Anxiety, depression and perceived control in patients having coronary artery bypass grafts

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Abstract
Title. Anxiety, depression and perceived control in patients having coronary artery bypass grafts.

Aim. This paper is a report of a study to determine (1) the course of anxiety, depression and perceptions of control, and (2) the influence of perceptions of control, in patients undergoing coronary artery bypass grafts before surgery, after surgery in hospital and 2 weeks after discharge.

Background. Anxiety and depression are common in patients undergoing coronary artery bypass graft surgery patients and predictive of worse outcomes. Few researchers have examined the influence of perceived control on these emotional states in the acute surgical period.

Methods. A prospective, descriptive design was used with a convenience sample of patients having coronary grafts (n = 155). Anxiety and depression were measured by the Hospital Anxiety and Depression Scale and perceptions of control over their cardiac illness by the Control Attitudes Scale before surgery, after surgery during hospitalization and 2 weeks after hospital discharge. The data were collected in 2005.

Results. Patients had low levels of anxiety at each timepoint; however, borderline or clinically significant levels were common before surgery (38.7%) and after discharge. Depression levels were low, but increased over time (F = 27.03, P < 0.001). Patients had low to moderate perceptions of control over their illness before surgery, which increased over time (F = 25.51, P < 0.001). Those with stronger perceptions of control were less anxious or depressed at all times and those who were more anxious or depressed before surgery continued to be so afterwards.

Conclusion. Routine assessment of anxiety, depression and perceptions of control are justified to identify patients at risk and to intervene to promote control perceptions.

Keywords: anxiety, control, Control Attitudes Scale, coronary artery bypass graft, depression, Hospital Anxiety and Depression Scale, nursing
Introduction

Coronary artery bypass graft (CABG) surgery is one of the most common procedures performed in developed countries. Annual procedure rates in the United States of America (USA) are over 515,000 (American Heart Association 2005) and in Australia, more than 17,000 (Australian Institute of Health and Welfare 2003). Despite CABG being relatively common, low mortality rates and proven relief of anginal symptoms (Eisenberg et al. 2005), many patients experience anxiety and depression in relation to the procedure.

The presence of anxious and depressed emotions before surgery is not surprising, given that many patients have anginal symptoms and concern about the outcomes (including mortality) of surgery at this time (Duits et al. 2002). Additionally, after surgery many patient experiences, such as pain and other symptoms, contribute to anxiety and depression while managing the work of recovery. This can be particularly stressful in the first 2 weeks after discharge, when patients and their families manage largely on their own (Davies 2000). At low levels, feelings of anxiety and depression are normal and may be adaptive in the context of major surgery (Salmon 1993, Moser 2007). However, increased levels of anxiety and depression are distressing and predictive of worse outcomes from CABG surgery.

Elevated depression and anxiety before surgery predict less symptom relief (Jenkins & Jono 1996), more rapid return of symptoms (Karlsson et al. 1999), worse function (Con et al. 1999), worse psychological adjustment (Duits et al. 1997) and more frequent readmissions after surgery (Oxlad et al. 2006). Postoperatively, depression independently contributes to worse emotional and physical recovery, poorer wound healing, more wound infections (Doering et al. 2005) and increased cardiac events (Rafanelli et al. 2006). Similarly, postoperative anxiety predicts readmission within the first 6 months (Oxlad et al. 2006) and acute and chronic postoperative pain (Nelson et al. 1998, Taillefer et al. 2006).

Background

Anxiety and depression levels are highest in the 2 weeks before and after CABG, including the postdischarge period. A study by Duits et al. (1998) examined patterns of anxiety and depression from 2 weeks before CABG to 6 months following surgery. Patients (n = 217) were assessed using the Spielberger State-Trait Anxiety Inventory (STAI) and the Hospital Anxiety and Depression Scale (HADS). Anxiety and depression were highest preoperatively, and reduced statistically significantly by 1 week postoperatively, with no further reductions by 6 months. These results reinforce the importance of the time period surrounding the acute surgical experience as crucial for understanding, and potentially treating, anxiety and depression.

