High risk-factor level and low risk-factor knowledge in patients not accessing cardiac rehabilitation after acute coronary syndrome

Julie Redfern, Elizabeth R Ellis, Tom Briffa and S Ben Freedman

ABSTRACT

Objective: To document the risk-factor profile and risk-factor knowledge of patients with an acute coronary syndrome (ACS) not attending standard cardiac rehabilitation.

Design and setting: Cross-sectional comparison in a tertiary hospital.

Participants: Patients admitted to hospital with an ACS, residing within 20 km of the hospital, and without severe comorbidity who did not access cardiac rehabilitation (NCR) were compared with a group about to commence standard cardiac rehabilitation (SCR).

Main outcome measures: Risk-factor profile, knowledge of risk factors via face-to-face assessment, quality of life.

Results: Of the 446 patients eligible for cardiac rehabilitation, 208 attended for assessment (NCR: $n = 144$; SCR: $n = 64$). The NCR group had higher mean (±SEM) low-density lipoprotein (LDL) cholesterol levels (2.6 ± 0.1 v 2.3 ± 0.1; $P = 0.02$), and were more likely than the SCR group to have a total cholesterol level of >4.0 mmol/L (78% v 53%; $P < 0.001$) and an LDL cholesterol level >2.5 mmol/L (47% v 25%; $P = 0.01$). They were more likely than the SCR group to be physically inactive (77% v 22%; $P < 0.001$); obese (46% v 33%; $P = 0.04$); depressed (21% v 5%; $P < 0.001$); or current smokers (21% v 1%; $P < 0.001$). Compared with the SCR group, the NCR group also had higher risk scores (LIPID risk score) (4.5 v 2.1; $P < 0.001$); lower quality of life (Medical Outcome Short Form [SF-36] Health Survey); and significantly poorer knowledge of risk factors. Among patients with at least two modifiable cardiac risk factors, the NCR group were less likely than the SCR group to be able to state at least one risk factor (24% v 38%; $P < 0.001$).

Conclusions: Patients not participating in cardiac rehabilitation after an ACS have more adverse risk profiles and poorer knowledge of risk factors compared with those about to commence cardiac rehabilitation. Alternate models for secondary prevention are required to improve health outcomes in patients not attending cardiac rehabilitation.

MJA 2007; 186: 21–25

Coronary heart disease (CHD) is a major cause of morbidity and mortality in Australia and is associated with significant cost.[1] Australian guidelines recommend that all patients with an acute coronary syndrome (ACS) participate in secondary prevention,[2] incorporating risk-factor management including lifestyle change and the use of vasoprotective medications. This is an effective means of extending overall survival, reducing the occurrence of non-fatal cardiovascular events, decreasing the need for coronary revascularisation and improving quality of life.[3] Cardiac rehabilitation is a widely recognised form of secondary prevention,[4] but participation rates are low (10%–30%)[5,6] because of transport difficulties, work and social commitments, lack of perceived need,[7] and functional impairment.[8] Therefore, despite short-term benefits for attendees, large groups of patients are not benefiting, presenting an opportunity and challenge to improve overall CHD care.[8]

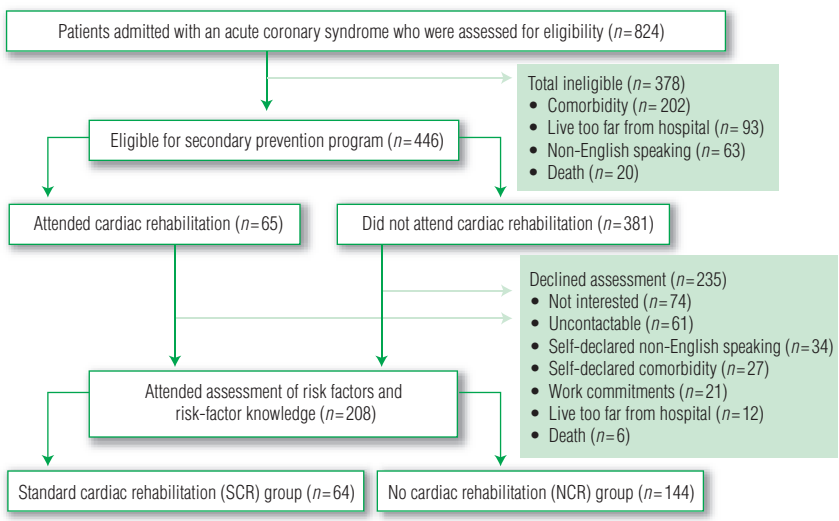
There are limited data reporting the risk-factor profile of patients not accessing cardiac rehabilitation,[9] and, to the best of our knowledge, there are no studies reporting both risk-factor prevalence and knowledge of risk factors in this group. Knowledge of risk factors is an essential basis for active participation in lifestyle changes, medication adherence[10,11] and improved quality of life[12] — all important aspects of optimal secondary prevention. Patients' knowledge may be suboptimal,[13] and, in this study, we aimed to quantify the CHD risk profile and knowledge of risk factors of outpatients not accessing cardiac rehabilitation after an ACS.

