Concordance with phase-one cardiac rehabilitation guidelines in the inpatient setting

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KEY WORDS

heart disease, rehabilitation, adherence, standards

ABSTRACT

Objective
To examine concordance with phase-one cardiac rehabilitation (CR) guidelines, undertake an intervention that might optimise adherence to the guidelines, and establish a benchmark for practice in the coronary care unit (CCU) setting.

Design
Pre-post intervention medical record review.

Setting
Level 1, university affiliated coronary care unit (CCU), Melbourne, Australia.

Subjects
Inpatients of the CCU with a discharge diagnosis of acute coronary syndrome, ischaemic-induced acute pulmonary oedema, myocardial infarction, arrhythmia, or cardiac arrest, and patients for elective coronary interventions (eg. angioplasty).

Interventions
Medical record review of concordance with phase-one CR guidelines and staff in-services to communicate the results; distribution of a questionnaire post in-service to collate staff perceptions of barriers to undertaking phase-one CR; and repeated medical chart audit to re-assess concordance.

Main outcome measures
Concordance with the guidelines for phase-one CR.

Results
Data was complete for 89 cases. Concordance rates ranged from 5 to 100%. Good concordance with guidelines was recorded in advising the patient of their medical diagnosis (98-100%); and in assessing the patient and their family's psychological adjustment to their condition and the impact it had on their well being (80-83%). The only significant improvement post intervention was a written invitation to a phase two CR program (5 vs. 14%).

Conclusions
The audit raised awareness of barriers to undertaking phase-one CR but did not appreciably alter the concordance rates. This suggests other strategies and resources to increase the delivery of phase-one CR need to be considered

INTRODUCTION

Heart disease is the primary cause of disease burden (AIHW 2003) and the most common cause of sudden death in adult Australians (AIHW 2005; AIHW and NHF of Australia 2004). Effective evidenced based guidelines exist for the inpatient management of acute cardiac events (NHF/CSANZ 2007). Evidenced based care has reduced the mortality rates of patients, who can then proceed to discharge from hospital following an acute cardiac event and intervention. Prior to hospital discharge, patients and their families require education and access to information on secondary prevention strategies that will empower them to make the necessary lifestyle modifications to actively manage a chronic health condition such as heart disease (Flynn et al 2007).

National and international guidelines recommend attendance at a cardiac rehabilitation (CR) program for patients post myocardial infarction (Leon et al 2005; NHF/ACRA 2004). Indeed, all acute care cardiac patients require cardiac rehabilitation and access to secondary prevention programs (Goble and Worchester 1999). The National Heart Foundation of Australia and the World Health Organization recommend that CR services be available and routinely offered to everyone with cardiovascular disease and that the program be delivered by qualified health clinicians (NHF/ACRA 2004; WHO 1993).

Cardiac rehabilitation is the process through which patients return to an active and satisfying lifestyle and provision of this service is an expected tenet in the patient care continuum (ACRA 1999). Phase-one CR is primarily concerned with counselling. It aims to explain the diagnosis and to raise the candidate's awareness of risk factor modification, cardio-protective dietary guidelines, smoking cessation, and early mobilisation. It includes reassurance of progress, family involvement, and education relating to angina, medications, alcohol consumption, and return to work and/or driving. It further includes follow-up and referral to a phase two program (Goble and Worchester 1999; New Zealand Guidelines Group 2002, 2003).

This study centre recorded 1278 inpatient admissions to their coronary care unit (CCU) in 2005. Despite the large number of admissions to the CCU and the recognition of coronary disease as a condition that requires long term care and patient education, this was the first attempt to evaluate concordance with phase-one CR guidelines. At the time of conducting this study there were few published reviews of adherence to phase-one CR guidelines in the clinical setting. There were some reports in the literature that adherence to guidelines that inform practice for the management of cardiovascular health conditions were sub-optimal. A recent study of quality of care for patients with acute coronary care syndromes published the outcomes from 12 process of care quality indicators (Scott et al 2002). Concordance with recommendations for inpatient cardiac rehabilitation was reported as 47% and 7% for phase-two cardiac rehabilitation. These authors suggested that quality improvement might follow from the implementation of a guideline-linked audit and feedback process, professional education, care maps, or from a combined educational approach.

In a more recent study (Harvey et al 2005), adherence to the evidence-based guidelines for the inpatient management of chronic obstructive pulmonary disease (COPD) was less than 60% and referral to an outpatient-based pulmonary rehabilitation program was 15%. These authors conducted an audit review and results were reported back at a senior clinical group peer review meeting. Following the feedback of the audit results, a second audit failed to report significant increases in adherence to the guidelines. This outcome suggested that while professional education and feedback improved concordance with some of the guidelines, additional mechanisms such as identifying barriers to adherence should also be examined to facilitate optimal uptake of guidelines in clinical practice.

