STRESSORS AND ANXIETY IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS SURGERY

By Robyn Gallagher, RN, PhD, and Sharon McKinley, RN, PhD

Background  Patients undergoing coronary artery bypass surgery who have increased anxiety levels have poorer outcomes than patients with lower levels, yet few studies have identified the concerns associated with this anxiety.

Objective  To describe the concerns of patients undergoing coronary artery bypass surgery and to identify concerns that were associated with higher levels of anxiety.

Method  Patients (n = 172) were interviewed to determine their concerns and anxiety levels before surgery, before discharge, and 10 days after discharge. Multiple regression was used to determine the predictors of anxiety.

Results  Although individual concerns changed over time, anxiety levels did not change from before to after surgery, remaining low to moderate. Being female and having more concerns about waiting for the surgery, being in pain/discomfort, and resuming lifestyle were predictors of increased anxiety before surgery. Predictors of increased anxiety while hospitalized after the surgery included taking anxiolytic or antidepressant medications, higher anxiety levels before surgery, concerns about personal things being inaccessible, and difficulty sleeping. Patients with higher anxiety levels after discharge were older, more anxious before surgery, and had concerns about being in pain/discomfort.

Conclusion  Patients waiting for coronary artery bypass surgery should be routinely assessed for anxiety before the procedure, and interventions to prevent or reduce anxiety should be provided. Interventions must be multifactorial, including information and support for pain management and realistic information about surgery schedules and resuming lifestyle after the surgery. Women and older patients may need to be targeted for intervention. (American Journal of Critical Care. 2007;16:248-257)
Nurses must help patients manage anxiety throughout the CABG episode because anxiety is distressing for patients and higher levels of anxiety are predictive of poor outcomes. Patients who are more anxious before CABG have more postoperative pain,13 less long-term relief of cardiac signs and symptoms, more readmissions,14,15 and poorer quality of life.14 Furthermore, patients with more anxiety after the surgery have worse long-term psychological outcomes.7,16

As a result, many interventions have been developed to reduce anxiety. The interventions usually include provision of information, support, and/or stress management. Although such interventions reduce anxiety after cardiac events such as myocardial infarction,7,17-19 their effects on CABG patients have been inconsistent.16,20-23 A possible explanation for the lack of a consistent effect is that the content of the intervention is often based on nurses’ perceptions of patients’ concerns and priorities rather than on the patients’ own perceptions. The 2 perspectives, patients’ and nurses’, differ in both magnitude and type.

Carr and Powers24 used the Stressor Scale, an instrument with Likert scale responses they developed, to examine concerns related to CABG in patients (n = 30) and nurses (n = 18) during the week after surgery. The scale included 30 items related to having CABG that had been culled from the literature and expert opinion, and the scale was refined after pilot testing. Data on patients were collected before data on nurses to avoid bias. Nurses’ and patients’ ratings differed, with nurses rating certain items more stressful for patients than the patients themselves rated those items. In particular, nurses scored the items “making progress in recovery” and “call light not being answered” as much more stressful than the patients did. Some of these differences are not surprising, because each patient was asked about his or her individual stress, whereas nurses were asked to rate patients’ stressors collectively.

Yarcheski and Knapp-Spooner25 conducted a replication study with 24 patients and 24 nurses, collecting data on patients at postoperative day 3, earlier than the collection of patients’ data on days 6 to 8 in the original study by Carr and Powers.24 Again, the type of stressors differed in importance between nurses and patients. Patients ranked being away from home or business most stressful, whereas nurses ranked dying due to illness or surgery as most stressful. Also, nurses ranked items as more stressful than patients did. If nurses’ perceptions of patients’ stressors and levels of anxiety are inaccurate, then nurses must modify their perceptions and guard against transferring their perception of the severity of stressors to patients.

Consequently, it is important to know patients’ perceptions of the CABG experience. In the studies just described, postoperative CABG patients identified their major concerns as the surgery itself, being absent from home or business, resuming lifestyle, pain/discomfort, and sleep interruptions. These concerns are important but may not reflect current patients’ stressors because many changes have occurred since those studies were conducted. Changes that may influence patients’ concerns...
include off-pump procedures, earlier extubation, postoperative protocols for pain management, case management, early discharge, and preadmission clinics. Preadmission clinics were developed in part to reduce anxiety because anxiety is at a peak before the CABG procedure, when anginal signs and symptoms are prevalent and patients are uncertain of the outcome of surgery.