METHODS

Participants

All patients admitted to a metropolitan tertiary referral hospital in Sydney with an ACS between April 2003 and February 2004 were identified using diagnosis-related groups (DRG) codes[14] for unstable angina (F72A, F72B), myocardial infarction (F41A, F41B, F60A, F60B) and chest pain (F74Z). Hospital medical records were reviewed to determine secondary prevention eligibility.

1 Profile of the recruitment process and attendance for assessment and cardiac rehabilitation



Reasons for ineligibility included living more than 20 km from the hospital; insufficient understanding of English to give informed consent; and uncontrolled congestive heart failure, severe comorbidity, or death.

Of the total of 824 admissions, 378 patients (46%) were ineligible for participation in a formal cardiac rehabilitation program (reasons given in Box 1). All 446 eligible patients were contacted by mail and telephone within 12 months of admission and invited to volunteer for research investigating CHD prevention; 235 declined (reasons given in Box 1) and three were excluded because they had previously attended cardiac rehabilitation. Altogether, 208 patients attended for an assessment (Box 1), 64 of whom were about to commence cardiac rehabilitation (standard cardiac rehabilitation [SCR] group) and 144 were not (no cardiac rehabilitation [NCR] group). Reasons for not attending cardiac rehabilitation included: transport problems (19%); work commitments (16%); doing own exercise (8%); not interested (10%); and not referred (47% — due to patient/physician preference and/or scarcity of resources). Risk factors for all eligible patients who did not attend face-to-face assessment were extracted from medical records to permit comparison of risk factors with those who attended assessment.

2 Demographic and clinical characteristics of patients with an acute coronary syndrome not attending (NCR group) or attending (SCR group) cardiac rehabilitation. Data are number (%) unless otherwise indicated

	NCR group (n = 144)	SCR group (n = 64)
Sex		
Male	107 (74%)	52 (81%)
Age (years)		
Mean ± SEM	64 ± 1.1	64 ± 1.3
Range	31–86	33–80
Country of birth		
Australia	80 (56%)	33 (52%)
Europe	48 (33%)	24 (37%)
Asia/Pacific/Africa	16 (11%)	7 (11%)
Occupation		
Not working	93 (65%)	45 (70%)
Working full time	40 (28%)	15 (23%)
Working part time	11 (8%)	4 (6%)
Acute coronary syndrome (ACS)		
Unstable angina	60 (42%)	33 (52%)
Myocardial infarction	84 (58%)	31 (48%)
Prior myocardial infarction	13 (9%)	7 (11%)
Time from ACS to assessment (months, mean ± SEM)	6.3 ± 0.2	3.3 ± 0.2*
Revascularisation		
Nil	63 (44%)	9 (14%)
Percutaneous coronary intervention	47 (33%)	29 (45%)
Coronary artery bypass graft surgery	34 (24%)	26 (41%)†
Any	81 (56%)	55 (86%)*
History of transient ischaemic attack/ cerebrovascular accident/peripheral vascular disease	13 (9%)	4 (6%)

* $P < 0.001$; † $P < 0.05$: for no cardiac rehabilitation (NCR group) v standard cardiac rehabilitation (SCR group). ◆

Standard cardiac rehabilitation is offered onsite to outpatients in a gym at Concord Hospital. The program includes two 60-minute gym sessions and a 2-hour education session each week for 6 weeks. Weekend or evening sessions are not available.

