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Cardiac rehabilitation

Reducing hospital readmissions through community based programs

Background
Community based cardiac rehabilitation programs have been shown to reduce cardiovascular disease related mortality and morbidity.

Methods
An observational study of 954 cardiac patients admitted to Royal Perth Hospital (Western Australia) with a cardiac event and registered in the HeartBeat™ cardiac rehabilitation program between October 2000 and December 2005. The primary end point was nonelective readmission for a cardiac condition within 12 months.

Results
Patients who attended the cardiac rehabilitation program were readmitted less often and spent less time in hospital. The program had a positive effect on women and men equally across a wide range of age groups.

Discussion
Community based cardiac rehabilitation programs are integral to the management of cardiac patients.

Cardiovascular disease (CVD) is the leading cause of death in Australia. Over 50 000 Australians died from CVD in 2004. Of the estimated 3.65 million Australians affected by CVD, around 1.1 million live with CVD related disability.[1] As a result, CVD costs the health care system more than $5.5 billion per year, with nearly 50% of that amount spent on associated hospitalisations.[2]

Cardiac rehabilitation has been shown to reduce mortality, cardiac symptoms and modifiable risk factors and to improve exercise tolerance and psychosocial factors.[3–6] These effects are seen across a range of cardiac patients (eg. myocardial infarction, congestive heart failure and postsurgical patients)[4,7] and may be a catalyst to long term lifestyle modification.[8] Cardiac rehabilitation programs have also been associated with reduced costs of care for the patient.[9–11]

HeartBeat™ is a comprehensive community based outpatient cardiac rehabilitation service. Established in 2000, it is a project of the Canning Division of General Practice in collaboration with Royal Perth Hospital (RPH) in Western Australia and is funded by the South Metropolitan Area Health Service. It serves the catchment area of the Canning Division of General Practice (total population approximately 298 000).

HeartBeat™ sessions are organised by qualified health professionals and counsellors. General practitioners provide feedback to program organisers, select suitable patients, encourage patient attendance in the program, provide support with patient medication management and monitor and treat patient CVD risk factors.

Methods

Study population

Patients were invited to register in the HeartBeat™ program if they had been admitted to RPH for a cardiac event and met the following criteria:

- received a diagnosis of angina, ischaemic heart disease, myocardial infarction, atrial fibrillation or cardiac arrest

- underwent stenting, coronary artery bypass graft surgery, angioplasty, valve replacement, pacemaker operation or angiogram
- had at least two risk factors (ie. cholesterol >5.5 mmol/L, blood pressure >140/90 mmHg, body mass index [BMI] >30, male over 35 years, postmenopausal female, smoker or ex-smoker, diabetes, family history, sedentary lifestyle).

Patients were invited and registered at time of RPH discharge. They were excluded from registering if their GP or a specialist had contraindicated exercise.

A total of 954 cardiac patients from RPH were registered in the program between October 2000 and December 2005. At registration, patients signed a consent form allowing their medical records information to be used in the program and its evaluation. The average wait between registration and program commencement was 3–6 weeks.

Intervention

Patients attended a typical HeartBeat™ program involving one session per week for 7 weeks. The sessions involved 1 hour of exercise (walking, circuit stretches, trunk stability, posture exercises and muscle strengthening for suitable patients) followed by 1 hour of intensive education on heart conditions and how to address lifestyle risk factors for heart disease. The education sessions included input from dieticians, pharmacists, exercise physiologists, 'peer educators' and counsellors from the National Heart Foundation.

Data collection

The primary end point investigated was nonelective readmission to RPH for a cardiac condition within a 12 month period 2–14 months after being registered with HeartBeat™. This information was obtained from hospital medical records. All participants used this hospital as their 'priority' destination for cardiac related diagnosis and treatment.

Data analysis

Nine hundred and fifty-four cardiac patients registered in the HeartBeat™ program. Those excluded from analysis were those with inadequate contact or follow up details (n=25) and those who attended ≤4 (of 7) sessions (n=621). This left 308 patients with data available for analysis: the intervention group who attended ≥5 (of 7) sessions (n=110), and the nonintervention group who attended no sessions (n=198).

The average age of patients included in the analysis was 67.3 ± 12.5 (range 35–91). Men in the nonintervention group were slightly younger ($p \leq 0.05$) and the distribution of the participants by gender was not significantly different between the study groups (*Table 1*).

All analyses were performed on SPSS version 15.0 statistical software. In addition to the descriptive univariate statistical data presentations, comparisons of categorical variables were performed by $\chi 2$ tests. An independent samples t-test was conducted to compare normally distributed continuous variables (eg. age) and is expressed as mean ± SE. Statistical significance was set at $p \leq 0.05$.

Results

Forty-five of 308 subjects were readmitted to hospital, with 12 subjects readmitted multiple (up to four) times. The relative risk of being readmitted to hospital if a patient did not attend HeartBeat™ was 3.02 (95% CI: 1.40–6.52, $p<0.01$). Those who did attend the program were readmitted less often and spent less time in hospital ($p \leq 0.05$) (*Table 2*).

