Cardiac rehabilitation program attendance after coronary artery bypass surgery: overcoming the barriers

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ABSTRACT

Objective: To investigate rates and predictors of cardiac rehabilitation (CR) attendance after coronary artery bypass graft surgery (CABGS) at Royal Melbourne Hospital (RMH), Victoria, where current best practice referral and recruitment strategies have been adopted.

Design, setting and participants: Prospective cohort study of 184 patients who underwent CABGS at RMH between July 2001 and April 2004. Patients completed questionnaires pre-operatively, and 170 patients (92%) had their CR attendance tracked after referral to CR either at RMH or elsewhere.

Main outcome measures: Rates of CR attendance among RMH patients referred to CR either at RMH or elsewhere; sociodemographic, medical, cognitive, psychosocial and geographical predictors of CR non-attendance.

Results: The CR attendance rate was 72%. Patients referred to CR at RMH were more than four times more likely to attend than patients referred elsewhere (odds ratio [OR], 4.36; $P = 0.024$). Travel time significantly predicted CR attendance (OR, 0.86; $P = 0.039$).

Conclusions: CR attendance rates were found to be higher than previously reported for CABGS patients, suggesting that best practice referral and recruitment procedures minimise common barriers to CR attendance.

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In Australia, cardiac rehabilitation (CR) is available for all patients after an acute cardiac event. CR usually comprises low-to-moderate-intensity exercise and education, and runs weekly for 6–8 weeks, commencing in early convalescence. CR has many benefits, including reduced mortality and improved risk-factor profiles and physical and psychological functioning.[1-3] Therefore, international guidelines recommend all cardiac patients be referred to CR.[1,4,5]

However, many patients do not attend CR programs,[3,6,7] due to a range of barriers.[1,6,8-10] While coronary artery bypass graft surgery (CABGS) patients are more likely than other cardiac patients to attend CR,[3,6] overall attendance in Australia remains less than optimal, ranging from 37%[3] to 66%.[6]

A major factor in non-attendance at CR is the absence of effective referral procedures.[1,7] The Victorian Government's *Best practice guidelines for cardiac rehabilitation and secondary prevention* recommend specific referral strategies to maximise CR attendance (Box 1).[1] Royal Melbourne Hospital (RMH) in Victoria has adopted these recommended referral procedures for all CABGS patients (regardless of the CR program to which they are referred), and has also implemented additional recruitment procedures consistent with the best practice guidelines (Box 2) to further encourage attendance among patients referred to the RMH CR program.

We investigated the CR attendance rates of RMH CABGS patients and the impact on attendance of sociodemographic, medical, cognitive, psychosocial and geographical barriers, to determine if adherence to best practice guidelines for CR referral and recruitment minimised the influence of individual patient factors on attendance.

METHODS

Study population

Eligible patients were 402 adults waitlisted for CABGS at RMH between July 2001 and April 2004. Patients were excluded if they were over 85 years of age, were subsequently assigned to a non-CABGS procedure, or failed to return the questionnaire before surgery. Of the 402 questionnaires mailed, 184 (46%) were returned. Included and excluded patients did not differ in terms of sex or age. CR attendance was tracked for 170 included patients (92%). Attendance data were not available for the remaining 14 patients (8%), as records for two CR programs had been destroyed.

Data collection

The Melbourne Health Human Research Ethics Committee approved the study.

Waitlisted patients were mailed the questionnaire package, with a cover letter signed by the head of the RMH Cardiothoracic Surgery Department. Questionnaires were completed before surgery and returned by reply-paid post. CR attendance was defined as having attended at least one CR session, and was confirmed by contacting the relevant CR program coordinators.

To determine the generalisability of the attendance rates for participating patients, the attendance rate for 117 (54%) of the 218 excluded (non-responding) patients was also tracked. Attendance data for this sample were obtained by contacting the CR coordinators of every second program on an alphabetical list of CR programs to which participating patients had been referred.