Outcome measures — risk-factor prevalence and knowledge

Face-to-face assessment

CHD risk-factor prevalence and level, overall risk profile and knowledge of risk factors were evaluated during a face-to-face assessment at 4.5 ± 0.2 months (mean ± SEM) after admission for an ACS. For 83% of patients accessing standard cardiac rehabilitation, assessment was conducted before the initial appointment and commencement of cardiac rehabilitation. Lipids were measured on a fasting blood sample. Resting blood pressure was measured with an Omron automatic blood pressure monitor (Omron Healthcare Inc, Illinois, USA).[15] Smoking status was measured by self-report and confirmed with the aid of a carbon monoxide meter (Air-Met Scientific Micro Smokerlyzer, Melbourne, Vic).[16] Physical activity was assessed using the international 7-day physical activity recall questionnaire,[17] and depressive mood was assessed using the cardiac depression scale.[18] The Medical Outcome Short Form Health Survey (SF-36) (version 2)[19,20] was used to assess quality of life, and socioeconomic status was compared between the groups using the socioeconomic index for areas scores (lower values represent regions of greater disadvantage).[21]

Cutoff points for modifiable risk factors

Cutoff points for determining the number of modifiable risk factors were:

- total cholesterol level, > 4.0 mmol/L;
- systolic blood pressure, ⩾ 140 mmHg;
- current smoking;
- physical inactivity score;[17]
- body mass index, ⩾ 30 kg/m²;
- known diabetes; and
- cardiac depression scale score, ⩾ 90 for depression.[18]

The LIPID risk score[22] was used to calculate each patient's relative cardiac risk. This score was developed for use in secondary prevention, and the aggregate score classifies patients as having low (score, ⩽ 4), medium (5–6), high (7–9) or very high risk (⩾ 10).

Knowledge of risk factors

To assess knowledge of risk factors, patients were asked whether they could state any of their own heart disease risk factors and whether they knew the current nationally recommended levels for total cholesterol, blood pressure, physical activity and smoking. A history of hypercholesterolaemia and hypertension was recorded from each patient's medical records, so that when comparing patients' knowledge of their own risk factors with risk factor prevalence, we used either a total cholesterol or blood pressure level above the cutoff point, or a history of the risk factor, as the denominator.

Ethical approval

Ethical approval for the study was obtained from the then Central Sydney Area Health Service, Concord (Repatriation General Hospital Zone) and the University of Sydney. All participants gave written informed consent.

Statistical analysis

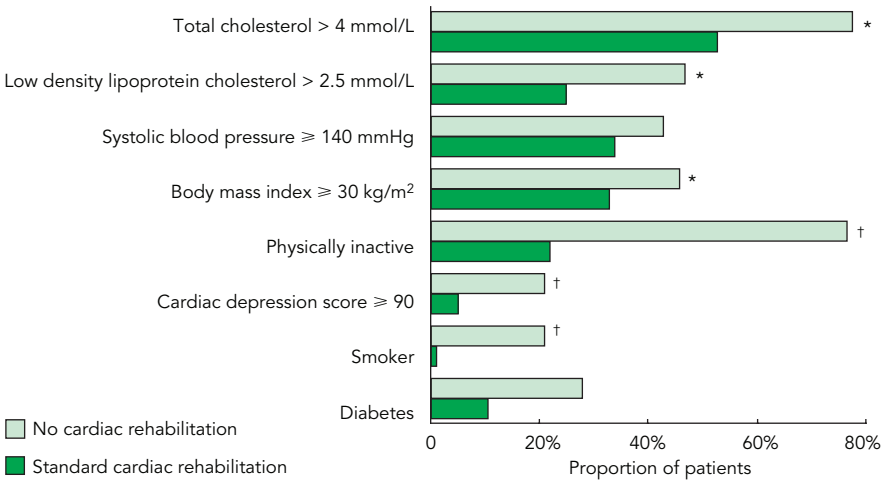
Data were analysed using SPSS for Windows (version 12.01; SPSS Inc, Chicago, Ill, USA) and are presented as mean and SEM or as proportions. Differences in outcome measures between groups were compared using t tests for continuous variables and either χ^2 tests or Fisher's exact tests for

