The rise and fall of cardiac rehabilitation in the United Kingdom since 1998

Hugh J. N. Bethell, Julia A. Evans, Sally C. Turner, Robert J. P. Lewin

Abstract

Background Provision of cardiac rehabilitation is inadequate in all countries in which it has been measured. This study assesses the provision in the United Kingdom and the changes between 1998 and 2004.

Methods All UK cardiac rehabilitation programmes were surveyed annually. Figures for each year were up-rated to account for missing data and compared with national data for acute myocardial infarction, coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI). The total numbers and percentage of eligible patients included were charted for 7 years.

Results For centres giving figures, the total number treated rose from 29,890 in 1998 to 37,129 in 2004. The up-rated figures show that the percentage of eligible patients enrolled rose from 25.0% in 1998 to 31.5% in 1999 and has changed little since, falling from 31.3% in 2002 to 28.5% in 2004. About 25% of myocardial infarction patients, 75% of CABG patients and 20% of PCI patients joined cardiac rehabilitation programmes.

Conclusions The National Service Framework for Coronary Heart Disease set a target for 85% of myocardial infarct and coronary revascularization patients to be enrolled in rehabilitation programmes. Only one-third of this number is currently being enrolled and the percentage is falling.

Keywords cardiac rehabilitation, myocardial infarction, National Service Framework, revascularization

Introduction

Cardiac rehabilitation is an effective treatment for patients recovering from acute cardiac illness or surgery. It has been shown to reduce morbidity and to improve quality of life and also to reduce total mortality over 3 years by 20% and cardiac mortality by 26%. It is a cost-effective therapy. To find out how well cardiac rehabilitation is provided in the United Kingdom, in 1997 the British Association for Cardiac Rehabilitation started an annual questionnaire survey of cardiac rehabilitation centres. From 1998 to 2003, this project received financial support from the British Heart Foundation. The questionnaire was sent to all the cardiac rehabilitation coordinators in the United Kingdom. Some findings from this survey have been reported elsewhere.

The first year’s questionnaire only sought information about the site, staffing and services offered by the programme. From 1998 onwards, we asked for the numbers and diagnoses of patients treated. This article reports the changes in numbers of patients enrolled in cardiac rehabilitation from 1998 to 2004 and how these figures are compared with the numbers of eligible patients in the United Kingdom.

Methods

The cardiac rehabilitation programmes were identified initially from a list held jointly by the British Heart Foundation and the British Association for Cardiac Rehabilitation and was expanded by telephoning coronary care units and by identifying centres that had received training in the use of the Heart Manual—a self-help system for home-based cardiac rehabilitation. By 2000, we established that all National Health Service hospitals with coronary care units had access to cardiac rehabilitation programmes. In 2002, the British Heart Foundation performed a search for unrecognized programmes that identified a further 25 centres which performed outpatient exercise-based (phase III) cardiac rehabilitation.
Each year, all cardiac rehabilitation coordinators were sent a questionnaire that included a request for the numbers of patients who had joined the programme the previous year, with their diagnoses, broken down by age and sex. If there was no response within 2 months, the coordinator was telephoned and this was repeated after a further 2 months if necessary. The numbers of patients enrolled in all the responding programmes were added together, and this figure was then up-rated to give an estimate of the total number of patients enrolled in the whole of the United Kingdom. Up-rating presumed that the average number of patients treated by non-responding centres was the same as the number treated by responding centres and was performed by multiplying the number of patients by the known number of cardiac rehabilitation centres and dividing by the number of responders. In a different study (R. J. Lewin et al., unpublished data), we have validated this method by intensive efforts to obtain figures (by telephone and by using figures from the previous year) which have increased the response rate to 89%. The up-rated figure underestimated the total derived by this method by 1.6%.

The figures for eligible acute myocardial infarction (AMI) patients were provided by the British Heart Foundation annual report,9 those for eligible coronary artery bypass graft (CABG) patients were taken from the website of the Society of Cardiothoracic Surgeons10 and those for percutaneous coronary intervention (PCI) patients from the website of the British Cardiac Intervention Society.11

There were, over the period of study, two changes in the year start and end used. In 1998 and 1999, we sought information for the 12 months from 1 April. In 2000 and 2001, we used the year from 1 January, and since 2002, we have reverted to the year from 1 April.

Since the year 2000, we have sought information about the funding for each programme.

**Results**

The number of identified centres increased from 286 in 1998 to 330 in 2004 (Table 1).

The number providing numerical information rose from 171 (72% of responders) to 195 (80% of responders).

For those centres giving figures, the total number treated rose from 29 890 in 1998 to 37 129 in 2004. When these figures are up-rated to account for those centres who did not give figures, the percentage enrolled for cardiac rehabilitation rose from 25.0% in 1998 to 31.5% in 1999 and has changed very little since, with a fall from 31.3% in 2002 to 28.5% in 2004 (Table 2, Fig. 1).