Phase-one CR is often regarded as an automatic part of cardiac inpatient care (Day and Batten 2006). Despite the evidence to support cardiac rehabilitation it has been suggested that a disparity often exists

between the published guidelines of care and actual practice in the clinical setting (Flynn et al 2007). The primary aim of this investigation was to examine concordance to phase-one CR guidelines. The study's further aim was to undertake a simple intervention that might optimise adherence to phase-one guidelines and establish a benchmark for translating evidence into practice in the CCU setting.

METHOD

Study design and setting

A retrospective chart review was conducted in a level one university-affiliated hospital. The underlying premise of this study was that if phase-one CR was not documented in the patient's medical records then it had not been done.

There were two data collection periods. The medical records of the first fifty admissions to the CCU in one calendar month were audited. A further fifty consecutive admissions to the CCU were audited following two staff in-services of the primary audit's outcomes, and completion of an anonymous questionnaire by the CCU staff. The questionnaire outlined commonly perceived barriers to undertaking phase-one CR education and invited participants to document any other barriers not listed. Both in-services were conducted during the overlap time between the morning and evening shifts.

As this was a pilot study, the sample size for the audit was chosen arbitrarily. The hospital's ethics committee granted approval for this quality assurance activity and for the reporting of the outcomes.

Subjects

Eligible subjects were consecutive patients admitted to the CCU with a discharge diagnosis of acute coronary syndrome, ischaemic-induced acute pulmonary oedema, myocardial infarction, arrhythmia, or cardiac arrest, and patients for elective coronary interventions (eg. angioplasty). All admissions were recorded in the CCU patient admissions register. The admissions register is derived from the Australian Nursing Assessment and Documentation Alternative (ANADA) system which has been reported previously (George 1995). The cases were accepted for the audit if the patient's medical file was available to be reviewed and if it confirmed the discharge diagnosis of a cardiac event as the primary reason for admission to the CCU. Cases were excluded if the medical record reported that the patient had a co-existing terminal illness or had cognitive impairment. Terminal illness or cognition are not reasons for exclusion from the CCU, but asking such candidates how they could modify their cardiac risk factors would seem inappropriate.

Data Collection

A trained abstractor extracted the information from the hospital records using a standardised data collection tool. The tool was based predominately on the content of the New Zealand Guidelines Group's evidence-based guidelines (New Zealand Guidelines Group 2002). These guidelines report the level of evidence with each component that cardiac rehabilitation education seeks to cover. Recommendations from these guidelines were cross-checked with other published reports (NHF/ACRA 2004; NHF/CSANZ 2004; Goble and Worchester 1999) before the data collection tool was finalised. These locally produced publications ensured that the guidelines espoused were relevant to the local population. A synthesis of these guidelines as the basis for the audit tool ensured the 'best available evidence' was incorporated in the development of the tool as summarised in Table two. The audit tool is available for scrutiny and/or use from the corresponding author.

Intervention

Data from the first audit were analysed and the outcomes twice presented at the CCU's monthly staff meetings. Staff discussed the outcomes and completed an anonymous questionnaire of perceived barriers to implementing phase-one cardiac rehabilitation. Questionnaires were deposited in a box and the feedback summarised.

Statistical analysis

Patient characteristics and demographics were compared between groups using X^2, parametric (t-test), and non-parametric methods. A p-value less than 0.05 was considered to be statistically

Table 1: Patient characteristics for the pre and post intervention audit results

	Pre- Intervention n = 40	Post- Intervention n = 49	p value
Age: M (SD) years	66 (15)	63 (14)	0.39
Gender: (Male)	20 (50%)	34 (70%)	0.09
LOS in CCU: M (SD) days	4 (4)	2 (2)	0.01*
Cumulative LOS in hospital: M (SD) days	6 (6)	4 (3)	0.05
Discharged home directly from the CCU	37 (93%)	42 (86%)	0.34
Australian born	19 (48%)	23 (47%)	0.94
AMI (STEMI / NSTEMI)	20 (50%)	15 (31%)	0.34
Elective percutaneous coronary intervention	5 (13%)	17 (35%)	0.01*

Note: M: Mean; SD: Standard Deviation; LOS: Length of stay, * Significant difference

significant. Kolmogorov-Smirnov and Shapiro-Wilks tests were performed to assess normality of the data. If the p-value was <0.05 in either test, it was assumed the data was not normally distributed. Concordance rates for each item were calculated as the number of phase-one components documented in audited records divided by the number in the audit sample and expressed as a percentage. Ninety five per cent confidence intervals were calculated for the difference in concordance rates before and after the intervention. Statistical analysis was performed using SPPS version 13.0 (Ill, USA).

