and the duration was 10–120 min (mean 30 min, median 35 min). Group discussion sessions were usually informal; in four programmes they were led by cardiac rehabilitation nurses or health visitors.

Community-based programmes

Half (33/65) the identified programmes were community-based, and accounted for 21% of provision. Most community-based programmes were small (median 20 patients per year) compared with hospital-based programmes (median 111 patients per year), although the range of programme size was comparable (≤ 322 vs 344 patients per year). The numbers of patients attending community sessions were similar in range to those at hospitals (1–45 patients), but the groups were usually smaller (median attendance in the

community: 10, hospitals: 16), and more community sessions were predominantly one-to-one (community programmes: 11 (33%), hospital programmes: 2 (6%)).

Patients were permitted to join a community programme 1–52 weeks after a cardiac event (median 7 weeks). This was generally later than hospital-based programmes, which mostly started before discharge (up to 12 weeks). The duration of programmes varied from one week to unlimited time in both community and hospital settings, but most of the former were unlimited and most hospital programmes ran for 10 weeks or less. Exercise programmes lasted from three weeks to unlimited time in the community (median unlimited) and from four to unlimited weeks in hospital (median 10 weeks).

In general, activities in the smaller community-based programmes were less comprehensive than in hospital-based programmes (Table 1), and tended to follow one of three formats:

- exercise-based
- counselling-based
- patient group-based.

The organisation and supervision of 14 community programmes were conducted by health care professionals, including physiotherapists, health visitors, practice nurses, district nurses and, on one occasion, a general practitioner. The remaining 19 community programmes were largely patient-organised, although often professionally supervised. For example, exercise sessions in six programmes were supervised by physiotherapists or nurses, in five by non-medical professional instructors, and in a further five by patients. The required facilities were located at health centres or clinics (12 programmes), sports or community centres (8), schools or universities (8), hospitals (4) and a church hall (1).

Discussion

Despite evidence from randomised trials and meta-analyses of the benefits of cardiac rehabilitation, its overall provision in Scotland is low. The identified programmes varied widely in features and format. It cannot therefore be assumed that they will all have similar benefits or the same as those described in randomised trials. The extent to which the surveyed programmes conformed with UK guidelines [7] is summarised in Table 2.

Exercise

Where exercise was provided, reported practice varied widely and may not produce the desired benefits. UK guidelines advise that exercise should be repeated regularly, and maximum benefit has been reported with at least three times weekly sessions [8]. By contrast, most programmes in this survey had once weekly

Table 2. Comparison of principal recommendations for cardiac rehabilitation in the UK [7] and programme activities in Scotland

UK principal recommendations	Activity	Scottish programme activities			
		Programmes (n=65)		Annual provision (n=4,979)	
		No.	%	No.	%
Psychological care:					
<i>Simple counselling aimed at addressing patients' and partners' main concerns, and correcting misconceptions</i>	Counselling available	22	34	2,255	45
<i>Group discussions . . . offer opportunities for comparison and shared experience</i>	Group discussion available	29	45	1,745	35
Education:					
<i>Patients should have access to information relevant to their medical condition and health status</i>	Individual education	16	25	1,177	24
	Group education	32	49	3,306	66
Pre-exercise assessment:					
<i>Pre-exercise assessment is important both in devising appropriate exercise programmes and for detecting potential risks</i>	Specific medical assessment	4	6	433	9
	Prior medical approval	58	89	4,268	86
<i>Exercise testing is useful both for pre-exercise assessment and to monitor progress</i>	Prior exercise test	17	26	1,546	31
Exercise:					
<i>Moderate intensity exercise (eg brisk walking) sustained for periods of about 20 min and repeated regularly</i>	Twice weekly sessions as recommended	14	22	1,519	31
<i>Low risk patients may move rapidly to unsupervised exercise with regular support</i>	Twice weekly (sessions or home) as recommended	20	31	2,168	44
Spouses and relatives:					
<i>The family should be offered participation in all aspects of rehabilitation</i>	Relatives invited to programme	47	72	3,549	71

exercise sessions, and few were augmented with adequate home exercise programmes. In fact, as many programmes in this study did not include any exercise, many patients were denied access to an intervention of proven value.

