What have our patients learnt after being hospitalised for an Acute Myocardial Infarction?

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Abstract

Background: Education for hospitalised patients is an important aspect of care for people who have an acute cardiovascular event.

Objective: To investigate the cardiovascular risk factor behaviours of patients together with their Acute Coronary Syndrome(ACS) knowledge, attitudes and beliefs following admission to hospital for an acute myocardial infarction.

Methods: Patients diagnosed with an acute myocardial infarction participated in an observational study. Patients completed a questionnaire consisting of cardiovascular risk factor behaviour questions and the ACS Response Index prior to discharge and at follow-up 10 weeks later.

Results: Of the 135 participants enrolled, 114 (84%) completed follow-up, 70% were males; mean age was 63 (± 11.6) years. The median length of hospital stay was 3 days (IQR 1) and the time to follow-up after discharge was 10 weeks. Self-reported risk factor behaviours improved significantly for diet ($p < 0.001$) and smoking cessation ($p = 0.023$) following discharge. At discharge 39% of patients had inadequate knowledge of ACS symptoms. The ACS Response Index improved significantly after discharge for attitudes ($p = 0.004$) and beliefs ($p = 0.008$). Despite 85% of patients indicating they would attend cardiac rehabilitation only 30% had commenced a program at follow-up.

Conclusion: Patients reported implementing a number of healthy lifestyle changes following discharge including smoking cessation and healthy eating. Attitudes and beliefs regarding ACS showed a significant improvement following discharge. More

than one third of patients had inadequate knowledge at discharge, suggesting current education practices may not be meeting the needs of patients with a myocardial infarction.

Key words: cardiovascular disease, cardiovascular nursing, consumer health information, health education, myocardial infarction, patient education.

Introduction

Cardiovascular disease (CVD) remains one of the most prevalent causes of death in Australia¹ and accounts for 33% and 29% of male and female deaths, respectively.² CVD affects an estimated 17% of the Australian population, over 3.4 million people.¹ Secondary prevention focusing on behaviour modification is an important aspect of care for people who survive a myocardial infarction^{3,4} decreasing mortality and hospital admissions.⁵ Patients with CVD are still not achieving the lifestyle and risk factor goals recommended by clinical practice guidelines.^{4,6,7} There are varying opinions regarding the relationship between knowledge and compliance,⁷ however knowledge is still considered an essential first step to promote appropriate self-care behaviours.^{8,9} Knowledge of risk factors has been correlated to compliance with some lifestyle changes, such as weight loss, increased physical activity, stress management and dietary changes.⁷ For patients with diagnosed CVD, recognition of ACS symptoms assists with appropriate responses and reduces pre-hospital delay to treatment.⁹ However even for those who have experienced an acute cardiac event, knowledge levels are generally poor.^{8,10} Over the last decade changes in our health care delivery have resulted in decreased lengths of hospital stay,¹¹ with less time available for education of patients with a diagnosis of ACS admitted to cardiac units. While the importance of patient education is well recognised many patients do not receive adequate education prior to discharge^{8,12} and patients have reported receiving less information than they wanted from health care professionals.¹³

It appears that the information needs of patients with CVD remain largely unmet at discharge from hospital.^{12,14} The theory of adult learning or andragogy recognises that identifying learning needs is an important component of learning.¹⁵ Adults need to

know why they need to learn something, so it is important to assist learners to identify the gaps in their knowledge.¹⁵ Another key aspect of adult learning is that adults become ready to learn when they need the knowledge in order to cope effectively with their real-life situation. Adults are motivated to learn when they perceive that learning will help them deal with the problems they are confronted with in their life. A recent review of education strategies for hospitalised CVD patients found that only 20% of studies reported that a theoretical framework guided the educational intervention.¹⁴ There is little evidence that the principles of andragogy have been effectively utilised to guide education for hospitalised CVD patients.