3 Medications taken by patients not attending (NCR group) or attending (SCR group) standard cardiac rehabilitation after an acute coronary syndrome

Medication class	NCR group ($n = 144$)	SCR group ($n = 64$)
Antiplatelet		
Aspirin	91 (63%)	43 (67%)
Clopidogrel	42 (29%)	25 (39%)
Any antiplatelet	144 (100%)	64 (100%)
Antihypertensive		
ACE inhibitor/ angiotensin II antagonist	87 (60%)	42 (66%)
Any antihypertensive	87 (60%)	43 (67%)
Statin	99 (69%)	53 (83%)*
β-Blocker	65 (45%)	38 (59%)
Calcium antagonist	22 (15%)	7 (11%)
Antiarrhythmic	11 (8%)	9 (14%)
Antianginal	32 (22%)	12 (19%)
Diuretic	22 (15%)	14 (22%)

* $P < 0.05$: for no cardiac rehabilitation (NCR group) v standard cardiac rehabilitation (SCR group). ACE = angiotensin-converting enzyme. ◆

4 Proportion of patients with various risk factors not attending (NRC group) or attending (SCR group) cardiac rehabilitation after an acute coronary syndrome



* $P < 0.05$; † $P < 0.001$: for no cardiac rehabilitation (NCR group) v standard cardiac rehabilitation (SCR group). ◆

proportions of categorical variables. Two-tailed P values of < 0.05 were considered significant.

RESULTS

Patient demographics, diagnoses and medications

Most of the patients were male, born in Australia and were not working (Box 2). Fewer patients in the NCR group than in the SCR group had undergone coronary revascularisation (56% v 86%; $P < 0.001$), and the mean (±SEM) time between ACS admission and risk-factor assessment was longer in the NCR group (6.3 ± 0.2 months) than the SCR group (3.3 ± 0.2 months). Socioeconomic status was not significantly different between the NCR and SCR groups. Fewer patients in the NCR group than in the SCR group reported taking a statin (69% v 83%, $P = 0.02$). Other cardiovascular medications were similar in the two groups (Box 3).

Modifiable risk factors and overall risk

A significantly greater proportion of patients in the NCR group than the SCR group had total cholesterol levels > 4.0 mmol/L, low-density lipoprotein (LDL) cholesterol levels > 2.5 mmol/L, were physically inactive, obese, depressed, and current smokers (Box 4), and had four or more cardiac risk factors. The mean (±SEM) LDL cholesterol level, cardiac depression scale depression score, number of modifiable risk factors and LIPID score were also significantly greater in the NCR than the SCR group (Box 5). Further, the proportion of patients with a LIPID score ⩾ 5 (medium-to-high risk) was significantly higher in the NCR than the SCR group (49% v 22%; $P < 0.001$). Quality of life measured using the SF-36 questionnaire was significantly worse in the NCR group compared with the SCR group in the dimensions: physical functioning (71.6 ± 1.5 v 76.5 ± 2.0; $P = 0.008$); vitality (50.5 ± 1.5 v 57.3 ± 2.6; $P = 0.04$); and role-emotional (78.3 ± 2.9 v 93.7 ± 1.8; $P = 0.001$).

Knowledge of own modifiable risk factors

Of the patients in the total cohort with at least one modifiable risk factor, most (137/194, 71%) were unable to state any risk factors. A significantly greater proportion of patients in the NCR group than in the SCR group were unable to state any of their risk factors (75% v 58%; $P = 0.013$). Also, significantly fewer patients in the NCR group than the SCR group could state nationally recommended targets for total cholesterol level, blood pressure and physical activity (Box 6).

To assess whether the number of modifiable risk factors present affected an individual's ability to state their own risk factors, we examined group difference for patients with one or more risk factor and for those with two or more risk factors. For patients with one or more risk factor, there was no difference in the proportion who could state at least one risk factor between the NCR (47/142, 33%) and SCR groups (20/55, 36%). However, among patients with two or more risk factors, those in the NCR group were significantly less likely to state at least one risk factor than those in the SCR group (31/128, 24% v 14/37, 38%; $P < 0.001$). In both the NCR and SCR groups, patients with two or more modifiable risk factors were significantly more likely to state at least one risk factor than patients with only one risk factor present.