Despite the recommendation by a working party of the British Cardiac Society [11] that defibrillators should be present at all exercise sessions in case of cardiac arrest, there is debate about the need for them amongst practitioners and they are not mentioned in the recent UK guidelines [7]. In the survey reported here, only a minority of exercise programmes had on-site defibrillators. Six resuscitations were reported, demonstrating the value of defibrillators. However, the incidence of cardiac arrests was low, and similar to

previous reports in North America both in cardiac rehabilitation programmes and in exercise in the general population [20]. In summary, rapid access to a defibrillator was of great benefit on very rare occasions.

Psychological care

The importance of psychological care has recently been highlighted [7,8], with psychological interventions shown in randomised trials to provide significant benefits. Patel's programme of instruction in breathing exercises, deep muscle relaxation, meditation and stress management for one hour per week for eight weeks, with encouragement to practice relaxation and

meditation for 15–20 min twice daily [12] reduced risk factors and coronary mortality in high risk patients. The results of a randomised trial of Lewin's angina management programme [13] showed reductions in angina, disability, anxiety and depression amongst patients in whom medical treatment had failed. This programme involves two mornings a week for eight weeks, and includes correction of cardiac misconceptions, stress management, goal setting, and yoga. Few programmes in this survey provided similar levels of psychological intervention. Many schemes included a 'psychological' component, most commonly weekly sessions of up to 15 min relaxation, but it is uncertain whether this confers any benefit.

Education

Most programmes included an educational component, sometimes with one-to-one counselling, but more usually in group sessions. Patients with a recent coronary event have been reported to have clear wishes for information [21], especially about their condition [9], and have been appreciative when provided with information following a myocardial infarction [22]. Three randomised trials of one-to-one counselling following myocardial infarction [14,15,23] reported further benefits, including reductions in anxiety and depression in post-infarct men and their spouses, fewer general practitioner consultations and subsequent hospital readmissions, and psychological improvement in neurotic personalities. The majority of patients in this study, however, did not receive one-to-one counselling.

Education in group settings has also been investigated in randomised trials, but with conflicting results. Rahe *et al* [24] reported reduced reinfarctions and increased rates of return to work in the intervention group, although there were no differences in coronary risk factors. Horlick *et al* [25] found no apparent differences between groups, except for a deterioration in the rate of return to work in the intervention group. The wish for group interaction amongst patients is also mixed, with many patients being deterred by this [9]. Group sessions are perceived as the cheaper option [7], which may explain their relatively common usage.

Community-based programmes

This study identified a substantial contribution from community-based programmes which has been missed by previous surveys [10,11]. Many community programmes dealt with only small numbers of patients and offered limited programmes. Their contribution is, however, essential for equitable provision of cardiac rehabilitation to patients in rural areas [9]. Although it is likely that some aspects of specialised care may not be possible for small community programmes, for example, exercise testing, all the remaining principal recommendations outlined in the UK guidelines [7]

were achieved by different community programmes, demonstrating that provision is possible by this means.

Conclusions

Cardiac rehabilitation must be readily available to those who could benefit, and be of proven quality to realise its potential mortality and morbidity benefits. The implications of this study are that it is poorly provided and that current practice is rarely in line with the evidence. There are two possible reasons for this situation:

1. Cardiac rehabilitation has been undersupported and under-resourced, relying heavily on a few enthusiasts and often depending on funds from outwith the National Health Service [17].
2. UK guidelines were unavailable until this year, so decisions about good practice were difficult to make [26].

The latter problem has now been corrected, and the newly published guidelines provide standards against which practitioners can audit their programmes [7]. However, substantial improvements in provision are unlikely without the resources to support them. It must be hoped that by adopting a robust, evidence-based approach it will be possible to persuade purchasers that the unrealised benefits of cardiac rehabilitation are worth attaining.

Acknowledgement

Neil Campbell was funded by a Health Services Research Training Fellowship of the Chief Scientist Office, Scottish Office Home and Health Department. The views expressed are, however, those of the authors alone and not of the funding body.

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