NSF for CHD: 3 years of 12-month follow-up audit after cardiac rehabilitation

Julia A. Evans, Hugh J. N. Bethell and Sally C. Turner

Abstract

Background The coronary heart disease (CHD) National Service Framework (NSF) sets standards and milestones. For acute myocardial infarction (AMI) or coronary revascularization, ‘Milestone 3, of Standard 12 requires that, by April 2002, every hospital should have clinical audit data no more than 12 months old showing ‘total number and % of those recruited to cardiac rehabilitation who, one year after discharge, report: regular physical activity of at least 30 minutes duration on average five times a week, not smoking and a Body Mass Index (BMI) of <30 kg/m²’. This study looked at cost, method and practicalities of retrieving this data.

Methods A postal questionnaire was used to follow-up coronary patients who started our cardiac rehabilitation programme between 1 April 2001 and 31 March 2004. The project was costed.

Results Three hundred and seventy-five (33 per cent) AMI patients, 412 (36 per cent) coronary artery bypass grafting (CABG) patients and 343 (30 per cent) percutaneous coronary intervention (PCI) patients entered the cardiac rehabilitation programme over 3 years. Completed questionnaires were received from 903 (80 per cent). Post-AMI patients or those stratified as high risk for further cardiac events were least likely to respond. Of responders, 74 per cent were exercising regularly, 95 per cent were not smoking and 79 per cent had a BMI <30 kg/m².

Conclusion Targets for smoking and BMI set by the NSF are too low and were achieved by most patients before the start of cardiac rehabilitation. Patients who are post-AMI or are stratified as high risk need to be targeted if a high level of follow-up is to be achieved.

Keywords: cardiac rehabilitation, exercise, NSF, smoking

Introduction

In the year 2000, the National Service Framework (NSF) for coronary heart disease (CHD) set out a 10-year programme of work to improve prevention, diagnosis and treatment of CHD. Chapter 7, Cardiac Rehabilitation, included the following audit requirement for patients recovering from acute myocardial infarction (AMI) or coronary revascularization: ‘by April 2002 every hospital should have clinical audit data no more than 12 months old to show the percentage of patients who had attended cardiac rehabilitation who are maintaining lifestyle changes’ – more specifically ‘total number and % of those recruited to cardiac rehabilitation who report: regular physical activity of at least 30 minutes duration on average five times a week, not smoking and a body mass index (BMI) of <30 kg/m²’. The target for each of these categories is 50 per cent (Standard 12, Milestone 3).

In 2004, we published a paper that reported on the practicalities, results and cost of meeting the NSF for CHD requirement for 12-month follow-up in our own cardiac rehabilitation population. We showed that the audit was inexpensive and that the targets for smoking and BMI were set at far too low a level, being exceeded even before the index cardiac event. This article reports a on a further 2 years’ experience and compares the results for different diagnostic and risk groups.

Methods

We sent postal questionnaires, enclosing an explanatory letter and a stamped addressed envelope to all the coronary patients who attended our cardiac rehabilitation programme over a 3-year period from 1 April 2001 to 31 March 2004. The questionnaire incorporated three sections:

- What is your weight today? (without shoes and clothes)
- Do you smoke? (yes or no)
- A validated brief physical activity questionnaire

In the first year, non-responders were telephoned on a maximum of two occasions to elicit a reply. In the second year, the practice of telephoning non-responders was dropped after 6 months. In the third year, non-responders were not telephoned.
We estimated the cost of the audit for postage, stationery and clerical hours worked.

During the follow-up period we were notified of any deaths by the Office For National Statistics and by general practitioners and/or relatives.

**Statistical method**

The $\chi^2$ test was used to assess the association between the response rates and each pair of the three diagnostic groups AMI, coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI) (Table 1).

$\chi^2$ test for trend was used to assess the relationship between response rates for the three ordered risk-stratified groups (Table 2).

**Results**

Three hundred and seventy-five (33 per cent) AMI patients, 412 (36 per cent) CABG patients and 343 (30 per cent) PCI patients entered the programme between 1 April 2001 and 31 March 2004.