McCrone et al. (2001) examined anxiety and depression in older (>60 years) CABG patients over time. Patients (n = 31) were recruited prospectively and assessed preoperatively and at 1, 2, 4, 8 and 12 weeks postoperatively using the STAI and Centre for Epidemiological Studies-Depression Scale (CES-D). Similar to the report by Duits et al. (1998), anxiety was common, peaking preoperatively at 38%, reducing to 34% by 2 weeks, with no further reductions by 12 weeks. In contrast to the findings of Duits et al. (1998), depression was less common preoperatively (26%), peaked at 65% at 2–3 days postoperatively, decreasing to 45% at 2 weeks, where levels remained for the rest of the study. These results confirm the need to investigate the early discharge period. McCrone et al. (2001) note that their study was limited by a small sample, and that the CES-D is a long tool to use clinically. They recommend the use of the HADS when acute symptoms are present.

These results were confirmed in first-time CABG patients (n = 330) (Taillefer et al. 2006). Anxiety was assessed by the STAI and Symptom Check List for depression, prior to surgery and 4 weeks afterwards. Anxiety and depression were highest prior to surgery, decreasing following surgery. The authors note the relative lack of influence of clinical variables on outcomes such as quality of life at 6 months, compared to the pervasive influence of psychological states.

The influence of psychological states such as anxiety and depression on subsequent psychosocial adjustment and quality of life after CABG was confirmed in a review of 17 studies (Duits et al. 1997). However, the reviewers also point out the important influence of other psychological factors, including preoperative feelings of control, as independent predictors of adjustment. Studies focused on patients’ perceptions showed that patients perceived events such as CABG as potentially uncontrollable and therefore stressful, resulting in anxiety and depression. Duits et al. (1997) commented that it was the belief or perception of control that proved important rather than a personal style of seeking control by involvement in health care.

Patients’ perceptions of control over their cardiac illness have been consistently demonstrated to influence psychological outcomes during recovery from a cardiac event (Moser & Dracup 1995, Dracup et al. 2003, Gallagher et al. 2003, Moser et al. 2007). Moser and Dracup (1995) examined the effect of perceived control in patients who had experienced myocardial infarction (MI) or CABG (n = 176). Patients were assessed following the cardiac event and 6 months later.
Anxiety, depression and hostility were assessed using the Multiple Affect Adjective Check List (MAACL), and adjustment to illness using the Psychosocial Adjustment to Illness Scale (PAIS). Patients were divided into high and low perceptions of control groups based on their scores on the Control Attitudes Scale (CAS). Those with more control at baseline had less anxiety, depression and hostility and better psychosocial adjustment at 6 months. Generalization of the results of this study are limited by the small number of women (n = 25) in the sample.

When female cardiac patients were investigated, the results were similar. A sample of women (n = 196) who had experienced a cardiac event (CABG, angina, percutaneous transluminal coronary angioplasty and MI) were followed from before hospital discharge to 12 weeks after discharge (Gallagher et al. 2003). The HADS was used to measure anxiety and depression, the PAIS for psychosocial adjustment and a modified CAS for perceptions of control over their cardiac illness. Higher perceptions of control were found to independently predict lower anxiety and depression at 12 weeks, but not psychosocial adjustment. In this study, readmission was frequent (36%), as were major stressful life events occurring after discharge (25%), and the latter may have altered the development of perceptions of control from the baseline measure and consequently psychosocial adjustment.

Perceptions of control appear to have most influence on emotional distress in cardiac patients. Outpatients with heart failure (n = 222) were assessed for emotional distress using the MAACL and perceptions of control over their cardiac illness, using the modified CAS in a study by Dracup et al. (2003). Those with high levels of perceived control were less anxious, depressed and hostile than those with low levels of perceived control. The independent effects of control, along with sociodemographic and clinical factors, were assessed by multiple regression analysis. Concurrent perceptions of control were found to have a strong, independent association with emotional state and functional state.