Measures

Sociodemographic variables: Sociodemographic data collected from patients included age, sex, marital status, language spoken at home, years of education, and current or previous occupation. Occupations were grouped into manual and non-manual.[11]

Medical variables: Patients' presurgical New York Heart Association classes and risk factors for coronary heart disease were obtained from hospital medical records. Risk-factor data included smoking status, body mass index, diabetes mellitus, high cholesterol, and hypertension recorded during the pre-admission clinic visit.

Cognitive functioning: A modified 28-item version of the Everyday Functioning Questionnaire (EFQ)[12] was completed by 169 participants. The EFQ assesses difficulties in concentration, memory, communication, organisation and lack of insight. Possible scores range from zero to 50.

Psychosocial variables: The Hospital Anxiety and Depression Scale (HADS)[13] was used to measure anxiety and depression. Possible scores for the two subscales range from zero to 21, with higher scores indicating greater distress. Patients were also asked if they lived alone.

1 Best practice referral strategies for all coronary artery bypass graft surgery patients[1]

- Automatic referral to cardiac rehabilitation (CR) of all eligible patients
- Referral to CR included in hospital discharge plan
- Personal invitation to CR
- Patient's choice of CR program encouraged
- Group exercise program in ward to encourage accurate patient perceptions
- Expectation from all health professionals that CR is part of treatment
- Ward clerks ensure referrals completed for all patients ◆

2 Additional recruitment procedures for patients referred to the Royal Melbourne Hospital cardiac rehabilitation (CR) program

- Written invitation given to patient in hospital
- Program brochure given to patient in hospital
- Comprehensive interpreter service used as required
- Appointment made for CR start day
- Non-attendees followed up tenaciously
- Transport arranged if required ◆

Geographical variables: Each patient's residence was classified as rural/remote or metropolitan.[14] Travel time (in minutes by car) and distance (in kilometres) between the patient's home and the CR program to which he or she was referred were calculated for each patient.[15]

Statistical analysis

We used χ^2 tests and one-way analysis of variance to identify patient characteristics associated with CR attendance. Variables significantly associated with CR attendance were then entered into a logistic regression model. The significance level was set at $P < 0.1$.

RESULTS

The average age of patients was 66 years (SD, 10 years; range, 42–88 years). Other patient characteristics are shown in Box 3.

Of the 170 included patients for whom CR attendance was tracked, 123 (72%) attended at least one CR session. The number of sessions offered across programs ranged from six to 16, with a mean (SD) of 6.9 (1.5). Most patients (90/123, 73%) who attended one session completed the full program. Of the 123 attendees, 30 were referred to and attended the program at RMH, while the remaining 93 were referred to and attended the program closest to their home. There was no significant difference in CR attendance between the included and non-responding patients ($\chi^2_1 = 1.60$; $P = 0.28$).

Characteristics of CR attendees and non-attendees are shown in Box 3. Compared with non-attendees, patients who attended CR had a significantly shorter travel time (mean difference, 5.31 min [95% CI, 0.81–9.81 min]; $F_{1,159} = 5.42$; $P = 0.021$), lived closer to the program venue (mean difference, 5.53 km [95% CI, –0.22 to 11.27 km]; $F_{1,159} = 3.61$; $P = 0.059$) and were more likely to have been referred to the program at RMH than elsewhere (91% v 68%; $n = 169$; $\chi^2_1 = 6.8$; $P = 0.006$). There were no other significant differences between attendees and non-attendees.

When these three significant variables were entered into the logistic regression model, referral to RMH (Wald, 5.10; odds ratio [OR], 4.36 [95% CI, 1.21–15.26]; $P = 0.024$) and travel time (Wald, 4.25; OR, 0.86 [95% CI, 0.75–0.99]; $P = 0.039$) emerged as significant, independent pre-

3 Characteristics of responding patients — differences between cardiac rehabilitation (CR) program attendees and non-attendees