The response rate and cost of the audit is summarized in Table 3. In total, over the three years, 903 (80 per cent) completed questionnaires were received. The response rate was significantly lower in the third than in the first year.

The cost of performing the audit included the following:

- 5 h per month at a rate of pay of £12 per hour for the research assistant at our rehabilitation centre to prepare and send the questionnaires and to enter the data into our patient database.
- On average, £160 per year for envelopes, labels, photocopying and stamps.
- Approximately £25 per year for telephone calls if chasing non-responders.
- 8 h per year at £12 per hour for the research assistant to analyse the data.
- 10 h per year at a rate of pay of £9 per hour for a Band 4 fitness instructor to make the telephone calls to non-responders.

Many of the telephone calls to non-responders resulted in clinical queries which were passed on to the cardiac rehabilitation team and the consequent extra costs have not been included.

The percentages of patients exercising regularly, not smoking and having a BMI $<30$ kg/m$^2$ at various stages before and after their cardiac event are shown in Fig. 1. Twelve months after starting the programme, 74 per cent of responders were exercising regularly, 95 per cent were not smoking and 79 per cent had a BMI $<30$ kg/m$^2$.

Table 1 summarizes the response rates and the results of the responses for the three diagnostic groups. Patients following PCI were significantly more likely to respond than either post-CABG patients ($p<0.001$) or post-AMI patients ($p<0.001$). Post-CABG patients were also significantly more likely to respond than post-AMI patients ($p = 0.037$). There were no differences between the three diagnostic groups for the percentage who reported exercising regularly, not smoking and having a BMI $<30$ kg/m$^2$.

When patients are screened at the start of cardiac rehabilitation, they are risk stratified into one of three levels of risk (low, medium or high) for the likelihood that they will succumb to a future cardiac event. Table 2 summarizes that those patients in the high-risk C group are the least likely to return their questionnaires ($\chi^2$ test for trend $p<0.001$).

Over the 3 years of the study, 57 (5.0 per cent) of the patients died – 32 (8.5 per cent) of the AMI patients, 15 (3.6 per cent) of the CABG patients and 10 (2.9 per cent) of the PCI patients.

**Discussion**

**Main finding of this study**

We have again shown that this audit is inexpensive to perform and that the targets set by the NSF are far too low. The figures from the recent Healthcare Commission report on progress towards NSF targets confirm this – from the small number of trusts which were able to give figures, the 12-month non-smoking figure was 85 per cent, the target BMI was achieved by 72 per cent and the exercise target by 54 per cent. A more challenging target would be a BMI $<25$ kg/m$^2$ at one year, as recommended by recent American guidelines, and a target for smoking cessation based on baseline findings.

We have also shown that patients following AMI and those at high risk are less likely to respond. We found no significant differences between the three diagnostic groups for maintenance of healthy behaviour. The group most likely to respond was the PCI group, perhaps because they were younger and at lower risk than the other two groups – and also had a lower death rate.

<table>
<thead>
<tr>
<th>AMI</th>
<th>CABG</th>
<th>PCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>375</td>
<td>412</td>
<td>343</td>
</tr>
<tr>
<td>266</td>
<td>319</td>
<td>318</td>
</tr>
<tr>
<td>73</td>
<td>72</td>
<td>71</td>
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<tr>
<td>96</td>
<td>96</td>
<td>95</td>
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<tr>
<td>70</td>
<td>78</td>
<td>70</td>
</tr>
</tbody>
</table>

AMI, acute myocardial infarction; BMI, Body Mass Index; CABG, coronary artery bypass grafting; PCI, percutaneous coronary intervention.

Comparison of response rates: AMI versus CABG, $p = 0.037$; AMI versus PCI, $p < 0.001$; CABG versus PCI, $p < 0.001$. 

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In the third year of the survey, we did not telephone the non-responders, with a reduction in cost of £114 – about £1.40 per patient who failed to respond but would have done so with telephone follow-up. We stopped the telephone follow-up because it created a large volume of extra clinical work for which we were inadequately staffed. If the telephone calls had been performed by clerical staff remote from the programme, this problem would not have occurred. However, the non-responders did have many clinical problems and would have benefited from a telephone call from a member of the clinical team if the funding allowed.