Perceptions of control moderate the effects of anxiety on other physical outcomes such as complications following acute MI. Patients with acute myocardial infarction (n = 546) were assessed within 72 hours of hospitalization for anxiety and perceptions of control (Moser et al. 2007). Anxiety was assessed by the Brief Symptom Inventory and perceptions of control by the CAS. In-hospital complications, such as recurrent ischaemic events and arrhythmias, were recorded by chart review following hospital discharge. Perceived control was found to be predictive of complications when combined with anxiety levels. That is, patients with high anxiety levels and low perceptions of control had increased odds (1.3, 95% CI 1.1–1.8) of in-hospital complications following MI. In the light of previous reports, this study confirms the important role of perceptions of control in cardiac patients, not only to lessen emotional distress, but also to reduce the consequences of anxiety.

This makes sense, because perceptions of control are considered to be self-generated beliefs that an individual has a response that can influence the event, in this case the cardiac event (Krantz 1980). Whether realistic or not, patients’ perceptions that they have a coping response which may control the event, for example by denying or distancing, decreases their stress. People try to achieve higher levels of perceived control, so patients’ adjustment to their illness situation incorporates the process of maintaining and regaining perceptions of control (Krantz 1980, Taylor et al. 1991). However, this process has not been documented. There are limited studies that have reported on the patterns of perceptions of control over time in relation to a cardiac event such as CABG, particularly in the preoperative and early postdischarge period. Additionally, the effect of perceptions of control on concurrent anxiety and depression in this time period has had limited investigation. This research is needed to gain a more complete understanding of the role of perceptions of control in relation to psychological distress associated with illness events (Jacelon 2007). It is particularly important to investigate these perceptions as they are amenable to nursing intervention, ultimately resulting in less psychological distress for patients (Moser & Dracup 2000).

The study

Aim

The aims of the study were to determine (1) the course of anxiety, depression and perceptions of control, and (2) the influence of perceptions of control, in CABG patients before surgery, after surgery before hospital discharge and 2 weeks after discharge.

Design

The study had a prospective, descriptive design. We undertook assessments of anxiety, depression and patients’ perceptions of control over their cardiac condition before surgery, after surgery before hospital discharge, and again 2 weeks after discharge following the surgery.

Participants

The setting, sample criteria and recruitment methods have been described previously (Gallagher & McKinley 2007).
summary, a convenience sample of patients was recruited who were on the waiting list for CABG surgery at two hospitals in Sydney, Australia during 2005. Patients were eligible if they were aged over 18 years, proficient in English and available on the telephone after discharge. Those transferred to another hospital for rehabilitation were excluded. For the current study, we excluded any patient currently being treated for anxiety and depression, including those prescribed anxiolytic or antidepressant medications. Both recruitment sites provided Phase I cardiac rehabilitation and referred all eligible patients to Phase II cardiac rehabilitation programmes, which commenced at 4 weeks postdischarge. Patients were reminded of the service by a follow-up phone call at 4 weeks.

The sample size was calculated to allow sufficient power for multiple regression analysis (Peduzzi et al. 1996). Cohen (1988) recommends a power of 0.80 and moderate effect size (0.5) for the behavioural sciences, and the level of statistical significance was set at 0.05 for the study. For the purposes of the current study there were seven main variables (gender, education, age, marital status, work status, previous CABG or myocardial infarction and concurrent perceptions of control) and two additional variables both preoperatively (cancellation, elective surgery) and postoperatively (concurrent procedure and postoperative day), and one variable postdischarge (length of hospital stay) in the analysis. This means that a maximum of nine variables were included in the regression analysis at any time. Ten to 15 participants are recommended per variable, so we selected 13 participants per variable and thus a sample size of 120 was required (Katz 1999). It was anticipated that 20% of the sample would be lost from the initial recruitment to the final interview; therefore it was necessary to recruit 155 patients to achieve an adequate sample size.

