

# Psychosocial components of cardiac recovery and rehabilitation attendance

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## Abstract

**Objective**—To examine the relations between demographic factors, specific psychosocial factors, and cardiac rehabilitation attendance.

**Design**—Cohort, repeated measures design.

**Setting**—A large tertiary care centre in western Canada

**Patients**—304 consecutive consenting patients discharged following acute myocardial infarction and/or coronary artery bypass graft surgery.

**Main outcome measures**—The Jenkins self-efficacy expectation scales and activity checklists of behaviour performance for maintaining health and role resumption, modified version of the self-motivation inventory, and the shortened social support scale.

**Results**—Those who had higher role resumption behaviour performance scores at two weeks after discharge were significantly less likely to attend cardiac rehabilitation programmes. At six months after discharge, those who attended cardiac rehabilitation demonstrated higher health maintenance self-efficacy expectation and behaviour performance scores. Health maintenance self-efficacy expectation and behaviour performance improved over time. Women reported less social support but showed greater improvement in health maintenance self-efficacy expectation. Changes in self-efficacy scores were unrelated to—but changes in health maintenance behaviour performance scores were strongly associated with—cardiac rehabilitation attendance.

**Conclusions**—Cardiac patients and practitioners may have misconceptions about the mandate and potential benefits of rehabilitation programmes. Patients who resumed role related activities early and more completely apparently did not see the need to “rehabilitate” while those who attended cardiac rehabilitation programmes enhanced their secondary prevention behaviours.

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Keywords: self-efficacy; motivation; social support; cardiac recovery; cardiac rehabilitation

Cardiovascular disease is a major cause of morbidity, social and economic burden, and mortality in North America.<sup>1,2</sup> As our population ages, increasing numbers of people are being discharged from hospital following a cardiac event. Their recovery is not a time limited process, as the lifestyle adjustments (secondary prevention behaviours) advocated once a cardiac diagnosis is made are life long. Successful recovery, adjustment, and adoption of secondary prevention behaviours following a cardiac event are enhanced through participation in multifaceted cardiac rehabilitation programmes.<sup>3–5</sup> Despite compelling research evidence identifying the biophysical and psychosocial benefits of participating in a multifaceted cardiac rehabilitation programme (for example, extending overall survival, improving life quality, decreasing the need for interventional procedures, and reducing the incidence of subsequent myocardial infarction in patients with coronary artery disease), estimates indicate that only 15–30% of eligible acute myocardial infarction, coronary artery bypass graft (CABG) surgery, or percutaneous transluminal coronary angioplasty (PTCA) patients attend or complete these programmes.<sup>3–7</sup>

Health care practitioners' patterns of practice influences the referral rate of patients to cardiac rehabilitation programmes.<sup>7,8</sup> However, this represents only one component contributing to cardiac rehabilitation utilisation rates. Patient characteristics and the availability

of social support also likely influence patient decision making regarding attendance at cardiac rehabilitation programmes.<sup>9–11</sup> Most commonly, demographic characteristics of the patient (for example, sex, age, place of residence, socioeconomic status, race) have been examined as mediators or predictors of cardiac rehabilitation attendance.<sup>12–20</sup> Yet, personality characteristics such as self-efficacy and self-motivation, as well as networks of support (social support), can contribute to patient decision making regarding their behaviours (including cardiac rehabilitation attendance).<sup>11,21–31</sup>

Characteristics such as self-motivation and self-efficacy have been shown to influence adoption of and sustaining healthy behaviours in patients of all ages.<sup>11,14,15,20–23,29</sup> Self-motivation encompasses a persons desire to activate or persist with a particular behaviour, whereas self-efficacy encompasses a persons belief that he or she is able to engage in a particular behaviour.<sup>29</sup> If patients who are referred to cardiac rehabilitation, are characterised as self-motivated and having self-efficacious beliefs, then they should be more likely to regularly attend cardiac rehabilitation and demonstrate behaviours associated with positive health outcomes.<sup>11,21,23–30</sup> In turn, the improvements in self-motivation and self-efficacy which should stem from successful adherence to a cardiac rehabilitation programme can improve compliance.<sup>22</sup>