Patients’ fears before surgery were examined by Koivula et al. Patients (n = 193) completed the Bypass Graft Fear Scale the night before surgery. This scale is used to measure 12 fears related to surgery that were derived from the literature and incorporates several questions from the Stressor Scale used by Carr and Powers and Yarcheski and Knapp-Spooner. Koivula et al. found that the highest scores were for fears related to pain, poor or uncertain surgical outcome, and having the surgery. One in 5 patients was classified as anxious according to the scores on the Hospital Anxiety and Depression Scale (HADS). All 193 patients had been on a waiting list, common in countries with universal access to healthcare or universal health insurance (eg, the United Kingdom, Canada, and Australia), and the waiting may have contributed to their anxiety.

Additional concerns related to being on the waiting list were identified in a study conducted by Fitzsimons et al. Patients in this study (n = 70) reported concerns similar to those identified by Koivula et al. However, patients also were stressed by their current signs and symptoms of angina, the uncertainty of the surgical date, and their dissatisfaction with the health service because of this uncertainty.

Most patients are relieved when the surgery is complete, and the biggest reductions in anxiety occur from preoperative to early postoperative times. However, anxiety levels remain higher than normal for some time following surgery. More than 40% of CABG patients were anxious in the week after discharge, but few investigators have examined the stressors associated with this anxiety. Most researchers have focused on patients’ signs and symptoms, which include sleep difficulties, pain, fatigue, and wound leaks. Returning home means patients must face signs and symptoms and circumstances in their personal lives. Major personal stress in patients’ lives is a stronger predictor of anxiety during recovery after discharge after CABG than any clinical or demographic factors.

Patients’ perceptions of the stressfulness related to CABG across time must be evaluated in an effort to understand the possible effects of these perceptions on recovery.

Nurses may need to modify the view that anxiety is a clinical problem and recognize anxiety as a normal response to a stressful situation. Anxiety is a fundamental part of being human and is adaptive in many situations. The work of worrying can help patients think through priorities and prepare coping strategies for discomfort, distress, and events related to the surgery. A total absence of anxiety may not be adaptive. Therefore, it may be more appropriate to determine the stressors associated with higher levels of anxiety rather than stressors associated with any anxiety at all. Not all stressors will be amenable to intervention, and some stressors resolve adequately with the passage of time.

The aims of this study were to describe the pattern of stressors that patients encounter when undergoing CABG and to identify the stressors associated with higher levels of anxiety from before surgery to after discharge.

**Methods**

A prospective, descriptive design with repeated measures taken before surgery, before discharge, and 10 days after discharge was used.

**Sample**

A convenience sample of patients scheduled for CABG was enrolled from 2 hospitals in Sydney, Australia. Patients were considered eligible for the study if they were 18 years or older; able to understand and speak English sufficiently for the consent and interview processes; had no major chronic illness, including psychiatric illness; and were available for interviews via telephone.

**Instruments**

Hospital Anxiety and Depression Scale. Anxiety was measured with the anxiety subscale of the HADS. The HADS discriminates anxiety from the array of physical signs and symptoms that patients experience during recovery from a cardiac event. The HADS anxiety subscale has 7 questions. The scale is administered by interview, and patients respond to questions by indicating the frequency of occurrence of feelings on a 4-point scale from 0 (not at all) to 3 (often). Scoring is reversed on 50% of the items to prevent response set bias. Scores are totaled for the subscale so higher scores reflect more anxiety. Scores of 0 to 7 indicate low levels of anxiety, scores greater than 10 indicate clinical cases of anxiety, and scores of 8 to 10 indicate borderline cases of anxiety. The HADS is a valid tool, with
scores in agreement with psychiatric assessments for anxiety \((r = 0.74, P < 0.001)\) and is reliable (interitem correlations of 0.41 to 0.76) and sensitive in cardiac patients. In our study, internal consistency reliability \(\alpha\) scores for anxiety ranged from .85 (before surgery) to .83 (after surgery) to .67 (after discharge).