The reduction in readmissions among the intervention groups was maintained across age and gender (*Figure 1*). Participation in the intervention significantly reduced readmission across the subgroups ($p \leq 0.05$). There was no difference in the number of women versus men readmitted based on whether or not they had participated in the program ($p>0.05$). The impact of the intervention on nonelective cardiac readmissions was preserved in the over 65 years versus under 65 years age groups and in the gender subdivisions (*Figure 2*).

Table 1. Characteristics of study subjects

	Nonintervention (n=198)	Intervention (n=110)	*p*
Age*	66.7±13.4	68.5±10.7	0.23
Female age*	70.4±1.51	69.0±1.74	0.56
Male age*	64.3±1.18	68.1±1.27	0.04
Gender (number of female, male)	75, 123	42, 68	1.00
* Mean ± SE			

Table 2. Nonelective cardiac readmissions to hospital

	Nonintervention (n=198)	Intervention (n=110)	*p*
Subjects readmitted	38	7	0.002
Total readmissions	56	9	0.004
Cumulative days hospitalised	217	32	0.001
Mean days spent in hospital	1.10 ± 3.78*	0.29 ± 1.45*	0.033
* Mean ± SE			

Discussion

Limitations of this study

This study looked at only one specific cardiac rehabilitation program. Other programs exist, some of which are more intensive, involving 2–3 sessions per week.

Self selection into the program could serve as a potential source of bias. Motivation to attend may reflect a person's overall willingness to improve their own health and address their risk factors. Alternatively, patients at risk of developing more severe disease may have been motivated to attend. Indeed, disease severity was not assessed and may have been a factor in longer and more frequent

Figure 1. Number of readmissions, females vs. males

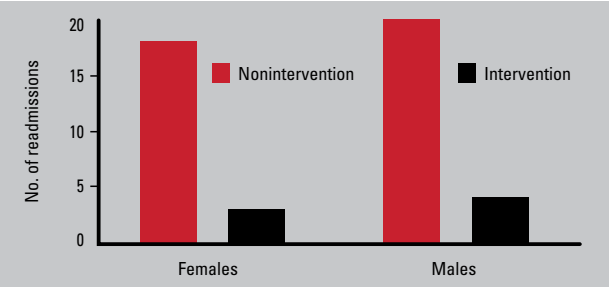
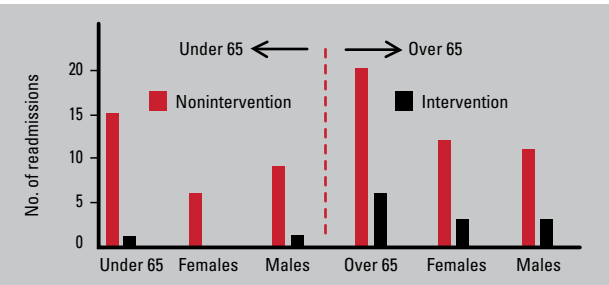


Figure 2. Number of readmissions, subjects aged under 65 years vs. subjects aged over 65 years



readmissions. Further, there may have been a subset of nonattendants who preferred to manage their risk profile independently.

This study did not analyse all outcomes from the HeartBeat™ program (eg. quality of life scores, BMI changes, medication compliance, dietary behaviour). However, the findings were in concordance with other studies using similar interventions.[3,7,11,12–14]

Underutilisation of cardiac rehabilitation

The majority of patients registering for this HeartBeat™ program attended fewer than two-thirds of sessions, and a number attended no sessions. Other Australian studies[15–17] have reported suboptimal rates of referral and utilisation of cardiac rehabilitation programs. A Queensland report[17] showed that of 16 000 eligible patients from 42 public and private hospitals, approximately 50% were not referred to a cardiac rehabilitation program. Of the 31 cardiac rehabilitation programs, 29 had unused spaces and only 61% of available spaces were utilised at least once; this suggested more referrals can be accommodated.

Underutilisation following referral reflects service and patient related factors.[17] Shorter courses may be preferable,[18] and home based programs may suit some patients more than others.[19] One comprehensive study[20] showed that older men, percutaneous intervention patients, smokers, the unemployed, nondrivers, and older or inactive women were less likely to attend. Return to work, difficulties with transportation, sickness and other commitments have been associated with infrequent attendance or nonattendance.[17,21]

It is clear that efforts to improve rates of referral and utilisation should take lifestyle issues into account. For example, transport issues may be resolved by providing taxi vouchers or bus passes, and follow up calls may help to reduce rates of nonattendance.

Conclusion

This study highlights the importance of community based cardiac rehabilitation programs in the management of patients with cardiac events. The HeartBeat™ program intervention model was shown to be effective in reducing cardiac readmissions and had an equally positive effect on women and men across a range of age groups.

General practitioner referrals to community based cardiac rehabilitation programs should be an integral part of care planning in cardiac patients.

Conflict of interest: none declared.

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