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Social support has been shown to correlate with severity of coronary artery disease, cardiac outcomes, cardiac rehabilitation attendance (more so for women than men), and sustaining healthy behaviour.<sup>9 26 28</sup> Social support is a function of the breadth of the network as well as the perceived benefit reaped from the network members. Patients who have support to attend rehabilitation programmes and make health changes have been shown to be more likely to continue to attend rehabilitation. Further, support systems can be enhanced while patients are enrolled in cardiac rehabilitation programmes, both from the health care staff and other participants.<sup>31 32</sup>

### Purpose of study

Psychosocial characteristics can be strong predictors of health related behaviours. Though potentially modifiable, psychosocial factors such as self-efficacy, self-motivation, and social support have been less widely considered in cardiac rehabilitation research—particularly as they pertain to whether patients choose to enrol in rehabilitation programmes.<sup>22-24</sup> Cardiac rehabilitation has been shown to be an important component of cardiac recovery and fostering behaviours aimed at secondary prevention of cardiovascular disease. Patient participation in cardiac rehabilitation programmes have been studied from a focus of those who have chosen to attend or who drop out of programmes. Little focus of attention has been paid to those who choose not to attend at all. Thus the purpose of this study was to examine, at two weeks and six months following a cardiac event, the relation between patients' demographic (sex, age) and psychosocial characteristics/attributes (self-efficacy expectations, behaviour performance, self-motivation, and social support), and their attendance at cardiac rehabilitation programmes.

### Methodology

A repeated measures design was undertaken following ethics approval from the joint academic and clinical ethics review panel. Over a six month period, a cohort of adult patients being discharged from a tertiary care centre in western Canada following acute myocardial infarction or CABG surgery, who were able to speak and understand the English language, were cognitively capable of participation, and were available for telephone follow up, was enrolled in this study. The consenting patients were contacted by telephone within two weeks of hospital discharge to complete a baseline interview which included measures of self-efficacy expectation, behaviour performance, self-motivation, and social support. Health records were systematically reviewed for relevant clinical data. Within approximately six months ( $\pm$  two weeks) following hospital discharge, patients were contacted again to readminister the baseline measures and administer a survey focusing on their choices regarding cardiac rehabilitation attendance.

### MEASURES

Self-efficacy was measured using the Jenkins self-efficacy expectation scales<sup>33</sup> for maintaining health and role resumption. Using an 11 point numeric scale (0 = not at all; 10 = totally), subjects are asked to rate their confidence in their ability to engage in a variety of specific activities related to the health maintenance (eight specific activities) and role resumption behaviour (12 specific activities). The numeric responses are summed and then divided by the number of activities to which the subject provided a response. The resulting score then renders an estimate of the subjects' self-efficacy expectation for those particular behaviours.

Actual behaviour performance was measured using the Jenkins activity checklists<sup>33</sup> for maintaining health and resuming roles. The statement stems to these scales are identical to those of the self-efficacy expectation scales. However, these scales require a response indicating actual behaviour rather than confidence to engage in that behaviour. The scores are calculated in the same manner, rendering an indication of the degree to which the subjects are actually engaging in the behaviours of interest.

A modified version of the self-motivation inventory<sup>25</sup> was used. The self-motivation inventory is a 40 item measure, consisting of both positively and negatively worded stems, each scored by the respondent on a five point Likert scale (1 = very unlike me; 5 = very like me). Negatively worded items are reverse coded. Pilot testing of the study measures revealed respondent burden and difficulty converting between the 11 point scales used in other questions, to a five point scale. Thus, a subset of four items (three positively worded, and one negatively worded), identified as particularly relevant by health care providers and patients, were used in this study and were measured using an 11 point Likert scale (0 = very unlike me; 10 = very like me). The scores from these items were summed, rendering a possible score of 0–40. Internal consistency remained reasonable (Chronbach's  $\alpha$  of 0.713 at two weeks, 0.759 at six months).