**Stressor Scale.** Concerns related to having CABG were measured by using the Stressor Scale as adapted by King et al. This adaptation includes the original stressor scale of 30 items used to measure fears and concerns related to CABG and 5 additional illness-related items. These 5 items were related to improving heart condition, resuming social roles and life plans, returning to work, and body image. The original scale is valid; the scores are in agreement with psychiatric assessments for anxiety \((r = 0.74, P < 0.001)\) and sensitive in cardiac patients. The adapted version of the scale has been tested on cardiac surgical patients. Items are scaled in terms of the participant’s current level of concern, from 0 (not at all) to 4 (a great deal). The reliability coefficient for internal consistency of the overall scale was .92 in our study.

All items were used in the interviews before surgery and after discharge. However, only 2 of the 18 hospital-related items were used in the interviews after discharge: needing help with activities and sleep interruptions; the other 16 items became irrelevant. Therefore, the interviews after discharge included 19 questions on stressors. Patients employed outside the home before surgery \((n = 61)\) were asked about returning to work. Those not employed outside the home \((n = 111)\) were asked about resumption of life or retirement plans.

Patients were also asked an open-ended question about their most important current concerns at each interview. This question has been a valuable addition to the scale to detect any major concerns not included in the questionnaire and to assess concurrence with responses to the scaled items. Patients wrote their own responses during face-to-face interviews, and their verbal responses were recorded verbatim from telephone interviews.

Clinical and sociodemographic data were collected from each patient and the patient’s medical chart to characterize the sample and identify potential predictors. A checklist was used for patient’s sex, age, education, work status, language background, marital status, previous cardiac diagnoses, cancellation of surgery, days on waiting list, anxiolytic or antidepressant medications, number of grafts, and length of stay.

**Procedure**

Potential subjects were recruited for the study from the surgical waiting list at the 2 hospitals from July 2002 to May 2003. Of the 247 patients asked to join the study, 172 were recruited. Thirty-three patients provided a reason for refusing the study, which included not being interested, being too anxious or too sick or tired, not wanting to think about surgery, having been visited by too many personnel, and being too angry because of cancellations of a scheduled surgery. In total, 172 patients completed the questionnaire before surgery, 143 completed the interview before discharge, and 138 completed the interview after discharge. Patients who completed the preoperative questionnaire only \((n = 29)\) did so because surgery was delayed \((n = 9)\), they were too tired or sick \((n = 8)\), they were withdrawn from the study because of illness \((n = 5)\) or death \((n = 2)\), or they were missed because of interhospital transfers and discharges \((n = 5)\). An additional 5 patients did not complete the final interview because their hospital stays were extended \((n = 3)\) or they were feeling too sick \((n = 2)\). In total, 130 patients completed all 3 interviews.

Interviews of patients before surgery were conducted via telephone for 18 participants awaiting elective surgery and in person after admission to the hospital for 154 patients. The stressor and anxiety scores did not differ significantly between the 2 groups. Interviews before discharge were conducted during hospitalization, 1 to 2 days before discharge. Additional clinical and sociodemographic information was collected from the medical records by using the checklist at that time. Interviews after discharge were conducted via telephone, 1 to 2 weeks after discharge, by using the questionnaire. Patients were given a copy of the questionnaire for this interview to help elicit information. Patients were withdrawn from the study if length of stay exceeded 21 days or if they could not be interviewed within 3 weeks after discharge.

**Data Analysis**

Patients’ concerns identified with the stressor scale were described by using means and then were rank ordered. Verbal data on stressors from the open-ended question were categorized by consensus between 2 members of the research team. Only the stressors that differed from the Stressor Scale items and were reported by at least 10% of patients are included in the results. Comparisons between the sexes were conducted for stressors at each time by using the Mann-Whitney test, with the \(P\) level at .001 to account for the use of multiple tests that
from after surgery and after discharge. Therefore, each analysis included a maximum of 15 variables, meaning that a sample of 150 participants was required. A loss of 10% was anticipated from the initial recruitment to the final interview; therefore, it was necessary to recruit 165 patients to achieve an adequate sample size. There was a slight shortfall from this calculation in the final samples after surgery (n = 143) and after discharge (n = 138).

