Utilisation of outpatient cardiac rehabilitation in Queensland

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ABSTRACT

Objectives: To determine patient participation rates in outpatient cardiac rehabilitation (OCR) programs; ascertain the barriers to participation; and evaluate the quality of OCR programs.

Design and setting: Retrospective cohort study of patient separations from selected public and private Queensland hospitals; questionnaire survey of hospitals and all registered OCR programs.

Participants: Patients discharged with cardiac diagnoses between 1 July 1999 and 30 June 2000 from 31 hospitals (24 public; 7 private).

Main outcome measures: Rates of referral of hospitalised patients to OCR programs; rates of program attendance and completion; barriers to OCR referral and attendance.

Results: 15 186 patients were discharged with cardiac diagnoses from participating hospitals, of whom 4346 (29%) were referred to an OCR program after discharge, compared with an estimated 59% (8895/15 186) of patients who were eligible for such a program. Proportionately more patients were referred from secondary (38% [1720/4500]) and private (52% [2116/4031]; $P < 0.001$) hospitals than from tertiary (25% [2626/10 686]) and public (20% [2230/11 155]) hospitals. Patients undergoing coronary revascularisation procedures comprised 35% of discharges, but accounted for 56% of all program attendances. Fewer than a third of all referred patients completed OCR programs, and only 39% of available OCR program places were fully utilised. Catchment populations of programs with unused places had excess coronary mortality.

Conclusion: There is significant underutilisation of facility-based OCR programs in Queensland. Procedures are required for identifying and referring eligible patients to existing programs and improving program compliance. Alternative OCR models are also required.

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CARDIOVASCULAR DISEASE remains the leading cause of death in Australia. In 1998, it accounted for 40% of all deaths, with 22% being attributed to coronary heart disease (CHD).[1] Age-standardised death rates due to cardiovascular disease vary across states and territories, with Queensland recording the second-highest rate in Australia (240 per 100 000 population) in 2001.[2] Despite their increased risk of adverse events, many patients with known CHD have suboptimal levels of smoking cessation, physical fitness, blood pressure control and use of cardioprotective medication.[3]

Multidisciplinary disease management programs for CHD conducted at a community level have limited impact on population health.[4] In contrast, randomised trials demonstrate cost-effective, long-term reductions in mortality, morbidity and disease progression from patient participation in formal programs of outpatient cardiac rehabilitation (OCR) (Box 1).[5-8]

The World Health Organization[13] and the National Heart Foundation of Australia[14] recommend that OCR programs be made available to all patients with cardiovascular disease. While most studies have recruited patients after acute coronary events or revascularisation procedures, the benefits of OCR may also extend to patients with chronic heart failure.[15] Reported rates of uptake of cardiac rehabilitation range from 10% to 20% of patients who have no overt contraindication to entry.[16,17] Limited availability of program places, failure of clinicians to refer patients, and patient-related barriers to attendance are cited as reasons for low participation rates.[18,19] Benefits of OCR to patients are also limited if OCR programs fall short of "best practice" standards of service delivery.[20]

We aimed to (i) profile patient referral, attendance and completion patterns for OCR programs throughout Queensland; (ii) ascertain reasons for any observed underutilisation; (iii) compare program activities against best-practice guidelines for OCR programs;[21] and (iv) consider alternative strategies for improving secondary prevention in patients with CHD.

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METHODS

Study population

Eligible patients were those discharged from selected Queensland hospitals (see below) between 1 July 1999 and 30 June 2000 with a principal discharge diagnosis of either coronary revascularisation surgery (percutaneous transluminal coronary angioplasty or coronary artery bypass grafting), or acute coronary syndromes (acute myocardial infarction or unstable angina).[22] As some patients may have had more than one hospitalisation during the study period with the

1: Outpatient cardiac rehabilitation (OCR) programs

OCR programs provide

- individualised medical evaluation;
- prescribed exercise regimens; and
- cardiac risk factor education and counselling.

The predominant model of OCR in Australia involves patients and spouses attending a facility-based program twice weekly for 6–12 weeks of supervised exercise and group counselling.[9] The addition of psychosocial interventions (stress management and social support) augments the benefits of exercise-based programs by addressing anxiety, depression and social isolation[10] — factors which independently predict death and recurrent cardiac events.[11,12]

same or different principal discharge diagnoses, patients were only counted once.

Patients were excluded if they were under 30 years of age, were transferred to another hospital or died in hospital. A subset of patients highly eligible to undergo exercise-based OCR was defined as those ⩽75 years of age and having no major comorbidities.