FINDINGS

There were statistically significant differences between groups in the patient's length of stay in CCU (p=0.01) despite no significant differences between groups in age, gender, country of origin, or proportion of direct discharges from the CCU. There were no significant differences between the pre- and

Table 2: Comparison of concordance for each phase-one recommendation pre- and post-intervention audits

	Pre- Intervention % concordance (n = 40)	Post- Intervention % concordance (n = 49)	95% CI for the difference in concordance rates
Cardiac diagnosis	100	98	2 (-0.76, 0.26)
Cardiac risk factors	78	71	7 (-0.14, 0.11)
Nutritional advice	40	35	5 (-0.07, 0.38)
Smoking cessation referral or record of smoking status	68	67	1 (-0.13, 0.61)
Physical activity plan until attendance at phase two cardiac rehabilitation	60	43	17 (-0.06, 0.47)
Psychological aspects and relationships	83	80	3 (-2.87, 0.78)
Involvement of partner and family in education	68	55	13 (-0.10, 0.31)
Angina management plan	68	59	9 (0.02, 0.41)*
Education about medications	73	78	5 (-0.01, 0.27)
Healthy heart range for alcohol consumption	5	6	1 (-0.07, 0.38)
Return to work	15	20	5 (-0.22, 0.53)
Return to driving	13	4	9 (0.05, 0.71)*
Written invitation whilst inpatient to attend phase-two cardiac rehabilitation	5	14	9 (-0.19, 0.15)

Note: *confidence interval (CI) does not include zero statistically significant difference.

post-intervention audits in patients presenting with an acute myocardial infarction (AMI). The volume of elective percutaneous coronary procedures differed significantly (p=0.01), which most likely explains the reduced length of stay in CCU and in hospital (see table 1).

Table 2 summarises the adherence to the phase-one CR guidelines pre and post intervention. Concordance with the guidelines remained exceptionally good in documenting the patient's medical diagnosis, discussing with the patient their cardiac risk factors, psychological adjustment to illness/ roles and relationships, and discussing with the patient the use of medications for their health management. Patient education regarding their prescribed medication, expected time off work, alcohol consumption and a written invitation to attend phase two cardiac rehabilitation were documented to have occurred more frequently post-intervention but these increases did not reach statistical significance. There were no statistically significant improvements recorded between the audit groups in the advising of patients of a cardio-protective dietary intake (p=0.18) or in the recording of smoking status/referral to the hospital's smoking cessation clinic (p=0.20). Formulation of a physical activity plan during phase-one CR, education on the use of sublingual glyceryl-trinitrate ('Anginine') and on resumption of driving were recorded to have occurred less in the second audit.

Table 3: Barriers to phase-one cardiac rehabilitation In the CCU setting

	Rank
Busy shift, education not a priority	1
Use of itinerant (locum) staff	2
Junior/ new staff	3
Patient too tired or anxious	4
Delay in confirmation of the medical diagnosis	5

The barriers that staff identified that had prevented phase-one cardiac rehabilitation from occurring in the CCU have been summarised in table 3. All staff present at the two clinical meetings (n=18) completed the questionnaire. This response rate represents approximately half the CCU roster. In-services were not conducted on the night shift and rotating rosters meant that it would be difficult to have all staff attend these inservice meetings.

Patients from both of the audit periods who during their admission to the CCU were transferred out to the ward prior to their discharge home had their charts reviewed to determine the degree of phase-one CR that had occurred whilst they were recovering in the ward environment (see table 4).

Table 4: Documented phase-one CR conducted with the patient upon transfer to the ward from the CCU

	First audit n=16	Second audit n=12
Cardiac diagnosis discussed with patient	1%	25%
Cardiac risk factors discussed with patient	0%	17%
Angina management plan discussed with patient	1%	42%

DISCUSSION

In the USA, it has been reported that 18% of men and 35% of women experience a further myocardial infarction within the following six year period subsequent to their initial coronary event (American Heart Association as reported in Flynn et al 2007). The likelihood of repeated presentations provides an additional impetus to empower patients and their families with evidenced based information and access to resources to help delay progression in coronary heart disease.