Results

The patients (n = 172) in the study had a mean age of 66.3 (SD 10.53) years and a mean of 10.9 (SD 4.33) years of education. They were primarily men (74%) and married (69%), as detailed in Table 1. Most patients had elective CABG (66%) for the first time (92%) and stayed in the hospital for 4 to 21 days (median 7 days; Table 2). Only a few patients were taking either anxiolytic medications (2%) or antidepressant medication (7%) at any time during the study.

Anxiety

The average patient had low levels of anxiety at all times, with no significant change across time (F = 1.629, P = .20). Despite this, patients who experienced anxiety at borderline or clinically significant levels (scores ≥8 on HADS) were relatively common, particularly before surgery and after discharge from the hospital (Table 3).

Stressors

Patients' stressors varied in type and across time (Table 4). The highest ranking stressors were as follows: before surgery, waiting for the surgery (mean 2.02); after surgery, being away from home or work (mean 1.63); and after discharge, being in pain or discomfort (mean 0.96). The stressors that patients identified as being their major concern in the open question were similar to their responses to the questionnaire, although an additional major concern was identified. This concern was for the effect of their illness or dying on their family's welfare; it was identified by 28 patients before surgery, 20 after surgery, and 7 after discharge. No significant differences (P < .001) in stressors were found between men and women at any time.

Predictors of Anxiety

Predictors of anxiety before surgery, after surgery, and after discharge and the model statistics are detailed in Table 5. Predictors of preoperative anxiety included being female and reporting concern about waiting for the surgery, being in pain or discomfort, and resuming a normal lifestyle. After surgery, predictors involved the Bonferroni calculation. Anxiety levels are described by using means and SDs and the percentage of subjects with scores indicating borderline or clinical cases of anxiety (≥8 on HADS). Changes in anxiety across time were tested by using repeated measures analysis of variance (with the Greenhouse-Geisser statistic) to determine if changes occurred in the participants who participated on all 3 occasions.

The relative influence of individual patient stressors on current anxiety at each time was determined by backwards multiple regression by using SPSS version 12 (SPSS Inc, Chicago, Ill). Backwards regression was selected because some of the variables may be important when in combination, and other methods of model reduction would exclude these variables. The assumption of collinearity between variables was assessed by using a variance inflation factor greater than 2.0 as the cutoff to exclude variables from the analysis. Predictors were included at a P of .10 and considered significant at a P of .03 or less to account for multiple analyses.

The sample size was calculated to allow sufficient power for the multiple regression analysis. The general rule is that a sample 10 times the number of independent variables is required for multiple regression analysis. Variables included in the analysis were the 10 stressors with the highest means at each time point plus each patient’s age, sex, type of work, and whether the patient was taking anxiolytic or antidepressant medications. Additional variables included in the analysis of data from before surgery were urgent versus elective surgery; the anxiety levels before surgery were included in the analyses of data from after surgery and after discharge. Therefore, each analysis included a maximum of 15 variables, meaning that a sample of 150 participants was required. A loss of 10% was anticipated from the initial recruitment to the final interview; therefore, it was necessary to recruit 165 patients to achieve an adequate sample size. There was a slight shortfall from this calculation in the final samples after surgery (n = 143) and after discharge (n = 138).
of anxiety included taking anxiolytic or antidepressant medications, being anxious before the procedure, reporting concern about personal things being difficult to get at, and difficulty sleeping in a strange bed. Soon after discharge, predictors of anxiety included being older, being anxious before the surgery, and reporting concern about being in pain or experiencing discomfort.

**Discussion**

Anxiety levels were fairly low in patients undergoing CABG and were reduced when surgery was completed, findings that confirmed previous reports.\(^6\)\(^-\)\(^8\) Despite the generally low anxiety levels, many patients in the sample had clinical levels of anxiety before and after surgery, and therefore intervention is warranted in individual patients undergoing CABG. Intervening before surgery is especially crucial because patients who were anxious before surgery were more likely to continue to be anxious throughout their recovery. Therefore, introduction of a brief anxiety assessment would be useful to determine which patients are at risk and to account for those personalities that may be prone to an anxious response.