People with CVD should receive comprehensive rehabilitation that includes patient education.¹⁶ However, providing education to hospitalised patients can be challenging. Patients may be physically and psychologically not ready for learning due to the acuity of their illness, anxiety, fatigue, cognitive function and health literacy.¹⁴ Healthcare staff barriers that negatively impact on patient education include paternalistic teaching style, lack of counselling skills and knowledge deficit about adult learning and education principles.¹⁷ Health care system barriers may include decreased length of hospital stay with decreased opportunities and time for teaching inpatients.¹⁸ Misunderstandings can arise when health care professionals use curative language to describe outcomes of proceedings, particularly for ACS patients who have had a percutaneous coronary intervention.¹⁹ For patients with CVD the adoption and maintenance of the appropriate risk-reducing behaviours can be difficult.¹⁴ Despite Phase 1 Cardiac Rehabilitation(CR) occurring in hospital, patients often remain unaware of how to implement appropriate risk factor behaviours and manage their ACS symptoms on discharge.¹⁹ Behaviour change is a complex and multi-faceted process and providing patient education to

promote adherence to recommendations is challenging for health care professionals.¹⁹ While clinical practice guidelines indicate that patient education is an essential element of care for the management of ACS, it remains unclear which educational strategies are most effective for hospitalised CVD patients. Additionally, determining how best to present cardiovascular risk effectively to patients, to facilitate decisions to reduce their risks, also remains unclear.²⁰ Patient education prior to discharge has been found to place the patient in a state of readiness to successfully manage their care and continuing recovery at home.²¹ It remains unclear whether patients have the opportunity to develop their knowledge during hospitalisation for an acute cardiac event.

The purpose of this research was to investigate knowledge and CVD risk factor behaviours in patients with a diagnosed acute myocardial infarction prior to discharge and at 10 weeks postdischarge.

Methods

Setting

This study was undertaken in a cardiology unit at a tertiary referral hospital in Brisbane, Australia. This acute clinical unit comprises a 14 bed Cardiology Ward, an 8 bed Coronary Care Unit and a 6 bed Procedural Unit. Acute patients with CVD including ACS, arrhythmias and heart failure are cared for in this unit. A range of cardiac procedures including percutaneous coronary intervention, implantation of pacemakers and defibrillators, electrophysiology studies and ablation are provided.

Participants

All patients admitted to this unit with a diagnosis of ST elevation myocardial infarction (STEMI) or non-ST elevation myocardial infarction (NSTEMI) were screened for eligibility for this study. Inclusion criteria were:-

- ≥ 18 years
- Able to read and write English
- Living independently
- Access to a telephone
- Aware of their diagnosis

Patients were excluded for the following reasons:-

- Documented cognitive impairment
- Documented psychological compromise
- Being listed for immediate cardiac surgery

Study Design

Participants were recruited during their initial admission for an acute myocardial infarction and completed a questionnaire to assess CVD risk factor behaviours and ACS symptom knowledge, beliefs, attitudes. The participants were contacted by telephone to complete the same questionnaire 10 weeks after discharge to assess changes. A follow-up of 10 weeks was selected to coincide with anticipated completion of the CR program. One of the researchers audited each patient chart for written documentation to confirm the delivery of patient education. Patients were asked if they recalled receiving information about their heart disease and whether they had received a written information booklet.

Questionnaire

The first section of the questionnaire focuses on cardiac risk factor behaviours with questions about behaviours known to be associated with increased risk for CVD specifically diet, exercise, smoking, and knowledge of blood pressure and cholesterol levels. Participants were also asked questions about their follow-up care, for example

if they were advised to visit their own doctor after discharge and if they intended to enrol in a CR program. At follow-up participants were asked if they had visited a doctor and commenced a CR program. These questions were developed locally based on the CVD risk factors addressed in the current CR program and assessed for face validity by a Cardiologist, CR clinicians and a small number of patients.