Recruitment and participation in data collection are outlined in Figure 1. To summarize, 231 patients were asked to join the study, 155 were recruited and completed the preoperative questionnaire, 132 completed the interview postoperatively before hospital discharge and 126 completed the interview after discharge. In total, 120 patients completed all three interviews.

Data collection

Preoperative patient interviews were conducted via telephone for 16 participants awaiting elective surgery, and in person after admission to the hospital for the remaining 139. The anxiety, depression and control scores did not differ statistically significantly between these groups. Postoperative interviews were conducted during hospitalization, the day before discharge. Additional clinical and sociodemographic data were collected from medical records by using a data extraction form at each time. Postdischarge interviews were conducted via telephone, 2 weeks after discharge, using the questionnaire. Patients were given a copy of the questionnaire for this interview to help elicit information.

Study instruments

Anxiety and depression were measured by the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith 1983). The HADS is useful to measure these states in patients undergoing CABG because it distinguishes the states of anxiety and depression from the array of physical symptoms.

![Figure 1 Recruitment and data collection flow chart.](image-url)

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they experience (Martin et al. 2003). There are 14 questions, with seven items each for the Anxiety and Depression subscales. Almost half the items are reverse-scored to prevent response set bias. The HADS is administered by interview, with patients responding to questions by indicating how often they have had the feelings on a 4-point scale from 0 (not at all) to 3 (often). Scores are totaled for the subscales with higher scores reflecting more anxiety or depression. Scores of 0–7 indicate low levels of anxiety or depression, scores of 8–10 indicate borderline cases and scores greater than 10 indicate clinical cases. The HADS has been shown to be valid, reliable and sensitive. Zigmond and Snaith (1983) reported concurrent validity with psychiatric assessments for anxiety ($r = 0.74$) and depression ($r = 0.81$), as well as reliability (inter item correlations of 0.41–0.76). Sensitivity has also been demonstrated in cardiac patients (Duits et al. 1998, Gallagher et al. 2003). In the present study, internal consistency reliability alpha scores for anxiety ranged from 0.85 before surgery to 0.67 two weeks after discharge, and for depression from 0.75 before surgery to 0.66 two weeks after discharge.

Patients’ perceptions of control over their cardiac illness were measured by the Control Attitudes Scale (CAS) (Moser & Dracup 1995). The CAS consists of four belief statements measuring perceptions of personal and family control in the context of cardiac disease. Patients respond to the items by indicating their feelings about their condition on a 7-point scale from 1 (not at all) to 7 (very much). Scoring is reversed in 50% of items to prevent response set bias. Scores are totaled so that higher scores indicate stronger perceptions of control over the illness. Although there are no published norms, scores below 16 are considered to indicate low levels of control (Moser et al. 2007). The CAS is a reliable tool (inter-item correlations) and sensitive in cardiac patients (Moser & Dracup 1995, Dracup et al. 2003, Gallagher et al. 2003, Moser et al. 2007). In our study, internal consistency reliability alpha scores ranged from 0.66 before surgery to 0.59 after surgery.

Additional data were collected from each patient and their medical record to identify clinical and sociodemographic characteristics and identify potential predictors. A data extraction form was used for sex, age, language background, education, work and marital status, previous cardiac events, cancellation of surgery, number of grafts, concurrent procedures and length of stay.

Ethical considerations

We received approval from the appropriate human research ethics committees.

Data analysis

Anxiety, depression and control scores were normally distributed and are presented as means and standard deviations. As all data were collected in person, no missing values occurred. Anxiety and depression are also presented as the percentage of participants with scores indicating borderline or clinical cases of anxiety or depression ($\geq 8$ on HADS subscale). Changes in anxiety, depression and control over time were tested by using repeated measures analysis of variance (with the Greenhouse-Geisser Statistic) in those patients who participated at all three times. Post hoc comparisons were performed using Tukey’s b test, and as three comparisons were conducted we used a Bonferroni correction and reduced the critical level of $P$ to 0.01 (Field 2005).