Risk factors of patients who declined assessment

Of the 235 eligible patients who declined attending for assessment, significantly fewer had experienced myocardial infarction than patients in the NCR group (20% v 58%; $P < 0.001$). However, there was no significant difference between those who declined assessment and those in the NCR group in the proportion with a total cholesterol level > 4.0 mmol/L (73% v 78%); systolic blood pressure ⩾ 140 mmHg (53% v 43%); diabetes (28% v 28%); current smoker (21% v 21%); mean (±SEM) total cholesterol level (4.8 ± 0.1 v 4.7 ± 0.1 mmol/L) or mean (±SEM) systolic blood pressure (137.1 ± 1.5 v 136.9 1.2 mmHg).

DISCUSSION

Our study quantifies the CHD risk profile and risk-factor knowledge of patients not

accessing cardiac rehabilitation (NCR group) after hospital admission for an ACS. Such patients had a more adverse risk-factor profile and poorer knowledge of cardiac risk factors than those about to commence standard cardiac rehabilitation (SCR group). Although serum cholesterol level is arguably the most important risk factor, fewer patients in the NCR group could state the recommended level and were more likely to have a high total cholesterol level than those in the SCR group. The difference in total cholesterol level between the two groups equates to a predicted increase in CHD risk of about 24%.[23]

Patients in the NCR group were more likely to be physically inactive, a trait that clusters with other risk factors such as obesity, smoking or depression.[1] Patients may decline to take part in an exercise-based program fearing overexertion, or because of self-consciousness resulting from inactivity or obesity. Therefore, an exercise-based approach may not be the most appropriate form of secondary prevention for all patients.

Surprisingly, ACS survivors had very poor knowledge of cardiac risk factors. Over 70% of patients were unable to state any of their own modifiable risk factors. In agreement with our study, a point prevalence study investigating patients' awareness of risk factors found that only 14/71 patients (20%) could define a cardiac risk factor and, overall, patients had "very little understanding" of their own risk factors.[13] Therefore, information about risk factors is not being processed, retained or provided during or after admission. We also found that risk-factor knowledge of patients in the NCR group was significantly inferior to those in the SCG group, while at the same time, the number of risk factors and the risk-factor level was significantly worse.

5 Modifiable cardiac risk factors in patients not attending (NCR group) or attending (SCR group) cardiac rehabilitation after an acute coronary syndrome. Data are mean ±SEM or number (%)

Risk factor	NCR group ($n = 144$)	SCR group ($n = 64$)
Lipid levels (mmol/L)		
Total cholesterol	4.7 ±0.1	4.3 ±0.1
High-density lipoprotein cholesterol	1.3 ±0.0	1.2 ±0.0
Low-density lipoprotein cholesterol	2.6 ±0.1	2.3 ±0.1*
Triglycerides	1.9 ±0.1	1.5 ±0.1
Blood pressure (mmHg)		
Systolic	137.1 ±1.5	135.7 ±2.6
Diastolic	78.1 ±1.0	76.8 ±1.4
Body mass index (kg/m²)	30.1 ±0.5	28.8 ±0.7
Physical activity (metabolic equivalent·min·week^{-1})	290.9 ±24.7	701.4 ±57.6†
Cardiac depression scale score	68.9 ±2.0	60.0 ±2.5*
Current smoker	30 (21%)	1 (1%)†
Diagnosed diabetes	40 (28%)	7 (11%)*
Relative cardiac risk (LIPID risk score)[21]	4.5 ±0.3	2.1 ±0.3†
Modifiable risk factors		
Median (interquartile range)	3.0 (2.0–4.0)	1.0 (1.0–2.0)†
0–1 risk factor	27 (19%)	34 (53%)†
2–3 risk factors	76 (53%)	29 (45%)
⩾ 4 risk factors	39 (27%)	2 (3%)†

* $P < 0.05$; † $P < 0.001$: for no cardiac rehabilitation (NCR group) v standard cardiac rehabilitation (SCR group).