Our audit quantified the percentage of CCU patients who had received documented phase-one CR education in a given sample. Good concordance with the phase-one CR guidelines were recorded in advising the patient of their medical diagnosis (98-100%), in assessing the patient and their family's psychological adjustment to their condition and the impact it had on their personal and social well-being (80-83%). The reporting back of the first audit results enabled some staff to ask what and where the phase-one CR guidelines contained and

could be accessed. In addition, the CCU staff had the opportunity to rank in their opinion the barriers to implementing phase-one CR in the CCU. In evidenced based projects, clinician input enables a greater link between the unit's and the clinician's priorities and to explore gaps in professional standards of care (Newhouse et al 2005).

The pressure of time was the primary barrier, followed by the staffing profile in the unit, patient fatigue, and the diagnostic ambivalence as evidenced with some cardiac enzyme markers that delays confirmation of a medical diagnosis. The presentation of the pre-intervention audit outcomes and increased awareness of barriers was considered a possible strategy that would improve the documenting of advice that patients received. With the exception of issuing a written invitation to attend phase two CR (5% vs. 14%), this study was unable to produce any significant improvements in the post intervention audit. This was an unexpected finding as a systematic checklist of phase-one CR and care maps exist in the CCU to optimise clinical practice. It has been identified in the literature that barriers to guideline adherence amongst physicians include a lack of awareness with guidelines and a lack of time and resources (Cabana, Rand and Powe 1999). The barriers reported by the CCU nursing staff were aligned with these reported barriers despite the systematic processes the CCU had in place.

There was a statistically significant reduced length of stay recorded in the CCU in the second audit time period, which would account for the reduced time patients had in CCU for education. The lack of significant improvement in the second audit was interesting as there were a significantly greater number of elective CCU patients in this sample who could be regarded as being in better prognostic shape and more likely to be earmarked for phase-one CR education. The high discharge rate (83-96%) directly from the CCU to the patient's home is indicative of the need for phase-one CR to be completed in the CCU. The patient's hospital stay is the opportunity to outline the link between the inpatient cardiac care received with the outpatient follow up and maintenance services. This need for time and resources to be invested in phase-one CR education in the CCU setting is especially evident when all patients in both audit periods who were transferred out to the ward appeared to receive minimal phase-one CR education in that setting. Unfortunately, education does not appear on any budget and is generally considered a generic responsibility for all health disciplines. However as health education is not 'owned' by any discipline or department nor has a discrete budget, its central role in health management is often not given the priority it requires (Lorig 1995). Despite this anomaly, it is widely acknowledged that patients, staff and the hospital all benefit when guideline based practiced is adhered to (Flynn et al 2007).

The limitations of this audit included no customer feedback as to the quality of the information received, nor the likelihood of incorporation of the lifestyle modifications to optimise their health. The need to evaluate the quality of the phase-one cardiac rehabilitation program from the consumer perspective has been considered by other health services as an outstanding area yet to be fully examined (Stokes 1999). Other limitations of this study include the lack of random sampling, small sample size and possible bias of the staff involved in the delivery of the phase-one CR program.

The underlying premise of the study was that if phase-one CR was not documented in the patient's medical records then it had not been done. These results are therefore a conservative estimate in a convenience sample of the number of cardiac patients who received phase-one CR in the inpatient setting.

CONCLUSION

This audit demonstrates the need to improve the management of phase-one cardiac rehabilitation education in the inpatient setting. A benchmarking process that will allow ongoing evaluation of the evidenced-based guidelines has been established. The next step in our quality improvement process is

to the modify barriers to implementing phase-one CR education, and evaluate the participant's feedback of the phase-one cardiac rehabilitation service offered.

Clinical leaders will be sought from within the cardiac team to devise strategies that increase adherence to phase-one cardiac rehabilitation guidelines. Sourcing clinical champion(s) has been identified as critical to optimising health outcomes. A clinical champion does not need to be the most senior member in the team but rather a clinical expert who will champion change and foster interdisciplinary collaboration (Flynn et al 2007). Discordant clinical cardiac care following myocardial infarction had been reported to adversely impact on health outcomes (Flynn et al 2007; Scott and Harper 2002).

Determining the impact of concordance with phase-one cardiac rehabilitation guidelines on health outcomes will be an important goal of future research in this area. There is also the potential to roll out this quality improvement process to other coronary care units. This retrospective audit and feedback accompanied by an awareness of barriers to undertaking phase-one CR did not appreciably alter the concordance rates. This suggests that other strategies and resources to increase the delivery of phase-one CR need to be considered.

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