The shortened social support scale<sup>34</sup> was used to indicate the breadth and perceived value of the subject's support network. This brief five item scale measures social network size as well as the perceived benefit of that social support. Subjects are asked to rank five sources of potential support on a five point numeric scale (0 = not applicable, 1 = not at all helpful; 4 = always helpful). The rankings are summed yielding a potential score ranging from 0–20.

Acquisition of clinical data was guided by a health record audit form which was modified from earlier clinical quality improvement network (CQIN) based studies and follow up studies of cardiac surgery recovery,<sup>31 35 36</sup> and had been successfully used in an earlier study regarding cardiac rehabilitation referral and attendance.<sup>7</sup> This form enabled collection of demographic, cardiac/health history, and documented risk factor data.

An internally developed survey focusing on the process by which patients were referred to cardiac rehabilitation and made choices to

Table 1 Sample characteristics (n = 304)

	% (n)
Sex	
Male	76% (231)
Female	24% (73)
Age group	
< 70 years	69% (210)
≥ 70 years	31% (94)
Discharge diagnosis	
AMI (AMI ± PTCA)	18% (55)
CABG (CABG ± AMI, PTCA)	82% (249)
Interview participation	
Interview 1 (psychosocial measures)	85% (259)
Interview 2 (psychosocial measures)	68% (207)
Cardiac rehabilitation survey	78% (238)
Cardiac rehabilitation attendance (n=238)	
Yes	41% (96)
No	59% (142)

AMI, acute myocardial infarction; CABG, coronary artery bypass graft; PTCA percutaneous transluminal coronary angioplasty.

(not) attend was also administered. This survey was refined following review by nurse and physician experts in cardiology and pilot testing with patients for comprehension and ease of use. The survey rendered primarily categorical (yes/no; most important) responses.

#### DATA ANALYSIS

Analyses were performed using the SPSS<sup>37</sup> statistical software package. Descriptive statistics (for example, frequencies and percentages) were used to provide a general description of the sample. Multivariate analysis of variance (ANOVA) was used to examine the effects of sex, age group, and cardiac rehabilitation attendance on the psychosocial variable measures at two weeks and six months post-discharge. Thereafter, relevant univariate ANOVA analyses were undertaken. Repeated measures ANOVA were used to examine changes in psychosocial variables over time. Data were included only for those subjects for whom complete data sets existed.  $\chi^2$  was used to examine differences between groups when data were nominal. A two tailed  $\alpha$  level of 0.05 was used for all statistical tests.

#### Results

Three hundred and ten subjects were enrolled into the study; six subjects, however, requested to withdraw when contacted two weeks following hospital discharge. Thus descriptors of the sample (retrieved from the health record audits) are for the remaining 304 subjects (table 1). Sixty four per cent (n = 195) of subjects completed all three components of the study interviews (questionnaires at two weeks and six months post-discharge and survey at six months post-discharge). A substantial proportion of those participating in the survey (41%, n = 96) stated they had attended a structured cardiac rehabilitation programme. Younger people were more likely than older people ( $\chi^2 = 14.55$ ,  $p < 0.001$ ), and men were more likely than women ( $\chi^2 = 6.06$ ,  $p = 0.014$ ) to attend cardiac rehabilitation programmes.

Multivariate analysis of two weeks post-discharge data revealed no significant interaction effects for sex, age category, or eventual cardiac rehabilitation attendance on the psychosocial and behavioural variables. However,

univariate analysis revealed that women reported significantly less social support ( $F(1207) = 10.67$ ,  $p = 0.001$ ) than men and subjects who did not eventually attend cardiac rehabilitation programmes demonstrated higher resumption of roles behaviour performance scores ( $F(1207) = 6.97$ ,  $p = 0.009$ ) than those who eventually went to cardiac rehabilitation.