Selected hospitals were those which, according to a central administrative database (Queensland Hospital Admitted Patients Data Collection [QHAPDC]), had more than 50 separations involving any of the above principal discharge diagnoses during the study period. Hospitals were classified as being private or public, tertiary or secondary, urban or rural/remote.[23]

Data collection

Two self-administered questionnaires were distributed as follows:

A hospital OCR referral rate questionnaire was sent to the chief executive officer (CEO) of all selected hospitals, listing, for each of the two diagnostic groups, the number of patients recorded on QHAPDC as being discharged from that hospital during the study period. In the case of private hospitals, written consent to participate and access QHAPDC data was obtained from the CEO before questionnaires were forwarded. Responding hospitals were asked to state the measured or estimated proportions of patients within each group referred to OCR programs at discharge.

2: Outpatient coronary rehabilitation (OCR) — patient referrals, attendance and completion*

	Public hospitals	Private hospitals	Total
All separations with revascularisation or ACS as discharge diagnosis	11 155	4031	15 186
Patients referred to OCR			
After revascularisation	317/3087 (10%)	1386/2254 (61%)	1703/5341 (32%)
After ACS	1913/8068 (24%)	730/1777 (41%)	2643/9845 (27%)
Total	*2230/11 155 (20%)*	*2116/4031 (52%)*	*4346/15 186 (29%)*
Referrals received by OCR programs	2259†/2230 (100%)	1253/2116 (55%)	3512/4346 (81%)
Attendance rates			
Of those referred	1370/2259 (61%)	705/1253 (56%)	2075/3512 (59%)
Of referrals received	1370/2230 (61%)	705/2116 (33%)	2075/4346 (48%)
Completion rates			
Of those who ever attended	857/1370 (63%)	616/705 (87%)	1473/2075 (71%)
Program utilisation rates			
No. of attendances/ no. of program places	1370/3110 (44%)	705/2190 (32%)	2075/5300 (39%)

* All comparisons of percentages of public and private patients were statistically significant ($P < 0.05$).
† The number of received public referrals exceeds the number of public hospital patients referred, as the latter did not include referrals from public hospitals that failed to meet the selection criteria (> 50 separations per year). ACS = acute coronary syndrome.

An OCR program questionnaire was sent to the coordinators of all 39 registered OCR programs in Queensland, requesting data on (i) the number of patient referrals received and rates of patient attendance (attending an OCR program on at least one occasion) and program completion (attending for the full duration of the OCR program), and (ii) information about referral sources, activity schedule, and patient follow-up. Programs were classified as urban or rural/remote,[23] and catchment areas were mapped according to proximate postcodes, defined as those within an 80 km radius of the program site.

Study methods were approved by the Medical Quality Processes Program Committee of the Queensland Health Quality Improvement and Enhancement Program.

Statistical analysis

χ^2 tests for testing comparisons of referral and attendance rates according to diagnosis, hospital sector (public, private), hospital referral status (tertiary, secondary), and geographic location of OCR programs (urban or rural/remote). Standardised mortality ratios due to CHD were calculated for population catchment areas of OCR programs outside the Brisbane metropolitan area for comparison with numbers of unused OCR program places.

RESULTS

Questionnaire survey participation

Forty-two hospitals (29 of 112 [26%] public hospitals and 13 of 53 [25%] private hospitals) met the selection criteria. Four private hospitals did not participate. Valid questionnaires were received from 31 (74%) of the 42 hospitals (24 public and 7 private), and 31 (79%) of 39 OCR programs (19 urban and 12 rural/remote). All analyses included only those hospitals and OCR programs that returned valid questionnaires.

Patient population

QHAPDC recorded 15 186 separations of patients with cardiac diagnoses from study hospitals, comprising 5341 (35%) episodes of coronary revascularisation and 9845 (65%) episodes of acute coronary syndrome. There were 8895 patients eligible for OCR (59% of the total). Total separations from all study

hospitals comprised 81% and 63%, respectively, of all public and private hospital separations in Queensland with these diagnoses. 70% of study hospital separations were from tertiary hospitals; 81% were from public hospitals.