Any preoperative intervention should address the stress of waiting for surgery, because waiting is the major concern of patients and is strongly associated with anxiety. Waiting for surgery is a major stressor.\(^22\) In our study, 1 in 4 patients had been waiting for at least a month; during that time, 1 in 3 had experienced cancellation of the time the patient had been told was scheduled for surgery. The stress of waiting might be reduced by offering patients a hospital hotline they can call to check their progress on the waiting list and by providing patients with information so that they do not have unrealistic expectations of the timing of surgery. Such interventions may be particularly appropriate for patients prone to anxious responses.

In our study, women were particularly vulnerable to anxiety before surgery, a finding consistent with published reports.\(^10\)\(^-\)\(^12\) This vulnerability, however, was not due to the stressors measured, including the women’s home responsibilities, which have been reported as likely to increase women’s stress.\(^3^6\) Women find it more acceptable than men do to express feelings, including anxiety,\(^6\) but expressing such feelings would be expected to occur at all times. Women undergoing CABG are older than men undergoing the procedure and are less likely to have a partner, so the women are more likely to lack support and thus have more anxiety before surgery.\(^11\) Indeed, older age was predictive of more anxiety after discharge, when patients were trying to recover and needed family support.

Many concerns before and after CABG were similar to concerns described in previous reports,\(^2^4\)\(^-\)\(^2^6\) and were related to the surgery and its consequences, such as dying, being in pain, and being away from home or work. Two concerns, being in pain or discomfort and being away from home or business, were important because they were major sources of stress throughout the process, even after discharge. Concerns related to pain or discomfort were particularly important because they were strongly predictive of increased anxiety levels both before surgery and after discharge, when most patients were at home. Soon after discharge, patients must self-manage pain when they are

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**Table 2**

**Clinical characteristics of the sample (n = 172)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waiting list*</td>
<td></td>
</tr>
<tr>
<td>≤1 week</td>
<td>86 (50)</td>
</tr>
<tr>
<td>1 week to 1 month</td>
<td>31 (18)</td>
</tr>
<tr>
<td>&gt;1 month</td>
<td>44 (26)</td>
</tr>
<tr>
<td>Elective surgery</td>
<td>113 (66)</td>
</tr>
<tr>
<td>Previous diagnosis*</td>
<td></td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>75 (44)</td>
</tr>
<tr>
<td>Angina</td>
<td>61 (35)</td>
</tr>
<tr>
<td>Coronary artery bypass surgery</td>
<td>14 (8)</td>
</tr>
<tr>
<td>Coronary angioplasty or stent</td>
<td>5 (3)</td>
</tr>
<tr>
<td>No cardiac events</td>
<td>14 (8)</td>
</tr>
<tr>
<td>Concurrent diagnosis</td>
<td></td>
</tr>
<tr>
<td>Valve replacement</td>
<td>16 (9)</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>6 (3)</td>
</tr>
<tr>
<td>Implantable cardioverter defibrillator or permanent pacemaker</td>
<td>4 (2)</td>
</tr>
<tr>
<td>Cancellation of scheduled surgery at least once</td>
<td>64 (37)</td>
</tr>
<tr>
<td>Anxiety medication at any time</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Antidepressant medication at any time</td>
<td>12 (7)</td>
</tr>
</tbody>
</table>

*Percentages for waiting list and previous diagnosis do not total 100 because of missing data.

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**Table 3**

**Anxiety levels in patients undergoing coronary artery bypass graft surgery**

<table>
<thead>
<tr>
<th>Level</th>
<th>Before surgery</th>
<th>After surgery</th>
<th>After discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety, mean (SD)</td>
<td>6.54 (4.54)</td>
<td>5.58 (4.13)</td>
<td>6.04 (3.88)</td>
</tr>
<tr>
<td>% clinically anxious*</td>
<td>40.6</td>
<td>28</td>
<td>40.6</td>
</tr>
</tbody>
</table>

*Score ≥8 on the Hospital Anxiety and Depression Scale.