There was a considerable difference in the percentages of eligible patients from the three target categories who were enrolled in cardiac rehabilitation programmes—from about one-quarter of AMI patients, nearly three-quarters of CABG patients and around one-fifth of PCI patients (Table 3).

Table 1 The number of centres identified each year, the number returning their questionnaires and the number providing figures for those whom they enrolled

<table>
<thead>
<tr>
<th>Year</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of centres</td>
<td>286</td>
<td>296</td>
<td>302</td>
<td>307</td>
<td>337</td>
<td>331</td>
<td>330</td>
</tr>
<tr>
<td>Number of responders</td>
<td>236</td>
<td>244</td>
<td>253</td>
<td>235</td>
<td>278</td>
<td>242</td>
<td>236</td>
</tr>
<tr>
<td>Number of responders giving figures</td>
<td>171</td>
<td>158</td>
<td>174</td>
<td>174</td>
<td>204</td>
<td>195</td>
<td>181</td>
</tr>
<tr>
<td>% of responders giving figures</td>
<td>72.1</td>
<td>65.8</td>
<td>69.0</td>
<td>74.0</td>
<td>74.0</td>
<td>80.0</td>
<td>77.0</td>
</tr>
<tr>
<td>% of total giving figures</td>
<td>60.0</td>
<td>53.0</td>
<td>58.0</td>
<td>57.0</td>
<td>61.0</td>
<td>59.0</td>
<td>55.0</td>
</tr>
</tbody>
</table>

This includes the total number eligible, the number reported by responders and an estimate of the total number and percentage of patients enrolled in cardiac rehabilitation in the whole United Kingdom.

Table 2 The numbers of patients enrolled each year in those centres which gave figures

<table>
<thead>
<tr>
<th>Year</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total eligible patients</td>
<td>199 982</td>
<td>202 866</td>
<td>208 383</td>
<td>213 655</td>
<td>220 190</td>
<td>228 761</td>
<td>237 661</td>
</tr>
<tr>
<td>Total treated</td>
<td>29 890</td>
<td>34 106</td>
<td>38 101</td>
<td>35 400</td>
<td>42 809</td>
<td>41 144</td>
<td>37 129</td>
</tr>
<tr>
<td>Up-rated total</td>
<td>49 990</td>
<td>63 895</td>
<td>66 130</td>
<td>62 458</td>
<td>68 973</td>
<td>69 839</td>
<td>67 694</td>
</tr>
<tr>
<td>% treated</td>
<td>25.0</td>
<td>31.5</td>
<td>32.4</td>
<td>29.2</td>
<td>31.3</td>
<td>30.5</td>
<td>28.5</td>
</tr>
</tbody>
</table>
Discussion

Main findings of this study

This study shows that the increase in the number of patients being treated in cardiac rehabilitation centres has not kept pace with the apparent increase in activity. There were small increases in numbers of AMI patients treated between 1998 and 1999 and in CABG patients treated between 1998 and 2000. In 2000, the National Service Framework for Coronary Heart Disease set a target for 85% of eligible patients to be offered cardiac rehabilitation, the eligible group including patients after AMI, CABG or PCI. Since the publication of this document, however, there has been no increase in the enrolment into cardiac rehabilitation of either AMI or CABG patients. The small increase in the total numbers of patients included in cardiac rehabilitation since 2000 is wholly accounted for by the increased inclusion of PCI patients. Even in this group, the percentage of those included in cardiac rehabilitation fell from 2002 to 2004 and now stands at the very inadequate figure of 18% of those eligible. The equivalent figure for AMI patients is an equally inadequate 26% but for CABG patients a more reasonable 72%.

What is already known on the topic

These figures are very similar to those found by the Healthcare Commission who found that, in 111 Hospital Trusts surveyed, 29% of coronary heart disease patients had joined cardiac rehabilitation programmes. However, the Commission also report that 68% of CABG patients, 52% of AMI patients and 48% of PCI patients ‘were participating, or going to participate in a rehabilitation programme’.

There has been a steady increase in the number of centres providing cardiac rehabilitation in the United Kingdom over the past 35 years—from 9 centres in 1969 to 99 in 1989, 151 in 1995 and 302 in 2000, the year in which we established that every UK hospital treating acute cardiac emergencies had access to a cardiac rehabilitation facility.