At approximately six months post-discharge, multivariate analysis again revealed no significant interaction effects of sex, age category, or cardiac rehabilitation attendance. Univariate analysis showed that women ( $F(1193) = 11.89$ ,  $p = 0.001$ ) and older subjects ( $F(1193) = 10.23$ ,  $p = 0.002$ ) reported significantly less social support than younger subjects and men, respectively. At this time, those who had attended cardiac rehabilitation programmes showed higher health maintenance self efficacy expectation scores ( $F(1193) = 9.23$ ,  $p = 0.002$ ) and behaviour performance scores ( $F(1193) = 29.12$ ,  $p < 0.001$ ).

Repeated measures analysis revealed that overall, subjects' scores for self-efficacy expectation for health maintenance ( $F(1190) = 6.49$ ,  $p = 0.012$ ), as well as behaviour performance for health maintenance ( $F(1188) = 15.08$ ,  $p < 0.001$ ) and resumption of roles ( $F(1188) = 87.45$ ,  $p < 0.001$ ) improved over time. Women showed greater improvement for self-efficacy expectation of health maintenance ( $F = 4.58$ ,  $p = 0.034$ ) than did men, and those who attended cardiac rehabilitation showed greater improvement in health maintenance behaviour performance ( $F = 22.72$ ,  $p < 0.001$ ) than those who did not. Motivation and social support scores did not change significantly over time. Changes over time in self-efficacy expectation for health maintenance, behaviour performance scores for resumption of roles, self-motivation, and social support were independent of cardiac rehabilitation attendance.

#### Discussion

Conclusions from previous work about cardiac rehabilitation attendance—that patients who are characterised as having greater self-efficacy and self-motivation and those who have more social support will attend and finish cardiac rehabilitation programmes, and that these characteristics/attributes vary with sex and age and they are enhanced by attending cardiac rehabilitation programmes—are based on samples who have attended, inconsistently attended, or have dropped out of cardiac rehabilitation programmes.<sup>6 9 11 20-24</sup> A unique aspect of this study was that the sample comprised patients who chose to attend at least some component of a cardiac rehabilitation programme as well as those who chose not to enrol at all. It is thus not unexpected that findings in this study do not support, in total, what has been previously found.

As measured in this study, neither self-motivation nor social support was associated with cardiac rehabilitation attendance either as a factor that predisposes patients to attend or

one that changes as a result of attendance. At best, in this cohort of patients, self-motivation and social support may have had a small but statistically insignificant effect on patients' early decision making to attend, or changed as a result of attending cardiac rehabilitation programmes. Current literature suggests<sup>11 20-28</sup> that these factors play a role with patients who have already enrolled in cardiac rehabilitation programmes. Future investigators may wish to consider the clinical significance of self-motivation and social support particularly as predictors of cardiac rehabilitation attendance.

In a manner in keeping with the social support literature,<sup>32 38</sup> sex and age variations occurred in social support. Women and the elderly are regularly reported to have low social support. In this study, women consistently reported significantly less social support than their male counterparts, while older people reported significantly less social support than younger people at the six month follow up only. The variation in the older patient's change in social support scores may be explained by the "novelty" of their index illness. Families and friends are likely to rally at what appears to be critical times, and this attention/support wane as the patient's condition improves.

At six months post-discharge, those patients who attended cardiac rehabilitation programmes showed significantly higher scores for health maintenance self-efficacy and behaviour performance, and significantly greater improvements in health maintenance behaviour performance over the follow up than those who did not attend. In support of current clinical practice guidelines,<sup>3 4</sup> cardiac rehabilitation programme attenders appeared to reap an essential benefit of doing so—enhancing behaviours aimed at secondary prevention of their cardiovascular disease. The health maintenance behaviours measured in this study were consistent with the aim of secondary prevention. The cohort of patients in this study who attended cardiac rehabilitation were more likely to achieve the important goal of believing in their capacity to engage in (self-efficacy) and actually engaging in behaviours associated with secondary prevention of their cardiovascular disease.