The second section, the Acute Coronary Syndrome (ACS) Response Index,²² was used to assess knowledge of ACS symptoms, as well as attitudes and beliefs regarding ACS in three sections. Firstly a dichotomous knowledge scale of 21 items in which participants are asked to identify symptoms of acute myocardial infarction from a list of 15 correct and 6 incorrect symptoms. Scores for ACS knowledge range from 0 to 21 with a score of <70% correct indicating a substantial deficit in knowledge. Secondly a 4 point Likert scale was used to evaluate attitude items. An attitude is a mental position regarding something known.²² The participants rated 5 attitude questions on symptom recognition (e.g. How sure are you that you could recognise the signs and symptoms of a heart attack?) on a scale of 1(not at all) to 4(very sure). Scores ranged from 5 to 20. Thirdly a 4 point likert scale was used to evaluate beliefs. Beliefs reflect strongly held opinions about the truth of a proposition without its verification.²² Participants were asked to rate 7 belief statements (e.g. If I thought I was having a heart attack, I would wait until I was very sure before going to the hospital) on a scale of 1(strongly agree) to 4(strongly disagree). Scores for the ACS beliefs range from 7 to 28. The psychometric properties of this scale have been demonstrated previously.²² Using Cronbach alpha, the internal reliability measures specific to this study were 0.644 (knowledge), 0.707 (attitudes) and 0.825 (beliefs).

Statistical analysis

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 18 for Windows (SPSS Inc, Chicago, IL, USA). Continuous variables were assessed for normality and described using mean and standard deviation or median and interquartile range (IQR). Categorical data were reported as counts and frequencies. Risk factor behaviours were reported using descriptive statistics with McNemar's test used to test for differences between the matched pairs of dichotomous variables. Analysis of the ACS Response Index scores was performed using paired t-tests, given the normal distribution, to analyse the initial and follow-up scores for knowledge, attitudes and beliefs. The responses for the attitude scales were recoded to not at all/little sure and pretty sure/very sure and analysed as dichotomous variables. Similarly the beliefs responses were recoded to strongly agree/agree and strongly disagree/disagree for analysis as dichotomous variables. The level of significance considered significant for all analysis was 0.05.

The appropriate institutional health service Human Research Ethics Committee approved the research (HREC/10/QPAH/300) and all participants gave informed, written consent prior to participation. Participants consented to completing in-hospital questionnaires and postdischarge follow-up questionnaires. Confidentiality of data was achieved by storing all data on a secure password protected computer at the hospital.

Results

Of the 135 participants recruited for this study, 114(84%) completed follow-up, as shown in **Figure 1**. The demographic and clinical profiles of the study participants are provided in **Table 1**. For the participants who completed follow-up the mean age was

63 years, 70% were males, the median length of hospital stay was 3 days (IQR 1) and the time to follow-up from discharge was 10 weeks. Of the participants initially recruited 21(16%) did not complete follow-up. There were no significant differences between this group and the 114 who completed follow-up. Reasons for no follow-up included death of 3 participants, 5 withdrew from the study, and 13 were unable to be contacted.

Significant improvements were found with participants reporting they were following healthy eating guidelines ($p<0.001$) and had ceased smoking ($p=0.023$) from hospital discharge to follow-up. Participants reported non significant trends in improvements in regard to knowledge of their blood pressure and cholesterol levels as shown in **Table 2**.

In hospital, 45(39%) patients demonstrated knowledge scores of $<70\%$ which indicates substantial deficits in knowledge of ACS symptoms, however at follow-up the number of participants with knowledge deficits had decreased to 36(32%) demonstrating an improvement in knowledge. There was a significant increase in scores for attitudes ($p=0.004$) and beliefs ($p=0.008$) from hospital discharge to follow-up at 10 weeks as shown in **Table 3**.

Participants' responses to the attitudes questions were significantly improved in two areas; how sure they were that they could recognise a heart attack in someone else ($p=0.006$) and how sure they were that they could tell the difference between the symptoms of a heart attack and other medical problems ($p<0.001$). In the beliefs section participants' responses improved significantly at follow-up in 2 questions. An

increased number of participants disagreed/strongly disagreed with the statement that they would be embarrassed to go to hospital if they thought they were having a heart attack but they were not ($p=0.019$), and an increased number of participants agreed /strongly agreed that if they were having a heart attack they would go to hospital straight away ($p=0.008$).