It is not easy to compare the performance of this country with that of other countries. In Europe and in the United States, the density of programmes per head of population have been reported, but the numbers of patients treated were not included. In each case, wide variation in geographical distribution of cardiac rehabilitation programmes was highlighted. Some regional studies have been published, but none give figures for recent years. Older studies indicate cardiac rehabilitation attendance rates in Victoria, Australia, in 1998.
were 15% for AMI, 37% for CABG and 14% for PCI.\textsuperscript{20} In Oporto, Portugal, in 1998, just 1.9% of AMI patients received cardiac rehabilitation.\textsuperscript{21} In Olmsted County in the United States, 55% of patients following a first infarct between 1982 and 1998 took part in cardiac rehabilitation.\textsuperscript{22} For the District of Columbia in Canada in 2001, 29.5% of AMI patients received cardiac rehabilitation.\textsuperscript{23}

**What this study adds**

There are several reasons for the shortfall in cardiac rehabilitation provision in the United Kingdom. There has never been any national plan for cardiac rehabilitation. Cardiac rehabilitation has not been driven by purchasers keen to provide rehabilitation for their heart patients but has been driven by the enthusiasm of nurses, physiotherapists and occupational therapists who have perceived the need in their area and set up programmes to meet this need—often without the support of their cardiologist colleagues. Even since the publication of the National Service Framework targets in the United Kingdom, cardiologists are very seldom involved with the promotion or delivery of cardiac rehabilitation.\textsuperscript{24} Guidelines and audit standards have been introduced but not generally followed,\textsuperscript{25} and cardiac rehabilitation programmes are often not an integral part of the cardiac department nor a recognized step in the patient’s care pathway.

Cardiac rehabilitation is also grossly under-funded. A recent survey by the Coronary Prevention Group found that only 54% of cardiac rehabilitation centres held a budget, the mean sum being £288 per patient rehabilitated.\textsuperscript{24} This is very similar to the figure quoted by the British Association of Cardiac Rehabilitation/British Heart Foundation survey which found that, for those who held a budget, the allowance per patient treated ranged from £50 to £712 with a median of £256 (year 2000 costs). The Scottish Intercollegiate Guidelines Network (Guideline Number 57 ‘Cardiac rehabilitation’) suggests a level of staffing which would, in 2004, cost between £327 and £396 per patient with a mid-point of £363.\textsuperscript{26} A recent study has investigated the cost of providing cardiac rehabilitation in England and found the average cost per patient to be £354 for staff and £486 in total.\textsuperscript{27} However, the mean figure conceals a very wide variation in staff costs—from £186 per patient for centres with two or fewer key staff to £542 for centres with more than five key staff. On this evidence, those cardiac rehabilitation coordinators who do hold their own budget are receiving a cost-effectiveness of providing about 80% of what they need to cover staff costs even though they are only treating about 35% of the patients who should be included (i.e. 30% against the target of 85%). Unfortunately, under-funded cardiac rehabilitation centres are the least likely to have the time and resources, particularly clerical help, to seek improvements in their funding. Lack of funds also contributes to the lack of staff, the lack of sessions and inadequate facilities, particularly space.

Finally, there is no incentive for Trusts to provide cardiac rehabilitation that forms no part of the quality assessment process. It is heartening to read that the Healthcare Commission acknowledges the need to expand the capacity of cardiac rehabilitation programmes.\textsuperscript{13} The Commission has declared that it ‘will develop indicators to support improvement in key areas...’. These might include ‘percentage eligible patients discharged who were referred to and completed a programme of cardiac rehabilitation’. Our findings suggest that without some such pressure it is unlikely that the provision of cardiac rehabilitation in the United Kingdom will improve in the foreseeable future.

The 2005 assessment of progress towards National Service Framework goals acknowledged that ‘[h]igh standard cardiac rehabilitation services are not yet consistently available throughout the country and further effort will be needed over the next five years to address this’.\textsuperscript{28} There is no indication that the current gross under-provision will be a major focus of the next phase of the implementation of the Coronary Heart Disease National Service Framework. The Healthcare Commission, the British Heart Foundation and the British Association for Cardiac Rehabilitation are currently engaged with clinicians in a national audit which will map in detail the under-provision and inequalities of provision of cardiac rehabilitation.\textsuperscript{29} This will provide the detailed information required by the Healthcare Commission to use quality indicators to encourage Trusts to improve their provision. It is unlikely that the current gross under-provision will be corrected otherwise.

**Limitations of this study**

There are several weaknesses in this study. The response rate each year was low, and the respondents were not exactly the same from one year to the next. However, examining the figures from those who did respond to every questionnaire yielded a similar result. The up-rated figures presumed that non-responders would have given similar figures to the responders, and we have validated this estimate by persistent telephoning of non-responding centres (R. J. Lewin et al., unpublished data). It is possible, because of double counting, we have probably underestimated the percentage of PCI patients receiving cardiac rehabilitation. This is because, in a proportion of the PCI patients, the intervention was for treatment of AMI—about 5% of patients with electrocardiograms showing ST segment elevation myocardial infarction are thus treated and a larger percentage of non-ST elevation...
infarct patients. The lack of general agreement about the diagnosis of AMI and acute coronary syndromes makes this impossible to estimate. Finally, the figures that we have used were dependent on the cardiac rehabilitation coordinators, and it was apparent that for many of them keeping accurate figures was not a priority—the Coronary Prevention Group survey indicated that only 68% of cardiac rehabilitation coordinators use IT-based data collection systems.24

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Competing interests

There are no competing interests.

References