Backward hierarchical multiple regression was used to determine the relationships among the independent variables and anxiety and depression, using SPSS version 14 (SPSS Inc, Chicago, IL, USA). The backwards method was selected because some of the variables may be important when in combination, and other methods of model reduction would exclude these variables (Katz 1999). This technique was combined with the hierarchical method because several predictors of anxiety and depression had previously been identified in the literature. Demographic variables (i.e. age, gender, marital status, employment status and education) were entered first, followed by clinical characteristics (previous diagnosis, non-elective procedure, cancellation). Preoperative levels of anxiety and depression were entered into the postoperative models next to control for correlation of the measures between timepoints. Perceived control was entered last so that its unique contribution could be identified. Predictors were considered statistically significant at a $P$ level of 0.025 or less, rather than 0.05 as two models were created for the data at each timepoint. Separate models were created for anxiety and depression as strong correlations at each time would have resulted in multicollinearity (Field 2005). The assumption of collinearity between variables within each model was assessed by using a variance inflation factor more than 2.0 as the cutoff to exclude variables from the analysis.

Results

Demographics

The study participants were aged on average 66.25 years (SD 10.68 years) and had a mean of 10.93 years (SD 4.42 years) of education. The majority were men (74%) and married (68%); most had elective CABG (66%) for the first time
(92%) and stayed in hospital for an average 7.95 days (SD 3.47 days) (Table 1).

Anxiety, depression and control

On average, patients had low levels of anxiety, which did not change across time \( (F = 2.23, P = 0.11) \) (Table 2) (Figure 2). Despite this, those with borderline or clinically significant levels (scores ≥8 on HADS) were common before surgery (38.7%) and after hospital discharge (38.6%). Depression levels were also low on average, but increased across time \( (F = 27.03, P < 0.001) \). Increases in depression occurred from before to after surgery \( (P = 0.004) \) and from after surgery to peak in the second week after discharge \( (P < 0.001) \). Congruent with this, there was a relatively small proportion of patients with borderline or clinically significant levels of depression (scores ≥8 on HADS) before (16%) and after surgery (18.2%), but more than 45% with depression after hospital discharge.

Low to moderate perceptions of control over their cardiac illness were reported by patients before surgery, which increased over time \( (F = 25.51, P < 0.001) \) from before to after surgery \( (P = 0.002) \) and again in the second week after discharge \( (P < 0.001) \). More than one quarter of patients reported low perceptions of control before surgery (26.5%), one in five after surgery (22%) and only 10.3% after hospital discharge.

Predictors of anxiety and depression

The independent predictors of anxiety and depression before surgery, after surgery and 2 weeks after discharge and the related model statistics are detailed in Table 3. Higher perceptions of control predicted less anxiety and less depression concurrently at each timepoint. Higher levels of anxiety and depression preoperatively predicted corresponding higher scores after surgery. Having a cancellation predicted less depression 2 weeks after discharge, whereas older age predicted more anxiety at this timepoint. The addition of perceived control to the last step of the regression equation was statistically significant for both before and after surgery models, contributing between 10% and 19% to the explained variance in anxiety and depression for before and after surgery (Table 4). Although this contribution to the explained variance also occurred in the 2 weeks after discharge models of anxiety and depression, it was reduced to 3% and 5%.