Of concern was the finding that patients who did not attend cardiac rehabilitation programmes engaged in significantly greater role related behaviours at two weeks post-discharge than those who eventually attended such programmes. Perhaps these people erroneously believed that returning to their role related activities showed that they did not need a "rehabilitation" programme. When Pashkow<sup>39</sup> coined the title "cardiac rehabilitation: not just exercise anymore" he acknowledged a current and serious problem. Cardiac rehabilitation's most important offering, which is often not understood by patients, is that of enabling development of behaviours aimed at secondary prevention of cardiac disease. If patients return to role related behaviours early following a cardiac event—and in doing so believe that they are not in need of the many components of cardiac rehabilitation programmes—they lose an extremely valuable opportunity to engage in

therapeutic exercise and to develop new knowledge and other behaviours aimed at improving their health.

#### LIMITATIONS

The external validity of the findings is limited because of the voluntary nature of subject participation and attrition over the six month follow up. Although the distribution of study subjects by age and sex was similar to that found in an earlier study (n = 1245) from this institution, the rate of cardiac rehabilitation attendance was higher (41% v 28%).<sup>7</sup> Patients who continued to participate in the telephone follow up were more likely well, and were a more interested and well educated subset of the general population of recovering cardiac patients, which possibly affected their participation rates.

It may be that there are misconceptions about the mandate and potential benefits of rehabilitation programmes—misconceptions that need to be addressed urgently for both health professionals teaching and referring patients to rehabilitation programmes and the public at large.

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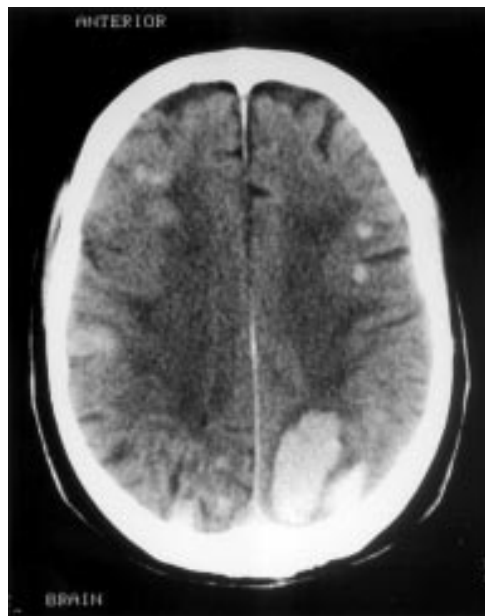
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## IMAGES IN CARDIOLOGY

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### Multiple cerebral haemorrhage following thrombolysis for acute anterior myocardial infarction

A 74 year old man was admitted at 9.30 am with a two hour history of central, crushing chest pain radiating to the throat and left arm associated with dyspnoea and vomiting. The patient's general practitioner had diagnosed angina pectoris some months previously. The rest of the past medical history was blameless.



The patient had a sinus tachycardia and blood pressure of 150/100 mm Hg. There was a fourth heart sound but no evidence of cardiac failure. The ECG showed changes of an extensive acute anterior myocardial infarction.

Recombinant tissue plasminogen activator (Actilyse, Boehringer Ingelheim) by an accelerated regimen was administered within three hours of the onset of symptoms together with aspirin and heparin.

At 8.00 pm the patient became agitated and disoriented in place and time. There was no focal neurological deficit. Temazepam was prescribed. The following morning the patient complained of headache and his mental state was unchanged. A computed tomographic head scan was arranged which demonstrated numerous recent intracerebral haemorrhages. The patient had a prolonged convalescence complicated by depression and patchy cognitive loss.

Despite numerous clinical trials and guidelines the choice of thrombolytic agent in the setting of acute myocardial infarction remains a matter of clinical judgement. In this case tissue plasminogen activator was chosen because of the extent of electrocardiographic change in an otherwise healthy patient. This case serves as a graphic reminder that the improved rates of coronary patency with tissue plasminogen activator compared to streptokinase are partly offset by an increased risk of serious bleeding.

W A PARSONAGE  
N P SILVERTON