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Women were vulnerable to anxiety before surgery and older patients had more anxiety following hospital discharge.
Being in pain and being away from a home were major sources of stress.

Table 4
Top 10 stressors (ranked by mean score) in patients undergoing coronary artery bypass graft surgery

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Before surgery (N = 172)</th>
<th></th>
<th>After surgery (n = 143)</th>
<th></th>
<th>After discharge (n = 138)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Rank</td>
<td>Mean Rank</td>
<td>Mean Rank</td>
<td></td>
<td>Mean Rank</td>
<td></td>
</tr>
<tr>
<td>Waiting for surgery</td>
<td>2.02 1</td>
<td>NA</td>
<td>1.99 NA</td>
<td>2</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>Having surgery</td>
<td>1.72 3</td>
<td>1.45 3*</td>
<td>0.96 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being in pain or discomfort</td>
<td>1.61 4</td>
<td>1.63 1</td>
<td>0.89 2†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Away from home or work</td>
<td>1.47 5</td>
<td>—</td>
<td>0.47 NA</td>
<td>6</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Dying from illness or surgery</td>
<td>1.45 6</td>
<td>1.27 7</td>
<td>0.89 2†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resuming lifestyle</td>
<td>1.44 7</td>
<td>1.59 2</td>
<td>0.80 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Making progress in recovery</td>
<td>1.40 8</td>
<td>1.28 6</td>
<td>0.81 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needing help</td>
<td>1.33 9</td>
<td>1.19 8</td>
<td>0.63 9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improving heart condition</td>
<td>1.08 10</td>
<td>1.32 5</td>
<td>0.85 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing activity</td>
<td>—</td>
<td>1.45 3*</td>
<td>0.65 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep interruptions</td>
<td>—</td>
<td>—</td>
<td>1.13 9</td>
<td>NA</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Sleeping in a strange bed</td>
<td>—</td>
<td>—</td>
<td>1.01 10</td>
<td>NA</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Things difficult to reach</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.73 7</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Losing income</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: NA, question not applicable at this time; —, not ranked in top 10.
*Being in pain or discomfort tied with sleep interruptions for the third rank.
†Being away from home or work tied with resuming lifestyle for the second rank.

experiencing many signs and symptoms, and they appear to need more appropriate information during admission and support in the early period at home. The high ranking of concern for pain before the operation indicates the need to provide information about the successful pain management protocols currently in use. This information could readily be given in a clinic before admission, offered as part of the protocol for preparation of hospitalized patients, provided by volunteer peers, or sent to patients who live far from the hospital.

Similar to concerns about pain, being away from home or business was important to patients. This issue may be particular to our sample because many patients had traveled a long distance to the hospital for their surgery. The distance was not only disrupting for the patients but had consequences for their families, who also were dislocated from home and work. It therefore was not surprising that patients reported an additional primary concern about the effect their illness was having on their family. What was surprising was that this concern continued after discharge, when patients are expected to be at home. On the contrary, our follow-up showed that many regional patients chose to convalesce nearby with their extended family before returning home. This level of concern is useful for nurses to help patients with the patients’ planning; however, it was not predictive of increased anxiety, and therefore other concerns should have priority.

Anxiety levels were lower while participants were still inpatients after surgery, and patients with higher anxiety levels were more likely to be taking appropriate medication. At this time, patients were concerned about pain and about being away, as described earlier, but 3 additional concerns were important. Patients were bothered by sleep interruptions, sleeping in a strange bed, and having their personal things difficult to reach. The last 2 of these concerns were strongly predictive of increased anxiety. In combination with postoperative signs and symptoms and hospital routines, sleeping in a strange bed may lead to sleep interruptions for patients, which promotes anxiety. Sleep disruptions also have been reported in other studies of patients after CABG.28,37

Although the causes of sleep disruption in patients undergoing CABG are most likely multifactorial, relatively straightforward interventions could include bringing familiar items from home, such as a pillow, to promote a sense of comfort and familiarity. Being unable to reach needed items such as eyeglasses, a water jug, or a wristwatch is frustrating for patients and is due to traditional placement of the patient’s locker beside the head of the patient’s bed. This arrangement is a problem for patients who have
undergone CABG because they must twist their torso and reach out an arm to reach items, a process that causes severe pain from the sternal wound. Simply moving the locker farther down the bed and turning the drawers to face the bed would decrease this discomfort and could reduce anxiety.