6 Proportion of patients not attending (NCR group) or attending (SCR group) cardiac rehabilitation who were able to state recommended risk-factor levels

Risk factor (recommended target)	NCR group ($n = 144$)	SCR group ($n = 64$)
Total cholesterol (⩽ 4.0 mmol/L)	46 (32%)	43 (67%)*
Blood pressure (⩽ 140/80 mmHg)	48 (33%)	35 (55%)†
Physical activity (on ⩾ 5 days for 30 min)	44 (31%)	36 (56%)*
Smoking (no smoking)	144 (100%)	64 (100%)

* $P < 0.001$; † $P < 0.05$: for no cardiac rehabilitation (NCR group) v standard cardiac rehabilitation (SCR group).

This highlights a crucial gap in the delivery of care — the patients with the greatest need and poorest knowledge are not accessing formal secondary prevention. Risk factor knowledge has been shown to correlate with greater adherence to lifestyle changes,[11] enhanced orientation of patients towards activity, and better health status and quality of life.[12] Alternative secondary prevention programs, such as the COACH study,[24] or a modular program[25] for patients who do not access exercise-based cardiac rehabilitation could improve outcomes by closing this gap in knowledge.

A potential limitation of our study is that a large proportion of patients not accessing cardiac rehabilitation after an ACS declined to attend our risk-factor assessment; it is possible that these patients had a different risk profile to the group we assessed. However, the risk-factor profile of those who did not attend for assessment was virtually identical to those in the NCR group whom we did assess. Another potential limitation is that 47% of the patients in the NCR group had not been referred to cardiac rehabilitation. Given that only 37% of those referred to cardiac rehabilitation in our institution actually attend, 83% (119/144) may still have declined to attend rehabilitation even if all those in the NCR group had been offered rehabilitation, indicating a sizeable gap in secondary prevention.

A further limitation is the longer mean duration between admission and risk assessment for the NCR group because this longer time may have reduced knowledge retention. Nevertheless, 75% of the NCR group with at least one modifiable risk factor were unable to state any risk factor at 6 months, a finding that would adversely affect long-term risk-factor management.

In conclusion, this study has identified a large group of patients who deserve attention. They do not access cardiac rehabilitation after an ACS, and have both adverse risk-factor profiles and little knowledge of their own risk factors. Future research should investigate alternative models of secondary prevention that could reach

a greater proportion of patients after an ACS and provide long-term management of risk.

ACKNOWLEDGEMENTS

We wish to thank the participating patients and staff at Concord Hospital in the Cardiology and Medical Records departments. This work was supported by the National Heart Foundation of Australia in the form of a Grant-In-Aide and a Postgraduate Clinical Research Scholarship for Julie Redfern. We also thank the University of Sydney (1 year scholarship for Julie Redfern) and the Cardiac Society of Australia and New Zealand (travel grant for Julie Redfern).

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Julie Redfern, BAppSc, BSc, Research Physiotherapist[1]
Elizabeth R Ellis, MHealthLaw, MSc, PhD, Honorary Senior Lecturer[1]
Tom Briffa, BPhysEd, MPhysEd, PhD, Lecturer[2]
S Ben Freedman, MB BS,PhD, FRACP, Professor of Cardiology,[3] Head Vascular Biology Group[3]

1 University of Sydney, Sydney, NSW.
2 Curtin University of Technology, Perth, WA.
3 Department of Cardiology, Concord Repatriation General Hospital, Sydney, NSW.