Discussion

Study limitations

The study findings are limited by the use of a convenience sample and loss of participants for the second and third interviews. In addition, designs that involve concurrently measured anxiety, depression and control do not imply causality because of the possibility of bidirectional effects. Further research on the effects of baseline perceptions of control on subsequent anxiety and depression is warranted, as well as longer-term follow-up to investigate whether depression persists beyond 2 weeks after discharge. Finally,

Table 1 Participant characteristics

<table>
<thead>
<tr>
<th>Characteristic ((n = 155))</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>66.25 (10.68)</td>
</tr>
<tr>
<td>Education (years)</td>
<td>10.93 (4.42)</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>7.95 (3.47)</td>
</tr>
<tr>
<td>Number of grafts</td>
<td>2.80 (1.20)</td>
</tr>
<tr>
<td>n (%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>41 (26)</td>
</tr>
<tr>
<td>Married</td>
<td>106 (68)</td>
</tr>
<tr>
<td>Employed</td>
<td>56 (36)</td>
</tr>
<tr>
<td>Elective</td>
<td>102 (66)</td>
</tr>
<tr>
<td>Cancelled</td>
<td>60 (38)</td>
</tr>
<tr>
<td>Previous CABG*</td>
<td>12 (8)</td>
</tr>
<tr>
<td>Previous MI†</td>
<td>71 (46)</td>
</tr>
<tr>
<td>Concurrent procedure†</td>
<td>22 (14)</td>
</tr>
</tbody>
</table>

*Coronary artery bypass graft.
†Myocardial infarction.
‡Implantable defibrillator, pacemaker, valve replacement.

Table 2 Anxiety, depression and control over coronary artery bypass graft experience

<table>
<thead>
<tr>
<th>Characteristic mean (SD)</th>
<th>Before surgery ((n = 155))</th>
<th>After surgery ((n = 132))</th>
<th>2 weeks postdischarge ((n = 126))</th>
<th>Time (F (P))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety (range 0–21)</td>
<td>6.29 (4.39)</td>
<td>5.27 (3.94)</td>
<td>5.91 (3.79)</td>
<td>2.23 (0.01)</td>
</tr>
<tr>
<td>Depression (range 0–21)</td>
<td>4.10 (3.22)</td>
<td>4.67 (3.49)</td>
<td>6.58 (4.03)†</td>
<td>27.03 (0.00)</td>
</tr>
<tr>
<td>Control (range 4–28)</td>
<td>18.49 (5.49)</td>
<td>19.70 (4.71)†</td>
<td>21.91 (4.70)†</td>
<td>25.51 (0.00)</td>
</tr>
</tbody>
</table>

*Before to after surgery time \(P = 0.004\).
†After surgery to 2 weeks after discharge time \(P < 0.001\).
‡Before to after surgery time \(P = 0.002\).
After surgery Anxiety
2 weeks after discharge Anxiety

Table 3 Independent predictors of anxiety and depression before and after coronary artery bypass graft and 2 weeks after hospital discharge

<table>
<thead>
<tr>
<th>Timepoint</th>
<th>Model outcome variable</th>
<th>Predictors for each model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Concurrent control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Beta (95% CI)</td>
</tr>
<tr>
<td>Before surgery</td>
<td>Anxiety</td>
<td>−0.34 (−0.47 to −0.22)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>−0.28 (−0.37 to −0.18)</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>−0.29 (−0.42 to −0.16)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>−0.25 (−0.36 to −0.13)</td>
</tr>
<tr>
<td>After surgery</td>
<td>Anxiety</td>
<td>−0.29 (−0.42 to −0.16)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>−0.25 (−0.43 to −0.07)</td>
</tr>
<tr>
<td>2 weeks after discharge</td>
<td>Anxiety</td>
<td>−0.17 (−0.35 to −0.008)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>−0.25 (−0.43 to −0.07)</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 Changes in model variance explained by the addition of perception of control

<table>
<thead>
<tr>
<th>Time</th>
<th>Model outcome variable</th>
<th>R² change (%)</th>
<th>Shift in R² (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before coronary artery bypass graft</td>
<td>Anxiety</td>
<td>16</td>
<td>10–26</td>
</tr>
<tr>
<td>After coronary artery bypass graft</td>
<td>Depression</td>
<td>19</td>
<td>6–25</td>
</tr>
<tr>
<td>2 weeks after discharge</td>
<td>Anxiety</td>
<td>12</td>
<td>34–46</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>10</td>
<td>35–45</td>
</tr>
</tbody>
</table>

Figure 2 Percentage of patients undergoing coronary artery bypass graft who are anxious, depressed or with low control levels over time.