### What is already known on this subject

The Annual Survey performed by the British Association for Cardiac Rehabilitation\(^7\) indicates that only about a quarter of cardiac rehabilitation programmes can give figures for BMI, physical activity and smoking habit at the end of the programme. It seems unlikely that they might have resources to follow-up patients routinely 1 year after their acute coronary event. This is confirmed by the Healthcare Commission which reports that ‘comparatively few services were able to supply this data...’. The report later states that ‘...16% of trusts are able to provide numbers and a further 14% were able to estimate a percentage’ but does not make clear what these figures refer to. They comment on the low priority many services give to routine data collection and conclude that one of three key areas for attention for the NSF in relation to cardiac rehabilitation is to ‘improve the capacity of cardiac rehabilitation programmes to collect and analyse data to contribute to audit and service improvement’.

A further survey of a representative sample of cardiac rehabilitation centres showed that only 9 per cent had 1-year follow-up audit data,\(^8\) but the authors concluded that this might be

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**Table 2** Effect of risk stratification on response rate and results of the audit

<table>
<thead>
<tr>
<th>Risk category</th>
<th>No questionnaires sent</th>
<th>Response rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, low</td>
<td>318</td>
<td>289 (91)</td>
</tr>
<tr>
<td>B, medium</td>
<td>655</td>
<td>502 (77)</td>
</tr>
<tr>
<td>C, high</td>
<td>157</td>
<td>112 (71)</td>
</tr>
</tbody>
</table>

\(\chi^2\) test for trend, \(p < 0.001\).

**Table 3** Response rate to questionnaire and cost of performing audit

<table>
<thead>
<tr>
<th>Year</th>
<th>Number Of questionnaires sent</th>
<th>Response rate (%)</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001–2002 Telephone follow-up of non-responders</td>
<td>403</td>
<td>89</td>
<td>£1204</td>
</tr>
<tr>
<td>2002–2003 First 6 months telephone follow-up</td>
<td>358</td>
<td>83</td>
<td>£1056</td>
</tr>
<tr>
<td>2003–2004 No telephone follow-up</td>
<td>369</td>
<td>67</td>
<td>£988</td>
</tr>
</tbody>
</table>

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**Figure 1** Percentages of patients exercising regularly, not smoking and having a Body Mass Index (BMI) <30 kg/m\(^2\) at different stages before and after their cardiac event.
because this task is seen as a responsibility of primary care (through secondary prevention CHD registers) rather than of rehabilitation professionals. However, the 12-month data are a reflection of the effectiveness of the programme. Cardiac rehabilitation in the United Kingdom is generally grossly under-funded.9 If cardiac rehabilitation professionals are to put the case for better funding, they need to keep statistics to show what they do and how well they perform. The 12-month data are part of these statistics, and it is in the interests of the cardiac rehabilitation programme to collect them. We have shown that it is inexpensive to do so and highlighted that high-risk patients and those recovering from AMI need targeting if data collection is to be as complete as possible.

The University of York, in association with the British Heart Foundation, has developed a data set for use in cardiac rehabilitation programmes,10 and this is currently being trialled in many centres before being rolled out to every centre in the country. The data is recorded on a patient by patient basis and will be included in the Myocardial Infarction National Audit Project (MINAP) and collected by the central cardiac audit database (CCAD). The general use of this tool will make the collection of the 12-month figures simpler and should result in it being more widely sought.

What this study adds

The telephone follow-up of patients who fail to respond to the 12-month questionnaire is highly cost-effective. Those most likely to require this extra attention are high-risk patients and those following AMI.

Limitations of this study

The main weakness of this study is that it relies on the self-reporting of patient data. This could be corrected by following up patients as out-patients after 12 months. We found that when we telephoned non-responders they often had clinical problems which they wished to discuss, so for these patients at least a face-to-face consultation with a clinician might be indicated. However, few cardiac rehabilitation programmes in the United Kingdom would have the resources to arrange this. Most programmes cannot treat the number of eligible patients in their area (only about 30 per cent of eligible patients in the United Kingdom are included in cardiac rehabilitation), they fail to follow national guidelines and they do not collect routine data – all because they are underfunded.

Acknowledgements

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References