Correspondence: ben@med.usyd.edu.au

REFERENCES

1 Australian Institute of Health and Welfare. Heart, stroke and vascular diseases, Australian facts 2004. Cardiovascular disease series No. 22. Canberra: AIHW, 2004. (AIHW Catalogue No. CVD 27.)
2 Acute Coronary Syndrome Guidelines Working Group. Guidelines for the management of acute coronary syndromes 2006. *Med J Aust* 2006; 184 (8 Suppl): S1-S32.
3 McAlister FA, Lawson FME, Teo KK, Armstrong PW. Randomised trials of secondary prevention programs in coronary heart disease: systematic review. *BMJ* 2001; 323: 957-962.
4 Taylor RS, Brown A, Ebrahim S, et al. Exercise-based rehabilitation for patients with coronary heart disease: a systematic review and meta-analysis of randomized trials. *Am J Med* 2004; 116: 682-697.
5 Bunker S, McBurney H, Cox H, Jelinek M. Identifying participation rates at outpatient cardiac rehabilitation programs in Victoria, Australia. *J Cardiopulm Rehabil* 1999; 19: 334-338.
6 Scott IA, Lindsay KA, Harden HE. Utilisation of outpatient cardiac rehabilitation in Queensland. *Med J Aust* 2003; 179: 341-345.
7 Evenson KR, Fleury J. Barriers to outpatient cardiac rehabilitation participation and adherence. *J Cardiopulm Rehabil* 2000; 20: 241-246.
8 Harlan WR, Sandler SA, Lee KL, et al. Importance of baseline functional and socioeconomic factors for participation in cardiac rehabilitation. *Am J Cardiol* 1995; 76: 36-39.
9 Sundararajan V, Bunker SJ, Begg S, et al. Attendance rates and outcomes of cardiac rehabilitation in Victoria, 1998. *Med J Aust* 2004; 180: 268-271.
10 Czar M, Engler M. Perceived learning needs of patients with coronary artery disease using a questionnaire assessment tool. *Heart Lung* 1997; 26: 109-117.
11 Alm-Roijer C, Stagmo M, Uden G, Erhardt L. Better knowledge improves adherence to lifestyle changes and medication in patients with coronary heart disease. *Eur J Cardiovasc Nurs* 2004; 3: 321-330.
12 Brody DS, Miller SM, Lerman CE, et al. Patient perception of involvement in medical care: relationship to illness attitudes and outcomes. *J Gen Intern Med* 1989; 4: 506-511.
13 Momtahan K, Berkman J, Sellick J, et al. Patients' understanding of cardiac risk factors: a point-prevalence study. *J Cardiovasc Nurs* 2004; 19: 13-20.
14 Commonwealth Department of Health and Ageing. Australian refined diagnosis related groups (AR-DRGs). AR-DRGs version 4.1 (Vol 1). Canberra: The Department, 1998. http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-casemix-ardrg1.htm (accessed Oct 2006).
15 El Assaad MA, Topouchian J, Asmar RG. Evaluation of two devices for self-measurement of blood pressure according to the international protocol: the Omron MS-I and the Omron 705IT. *Blood Press Monit* 2003; 8: 127-133.
16 Cunningham AJ, Hormbrey P. Breath analysis to detect recent exposure to carbon monoxide. *Postgrad Med J* 2002; 78: 233-237.
17 Booth M. Assessment of physical activity: an international perspective. *Res Q Exerc Sport* 2000; 71: S114-S120.
18 Hare DL, Davis CR. Cardiac depression scale: validation of a new depression scale for cardiac patients. *J Psychosom Res* 1996; 40: 379-386.
19 Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF36). I: Conceptual framework and item selection. *Med Care* 1992; 30: 473-483.
20 Ware JE, Snow KK, Kosinski M, Gandek B. SF-36® health survey manual and interpretation guide 1993. Boston, MA: New England Medical Center, The Health Institute, 1993.
21 Australian Bureau of Statistics. 1996 Census of population and housing: socio-economic indexes for areas (SEIFA), Australia. Canberra: ABS, 1998. (Catalogue No. 2033.0.30.001.)
22 Marschner IC, Colquhoun D, Simes RJ, et al. Long-term risk stratification for survivors of acute coronary syndromes. *J Am Coll Cardiol* 2001; 38: 56-63.
23 Simes JR, Marschener IC, Hunt D, et al, on behalf of the LIPID Study Investigators. Relationship between lipid levels and clinical outcomes in the Long-term Intervention with Pravastatin in Ischaemic Disease (LIPID) trial: to what extent is the reduction in coronary events with pravastatin explained by on-study lipid levels? *Circulation* 2002; 105: 1162-1169.
24 Vale M, Jelinek M, Best JD, Santamaria JD. Coaching patients with coronary heart disease to achieve the target cholesterol: a method to bridge the gap between evidence-based medicine and the "real world" — randomized controlled trial. *J Clin Epidemiol* 2002; 55: 245-252.
25 Redfern J, Ellis E, Briffa T, Freedman SB. Modular prevention of heart disease following acute coronary syndrome (ACS) [ISRCTN42984084]. *BMC Cardiovasc Disord* 2006; 6: 26.

(Received 20 Mar 2006, accepted 4 Sep 2006) ❑