Discussion of results

This study contributes to the growing body of knowledge on psychological distress in cardiac patients and the relationship to perceived control. Perceptions of control were moderate before surgery and improved statistically significantly once the surgery was completed and again in early recovery in the second week, after patients had gone home. This is consistent with proposals that adjustment to illness involves the process of maintaining and regaining perceptions of control (Krantz 1980, Taylor et al. 1991). Given that 66% of the patients had elective surgery and could anticipate the surgery and recovery trajectory, it is not surprising that control levels (mean 19.7) were a little higher than in a sample that included myocardial infarction patients at the same recovery timepoint in the studies of Gallagher et al. (2003) (mean 17.6) and Moser et al. (2007) (mean 18), and much higher than patients with heart failure in Dracup et al. (2003) (mean 11). By the time of discharge, most of our patients (89.7%) had at least moderately high levels of control.

Perceptions of control are important because they had a positive influence on concurrent anxiety and depression at all times, independent of important sociodemographic and clinical factors. This effect was most pronounced before surgery and postoperatively before discharge. Interventions that improve control delivered at these times may therefore lessen psychological distress, concurrently and
subsequently. Suggested interventions include promoting positive coping behaviours and thoughts (Shapiro & Schwartz 1996). This includes promoting attributions of CABG that are helpful, normalizing the appraisal of threat of CABG, and illness representations that are separate from self-appraisals (Sharpe & Curran 2006). At present, these interventions demonstrate promise but specific clinical guidelines are lacking (Moser & Dracup 2000, Rozanski et al. 2006). Furthermore, many interventions have been developed to treat psychological distress, particularly anxiety, in patients having CABG, but few have been successful (Lamarche et al. 1998, Arthur et al. 2000, Ku et al. 2002, Shuldhman et al. 2002). In contrast, an intervention which used peers of patient having CABG was successful in reducing anxiety (Parent & Fortin 2000). It may be that the use of peers as role models is a powerful way to promote positive coping behaviours and thoughts and therefore increase perceptions of control of the cardiac illness.

It is important that participation in cardiac rehabilitation is encouraged because it is likely that cardiac rehabilitation also promotes perceptions of control, because of the focus on recovery and the positive focus on what patients can do. Cardiac rehabilitation is recommended for all recovering CABG patients but many miss or decline to use these services (Wenger 2008).

Both intervention and assessment to lessen distress are needed because this study confirms that anxiety and depression are common experiences for patients undergoing CABG. In this population of CABG patients, which was exclusive of patients prescribed anxiolytics or antidepressants, anxiety levels were remarkably similar to those of previous samples without such exclusions (Duits et al. 1998, Boudrez & De Backer 2001, McCrone et al. 2001). Although anxiety levels were relatively low on average, this concealed the one in three patients who were at least borderline clinically anxious before surgery and 2 weeks after hospital discharge. Importantly, anxiety in this sample did not decline statistically significantly after surgery or after hospital discharge. Similarly, depression levels did not decline, but increased statistically significantly over time so that 2 weeks after discharge they were equal (McCrone et al. 2001) or higher than previous reports (Duits et al. 1998, Boudrez & De Backer 2001).