OCR program referrals

Referrals to OCR programs: Of the 15 186 separations, 29% of patients were referred to OCR programs (Box 2). Proportionately more patients were referred after coronary revascularisation (32%) than after acute coronary syndromes (27%) ($P < 0.001$). Secondary hospitals referred proportionately more patients than did tertiary hospitals (38% [1720/4500] v 25% [2626/10 686]; $P < 0.001$), as did private compared with public hospitals (52% [2116/4031] v 20% [2230/11 155]; $P < 0.001$). This private–public differential was most marked for patients undergoing coronary revascularisation (61% [1386/2254] v 10% [317/3087]; $P < 0.001$).

Referrals received by OCR programs: Of 4346 patients referred to OCR programs, 3512 referrals (81%) were received by the participating OCR programs.

Patient attendance and completion rates

Of the 3512 referrals received, 2075 patients (59%) attended an OCR program at least once, of whom 1473 (71% of attenders; 42% of all received referrals; 34% of all hospital referrals) attended for the full program duration. In contrast to urban programs, rural/remote OCR programs reported higher rates of attendance (100% [all 428 referrals] v 53% [1647/3084]; $P < 0.001$) but lower rates of program completion (41% [176/428] v 79% [1297/1647]; $P < 0.001$). A greater proportion of patients with revascularisation attended OCR programs (23% [1224/5341] of patients, accounting for 56% of attendances) than patients with acute coronary syndromes (9% [851/ 9845], accounting for 40% of attendances; $P < 0.001$ for all pairwise comparisons).

Barriers to OCR referral and attendance

Perceived barriers to OCR referral: Reasons for patients not being referred by hospitals are listed in Box 3A. The absence of a local OCR program was mentioned as a contributory factor by 14 of 31 hospitals (45%).

Patient-related barriers to attendance: Fifteen of 31 (48%) OCR program coordinators cited patients' return to work and 12 (39%) cited lack of transport as explanations for infrequent (< 25% of visits) attendance (Box 3B). Both factors were more frequently cited by urban than by rural/remote coordinators (53% v 42% and 53% v 17%, respectively).

OCR program utilisation

Each year, about 5300 OCR program places are available in Queensland (holiday periods excluded), assuming an average program duration of 4–6 weeks, comprising two 1–2-hour sessions per week. OCR programs varied markedly in the numbers of received referrals per patient separation and rates of patient attendance and completion. During the study period, 2075 patients attended at least once, utilising, at least partially, 39% of available places. The availability of program places in relation to demand was similar in both urban and rural/remote locations (12 v 13 places per 100 separations). All programs except two had unused places (median, 22; range, 0–250), as did all programs (median, 58; range, 7–168) whose catchment populations had excess CHD mortality, as measured by the standardised mortality ratio exceeding 1.00. We estimated that 132 excess deaths due to CHD occurred during the study period in the presence of 676 unused OCR program places.

Profile of OCR programs

Group programs, individual programs, or a combination of both, were delivered by 42%, 29% and 26% of programs, respectively, with most having a program duration of 4–6 weeks (61%), comprising 1–2 patient visits per week (58%). Virtually all programs (> 90%) provided patient education about diagnosis, medications, risk factors, behaviour modification and symptom management, and most provided an exercise program (77%) and psychosocial counselling (81%).

Best-practice standards[21] were met by 68% of programs, with no differences between urban and rural/remote programs. Most programs (68%) notified general practitioners of their patients' participation, and forwarded detailed exit assessments and management recommendations, while 71% provided patient follow-up on completion. Program effects on clinical outcomes

3: Reported barriers to outpatient coronary rehabilitation (OCR) program referral and attendance

A. Barriers to patient referral to OCR program at hospital discharge	Number (%) of respondents*
Absence of local OCR program	14 (45%)
Failure of attendant doctors to consider referring eligible patients	10 (32%)
Lack of clinician awareness of program availability	8 (26%)
Absence of a dedicated OCR program coordinator with whom to liaise	7 (23%)
Insufficient time to arrange referrals	11 (35%)
Unfamiliarity of clinicians and hospital coronary rehabilitation coordinators with referral process	5 (16%)
Distance/transport problems	5 (16%)
B. Barriers to patient attendance at OCR programs	**Number (%) of respondents†**
Work commitments	15 (48%)
Transport difficulties	12 (39%)
Pressure of other duties	9 (29%)
Patients not suited to planned activities	6 (19%)
Program not considered helpful by patient	5 (16%)
Comorbidity factors	2 (6%)
Other reasons	10 (32%)

*Hospitals returning valid responses ($n = 31$).
† OCR program coordinators returning valid questionnaires ($n = 31$).