	CR attendees ($n = 123$)		CR non-attendees ($n = 47$)		
Variable	No. (%)	Mean (SD)	No. (%)	Mean (SD)	*P*
Sociodemographic					
Age (years)		65.7 (9.8)		66.4 (9.4)	0.71
Male	96 (78%)		39 (83%)		0.31
Partnered	91 (74%)		35 (74%)		0.85
NESB	34 (28%)		15 (32%)		0.58
Manual occupation	53 (43%)		25 (53%)		0.26
Years of education		11.1 (2.3)		10.7 (2.5)	0.29
Metropolitan	66 (54%)		24 (51%)		0.86
Medical					
Past smoker	81 (66%)		34 (72%)		0.42
Current smoker	10 (8%)		6 (13%)		0.26
Body mass index (kg/m^2)		29.1 (4.5)		28.4 (4.8)	0.33
Diabetes mellitus	37 (30%)		10 (21%)		0.25
High cholesterol	109 (89%)		41 (87%)		0.80
Hypertension	108 (88%)		38 (81%)		0.18
NYHA class I	31 (25%)		16 (34%)		
NYHA class II	59 (48%)		15 (32%)		0.16
NYHA class III/IV	32 (26%)		16 (34%)		
Cognitive					
EFQ score		10.3 (8.6)		10.7 (6.6)	0.74
Psychosocial					
Lives alone	21 (17%)		10 (21%)		0.33
Anxiety (HADS)		6.6 (4.2)		7.3 (4.4)	0.35
Depression (HADS)		5.1 (4.0)		6.0 (4.0)	0.24
Geographical					
Distance to CR (km)		11.4 (13.0)		16.9 (23.1)	0.06
Travel time to CR (min)		11.0 (10.1)		16.4 (18.2)	0.02

NESB = non-English-speaking background. Metropolitan = living in a capital city or other metropolitan area. NYHA class = New York Heart Association functional class. EFQ = Everyday Functioning Questionnaire. HADS = Hospital Anxiety and Depression Scale. ◆

dictors of attendance. Patients referred to RMH were over four times more likely to attend CR than patients referred elsewhere. Patients were less likely to attend CR as travel time increased: 1 min of extra travel time was associated with a 14% reduction in the likelihood of attendance, and 10 min of extra travel time corresponded to a 77% reduction. The model explained more than 10% of the variance in CR attendance (Nagelkerke's $R^2 = 0.124$).

DISCUSSION

The implementation of best practice guidelines at RMH appears to overcome the multiple barriers to CR referral and attendance.[1,6,8-10] To our knowledge, no other studies have reported a higher CR attendance rate for CABGS patients, either within Australia or internationally. Patients traditionally at risk of non-attendance[1,6,8-10] were no less likely to attend CR, and the attendance rate for patients referred to CR at RMH itself was particularly high. Thus, when routine inclusive referral practices are in place, along with tenacious follow-up, attendance rates are high and the impact of individual patient characteristics on attendance is minimised.

RMH has a policy of automatic referral to CR as part of the discharge plan for all CABGS patients. This process is facilitated by the ward clerks, who ensure that referrals are completed before discharge. In many Australian hospitals, the referral process is often ad hoc, being the responsibility of busy ward nurses or a single staff member, and can be vulnerable to time pressures.[16] The higher overall CR attendance rates at RMH appear to have resulted from efforts to overcome systemic problems in the referral process. Further, the practices followed by the cardiothoracic unit at RMH aid patient decision making about CR attendance by ensuring that patients' perceptions of CR are accurate and positive.

Attendance was affected by travel time. This is an important consideration in planning service provision for cardiac patients, highlighting the importance of a network of CR programs to ensure that travel times are minimised and access maximised.

Some limitations of our study should be noted. First, while the 46% response rate is consistent with that for previous postal surveys for this patient group,[17] it could reduce the external validity of the study findings, although participant and non-participant characteristics were comparable. Second, CR attendance could not be tracked for all patients due to loss of records in two hospitals. Finally, while adoption of systematic procedures for routine referral and follow-up appears to enhance attendance for CABGS patients, these findings do not necessarily apply to patients who have had other acute cardiac events.

Our findings reinforce the importance of attention to procedures as well as policy. It is recommended that, where possible, the best practice guidelines[1] for both referral and follow-up should be adopted by all hospitals. Future research could then investigate the impact of widespread implementation of these practices.

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COMPETING INTERESTS

None identified.

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