The in-hospital questionnaire asked patients to identify if they planned to attend a CR program and then at follow-up they self-reported if they had commenced, were enrolled or were not intending to participate in a CR program. This could be a face-to-face or a telephone CR program. Initially 84% of participants indicated they intended to commence a program on discharge however 10 weeks later only 30% had commenced while a further 25% reported they were enrolled waiting to commence. At the time of follow-up there was a significant difference in the knowledge score of participants who had attended CR ($M=16.0$, $SD1.94$) and participants who had not attended CR ($M=14.6$, $SD 2.9$) $t(112) = -3.023$, $p=0.003$.

In hospital 85% of patients indicated they had been advised to contact their own local doctor or General Practitioner on discharge. At follow-up 99% reported they had attended a doctor's appointment.

The chart audit indicated patients received education from health care professionals including ward nurses, specialist CR nurses, doctors, occupational therapists, physiotherapists, dietitians, speech therapists, and social workers. During their hospitalisation 108(95%) patients received patient education from ward nurses however only 64(56%) of the patients recalled receiving education from the nurses.

While in hospital 102(90%) participants indicated they received a written patient education booklet.

Discussion

This study investigated cardiovascular risk factor behaviours together with ACS symptom knowledge, attitudes, and beliefs. After 10 weeks patients had implemented some appropriate behaviour changes related to their CVD risk factors and their attitudes and beliefs had improved significantly. Behaviours related to reducing known CVD risk factors improved, specifically smoking cessation, and following healthy eating guidelines. Previous research has suggested that decisions concerning risk factor behaviours may be considered and acted upon in the immediate post-infarct phase.²³ Therefore it is important to focus on providing effective education regarding modifiable risk factor behaviours while patients are in hospital.

Similar to previous studies, this study revealed that ACS Response Index knowledge scores for CVD patients' remains poor.^{10, 24} At discharge 39% of the participants demonstrated inadequate knowledge and were unable to differentiate between typical and atypical symptoms associated with ACS. Inadequate knowledge level has previously been reported.^{8, 10} In-hospital patient education, although recognised as a standard of care to promote knowledge and prepare a patient for discharge, is complex due to issues such as the timing of the teaching, the relevance of the education provided and the barriers to retention of the information.^{14, 21} Health care professionals often focus on the content itself and provide information they think is important rather than assessing the information needs of the patients.²⁵ Rather than the content, the strongest predictor of the effectiveness of this teaching has been found to be the delivery of the

teaching.²¹ Even though participants in this study received information regarding ACS symptoms together with a chest pain action plan, a more important focus to promote knowledge development may be how the information is delivered and whether the information is individualised to meet the patients' learning needs. A patient-centred approach based on the principles of andragogy to guide education for hospitalised patients may improve their knowledge. Interestingly there was a trend towards improved knowledge at follow-up. This may be due to patients reading the booklet they were given on discharge or it may be due to patients seeking information from other sources such as the CR program. Adults will typically learn when they experience a need to cope with a life situation,¹⁵ therefore following hospitalisation for an acute MI, patients may seek additional information to cope with their newly diagnosed disease. Even though less than one third of patients attended a CR program, there was a significant knowledge increase for these patients.

Patients perceptions of receiving information prior to discharge do not necessarily reflect the actual amount or type of teaching provided by their nurses.²⁵ The patients in this study received verbal and written patient education while in hospital. A chart audit revealed patient education was delivered by a range of health care professionals. Nearly all the patients received education from the ward nurses, however only about half recalled receiving this education. Previous explanations for such discrepancies have focused on a lack of attention during information exchange, difficulty coping with their illness, feelings of intimidation, and information overload.²⁵ Generally ward nurses integrate patient education into the delivery of care throughout the hospital stay. However with a shortened hospitalisation, there may be less time and opportunity available for nurses to engage the patient in education and support.¹⁸ Previous

research has shown that a brief individualised intervention focusing on ACS knowledge, attitudes and beliefs can have a positive impact.⁹ The quality of the delivery of patient education has been strongly associated with increased effectiveness of education.²¹