There is a good justification for assessment of anxiety and depression before surgery, as preoperative anxiety and depression were predictive of subsequent postoperative anxiety and depression. With more than 45% of patients at least borderline clinically depressed and more than 38% at least borderline clinically anxious in the second week after hospital discharge, there is more justification for routine assessment at this time. Postdischarge depression is particularly important to treat because of the impact of depression on emotional and physical recovery, including wound infections and poor healing (Doering et al. 2005), less relief of preoperative anginal symptoms (Jenkins & Jono 1996) and quality of life (Duits et al. 1997). Without assessment there is unlikely to be treatment, and healthcare staff are reported routinely to under-recognize and undertreat anxiety and depression among cardiac patients on inpatient cardiac units (Huffman et al. 2006). Not surprisingly, then, in our study only 3% of patients were taking anxiolytic or antidepressant medication postdischarge. Assessments of anxiety, depression and control are straightforward, and a variety of short instruments are available (Abu-Ruz et al. 2005). This would allow healthcare staff to focus interventions more efficiently and cost-effectively on high-risk patients.

High-risk patients include older patients as we found that these people were more anxious 2 weeks postdischarge. This result is in contrast to previous reports that younger patients were more anxious (Koivula et al. 2002, Okkonen & Vanhanen 2006) or that age had no independent effect on anxiety (Duits et al. 1998, McCrone et al. 2001, Gallagher et al. 2003). However, we assessed anxiety 2 weeks after discharge, much earlier than in these previous studies. It is likely that older patients, while relieved to have survived the surgery, were now concerned with how they would manage the reality of fatigue, pain and difficulties with function. Appropriate discharge planning for older patients is warranted and must link with cardiac rehabilitation services. Patients in our sample were routinely offered at 4–6 weeks; however, support during the early recovery period is clearly justified based on our results and could link with postacute services in the home or telephone follow-up.

Interestingly, patients who had experienced cancellation of their scheduled surgery were less depressed in our study. The effect of cancellation on psychological state before surgery has received limited attention. One study was found that showed that patients who had their CABG postponed were angry, anxious, depressed and frustrated preoperatively (Bresser et al. 1993). These feelings are also experienced by patients on waiting lists (Teo et al. 1998, Koivula et al. 2002, Screeche-Powell & Owens 2003). No study was found that reported the effect of cancellation or waiting on subsequent psychological state. It is likely that patients whose surgery has been cancelled and who subsequently have their operations would experience stronger feelings of relief.
Conclusion
Future research should focus on the development of rapid assessment tools that are useful in identifying patients who are anxious or depressed. Additionally, research to develop and test interventions for patients with high levels of anxiety and depression are associated with worse outcomes following coronary artery bypass graft surgery.

What is already known about this topic
- Anxiety and depression are common in patients undergoing coronary artery bypass grafts surgery.
- Increased levels of anxiety and depression are associated with worse outcomes following coronary artery bypass graft surgery.
- Positive psychological factors such as perceptions of control over their illness may lessen anxiety and depression in cardiac patients.

What this paper adds
- Anxiety and depression are common 2 weeks after discharge from coronary artery bypass grafts when there is a gap in service provision.
- Perceptions of control over their cardiac condition has an independent positive influence on anxiety and depression for patients undergoing coronary artery bypass grafts.
- Interventions that promote perceptions of control need to be developed and tested.

Implications for practice and/or policy
- Assessment of and intervention to lower anxiety and depression should occur preoperatively because distress at this time is strongly associated with subsequent anxiety and depression.
- Coordination between postacute services and cardiac rehabilitation should be arranged to ensure that assessment of and support for patients with anxiety and depression occur in the early weeks of recovery.

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Conflict of interest
No conflict of interest has been declared by the authors.

Author contributions
RG & SM were responsible for the study conception and design. RG performed the data collection. RG performed the data analysis. RG & SM were responsible for the drafting of the manuscript. RG & SM made critical revisions to the paper for important intellectual content. RG & SM provided statistical expertise. RG & SM obtained funding. RG & SM provided administrative, technical or material support. SM supervised the study.

References


Screeche-Powell C. & Owens S. (2003) Early experiences of patients waiting to be accepted for CABG. *British Journal of Nursing* 12, 612–619.


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