(weight reduction, smoking cessation, exercise tolerance, adjustment to illness and return to work) were evaluated by 48% of programs, the extent to which participants received all program elements was evaluated by 39%, and patient understanding and adherence by 26%. Secure funding was considered by OCR program coordinators to be a prerequisite for better program performance and sustainability.

DISCUSSION

All patients recently hospitalised with acute coronary events or procedures should be considered eligible for enrolment in an OCR program. At least half of these patients are eligible for entry into an exercise-based program, consistent with the highest reported participation rates of more than 50%.[24] In the United States, 10%–20% of such patients participate in formal OCR,[17] compared with 11% in the United Kingdom[25] and 28% in Victoria.[16]

In our study, 29% of patients were referred at hospital discharge, and 10% of patients discharged after acute coronary events or procedures completed OCR programs; 61% of available OCR program places were less than fully utilised. This underutilisation occurred in association with excess CHD-related mortality in catchment populations of all OCR programs.

Study limitations

In the absence of patient-level data disclosing contraindications to entry into exercise-based programs, or previous enrolment in OCR after past admissions, we may have overestimated the numbers of patients potentially eligible for OCR. In addition, the number of patients attending OCR programs may have been underestimated, as not all OCR programs returned valid questionnaires. Referral rates were also subject to measurement error in that almost half of the hospitals included provided estimates rather than actual measures of hospital referral numbers, and half of the private hospitals did not participate. However, under-referral was confirmed by comparing the 29% referral rate from included hospitals with the estimate that 59% of discharged patients met eligibility criteria. Finally, reasons for patient non-attendance were not ascertained directly from patients themselves, but as observations of OCR program coordinators. This may have introduced observer bias.

Reasons for program underutilisation

Underutilisation of OCR relates mainly to service or patient factors. Patients discharged from secondary or private hospitals were more likely to be referred. Lack of awareness by clinicians of OCR programs, inadequate hospital referral procedures, and poor program organisation (such as no designated inhospital cardiac rehabilitation coordinator) were contributory factors to referral failure, as reported by others.[26] Failure of hospital referral procedures is of concern given that patients react more positively to specialist recommendations to attend OCR than to recommendations by other health professionals.[27]

From the patient's perspective, competing work commitments, lack of transport and perceptions that programs were of limited value were frequently given as reasons for non-attendance. Other research replicates these findings,[18] and also suggests that smokers,[28] women,[29] older patients,[30] and those living alone or with no spouse or social support,[31] or in socioeconomically disadvantaged areas,[27] are more likely to drop out of OCR programs.

Program adherence to "best-practice" standards

The activities of OCR programs in Queensland do not fully comply with best-practice guidelines, although they rate well internationally.[20,26] While performing strongly in terms of entry assessment, goal setting and program content and duration, 30% or more of programs omitted discharge assessments, detailed referrals to GPs, and exit evaluation of patient risk factors and level of understanding. Only a minority engaged in systematic patient follow-up. Limited resources and absence of a formal accreditation review process impaired program ability to adhere to best-practice guidelines.

Implications for practice

Older patients with various comorbidities now comprise up to 50% of patients hospitalised with cardiac conditions who can benefit from OCR, but who have difficulty participating in OCR.[32] Solutions include improving use of current facility-based programs and exploring new service models that overcome access and adherence barriers.

For current programs, eligible patients should be identified before hospital discharge, and be subject to an automatic, standardised referral process, unless a clinician specifically directs otherwise. Screening and referral registries should be established, and, in cases of deferred enrolment (awaiting stress tests or coronary angiography), recall systems need to be implemented, including reminders to GPs requesting OCR referral when clinically appropriate. OCR program personnel also need to ensure that programs meet the individual needs and preferences of participants.[33]

Randomised trials have shown worthwhile benefits of alternative models of OCR. These include supervised, home-based exercise programs, which incur no added risk of cardiac arrest;[34,35] personalised health education by specialist nurses[36] and individualised "coaching" programs;[37] visits to nurse-run secondary prevention clinics affiliated with general practice surgeries;[38] nurse-supervised case management;[39,40] and individualised education and telephone outreach services.[41] Such models warrant further study. Attention also needs to be given to ways of extending intensive OCR into long-term secondary prevention programs.[42] Selected OCR programs in Queensland are developing and testing new models of OCR delivery.[43]

Our study has shown marked underutilisation of cardiac rehabilitation programs. Concerted efforts are needed from OCR program staff, professional societies, health foundations and government departments to improve participation rates and investigate new models of OCR.

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COMPETING INTERESTS

None identified.

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