Initially participants in this study had a mean attitude score similar to previous studies¹⁰ and this improved significantly at follow-up. Participants' responses demonstrated improvement in most of their ACS attitudes. There was significant improvement in their ability to recognise the signs and symptoms of a heart attack in someone else, as well as being able to differentiate between a heart attack and other medical problems. The initial mean beliefs score was comparable to previous studies⁸ with significant improvement over the follow-up time. Improved responses indicated that participants would no longer be embarrassed to go to hospital if they thought they were having a heart attack but were not. Similarly if they thought they were having a heart attack they would go to hospital right away. These are important concepts as pre-hospital delays contribute to poor patient outcomes. Being able to make a prompt decision to seek medical assistance quickly is critical to minimising morbidity and mortality.⁸

Attendance at a CR program is recommended in current guidelines as a recognised effective treatment for reducing cardiac risk factors and improving patient outcomes.^{26, 27, 28} However these programs are generally underutilised with fewer than one in three eligible patients attending a CR program.²⁸⁻³⁰ Our study found that although 85% of patients indicated they would attend a CR program postdischarge, only 30% of patients had commenced a CR program at 10 weeks, with another 25%

enrolled and waiting to commence. Factors associated with low attendance at CR programs include patients' lack of understanding about the severity of their disease, and lack of availability of flexible programs.^{28, 30} While the benefits of attending CR education and exercise programs are well known²⁸ this study has emphasised the need for patients to be able to access programs in a timely manner postdischarge. Reasons for delays in commencing and non-attendance need further investigation.

There are several limitations of this observational study. This study involved a pre-test post-test methodology, therefore a testing effect may have influenced the follow-up test results, as it is recognised that people being tested for a second time tend to do better on the second test.^{31, 32} Additionally a follow-up of 10 weeks may not have been long enough and the improvements in attitudes and beliefs may not have been sustained after this time. Lastly the risk factor behaviours were self-reported by the participant and may not reflect actual behaviour.

Conclusion

After hospitalisation for an acute cardiovascular event patients demonstrated poor knowledge of the symptoms of ACS. Following a diagnosis of ACS, patients need effective education to improve their knowledge and to develop an understanding of appropriate risk factor modification behaviours. Current educational practices may not be meeting the needs of ACS patients. Educational interventions guided by the principles of adult learning with an individualised patient-centred approach may be more effective.

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Figure 1: Flowchart of participants.

Table 1: Demographics

	Completed follow-up n=114	Did not complete follow-up n=21	p-value
Age : mean(SD)	62.8 (±11.6)	60.1 (±11.9)	0.337 ^a
Sex : male n (%)	80(70.2)	12(57)	0.239 ^b
Time in hospital: mean days (SD)	4.1 (±3.1)	4.5 (±3.54)	0.600 ^a
Time to follow-up : mean days (SD)	71.9(±12.9)	N/A	

^a *t*-test for continuous variables, ^b chi-squared for categorical variables

Table 2: Health Care Behaviours

	In-hospital	At follow-up	p-value
	n(%)	n(%)	
Following healthy eating guidelines	41(36)	88(77)	<0.001^d
Following recommended exercise guidelines	61(54)	52(46)	0.243 ^d
Currently smoking	29(25)	17(15)	0.023^d
Have knowledge of own blood pressure reading	77(68)	85(75)	0.078 ^d
Have knowledge of own cholesterol blood levels	72(63)	77(68)	0.511 ^d

^d McNemars test

Table 3: ACS Response Index

	In-hospital	At follow-up	p-value
Knowledge (0-21)	14.5(±3.0)	15.0 (±2.7)	0.120 ^c
Attitudes (5-20)	15.3(±3.1)	16.1(±2.7)	0.004 ^c
Beliefs (7-28)	23.2(±5.2)	24.7(±3.6)	0.008 ^c

^c paired *t*-tests