In addition to the concerns just described, patients in our study were concerned about their recovery and their ability to resume their lifestyle, as has been reported in other studies with a similar follow-up time.9,10,24,25 Although these concerns assumed greater importance after discharge when patients were faced with these issues, resuming lifestyle was predictive of anxiety before surgery. Clearly patients are concerned not just with the immediate survival issues but also with the potential long-term effect of the cardiac surgery. Nurses are in a position to help with information about anticipated steps in recovery and rehabilitation when they are preparing patients for discharge from hospital.

A limitation of this study is the potential for a biased sample because 30% of the potential participants approached did not join the study and the sources of stress in those patients is unknown. Furthermore, sample numbers changed over time, a situation that may have resulted in changes in the character of the sample. Where possible, this potential problem has been accommodated for in the data analysis techniques, but the predictors for subsequent time periods cannot be presumed to apply to the original sample.

The anxiety subscale of the HADS had lower reliability than expected (.67) after discharge, which may have been influenced by the use of telephone interviews rather than the face-to-face interviews that were used for almost all other interviews. However, most CABG patients in Australia live in rural areas and travel for their surgery, so the use of face-to-face interviews after discharge would substantially limit recruitment and the applicability of the study results.

Table 5
Predictors of anxiety while hospitalized before and after coronary artery bypass graft surgery and 1 week after discharge

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unstandardized β</th>
<th>Standardized β</th>
<th>P</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before surgery</strong> (r = 0.624, r² = 0.389, F = 16.819, P &lt; .001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting for surgery</td>
<td>3.254</td>
<td>0.316</td>
<td>&lt;.001</td>
<td>1.710 to 4.798</td>
</tr>
<tr>
<td>Pain or discomfort</td>
<td>2.660</td>
<td>0.221</td>
<td>.002</td>
<td>0.975 to 4.346</td>
</tr>
<tr>
<td>Resuming lifestyle</td>
<td>2.605</td>
<td>0.271</td>
<td>&lt;.001</td>
<td>1.223 to 3.988</td>
</tr>
<tr>
<td>Sex of patient</td>
<td>-2.100</td>
<td>-0.206</td>
<td>.003</td>
<td>-3.490 to -0.711</td>
</tr>
<tr>
<td><strong>After surgery</strong> (r = 0.696, r² = 0.484, F = 20.321, P &lt; .001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking anxiolytics or antidepressants</td>
<td>3.766</td>
<td>0.287</td>
<td>&lt;.001</td>
<td>2.092 to 5.440</td>
</tr>
<tr>
<td>Things difficult to reach</td>
<td>2.018</td>
<td>0.245</td>
<td>&lt;.001</td>
<td>0.904 to 3.132</td>
</tr>
<tr>
<td>Sleeping in a strange bed</td>
<td>1.383</td>
<td>0.169</td>
<td>.02</td>
<td>0.277 to 2.489</td>
</tr>
<tr>
<td>Anxiety level before surgery</td>
<td>0.323</td>
<td>0.353</td>
<td>&lt;.001</td>
<td>0.201 to 0.446</td>
</tr>
<tr>
<td><strong>After discharge</strong> (r = 0.472, r² = 0.223, F = 6.88, P &lt; .001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain or discomfort</td>
<td>2.308</td>
<td>0.295</td>
<td>&lt;.001</td>
<td>1.033 to 3.582</td>
</tr>
<tr>
<td>Anxiety level before surgery</td>
<td>0.235</td>
<td>0.257</td>
<td>.003</td>
<td>0.084 to 0.386</td>
</tr>
<tr>
<td>Age</td>
<td>0.086</td>
<td>0.227</td>
<td>.02</td>
<td>0.011 to 0.160</td>
</tr>
</tbody>
</table>

Implications for Practice and Research

Identification of the most important stressors for patients undergoing CABG, particularly stressors associated with anxiety, is important for nurses because it helps them prioritize and develop appropriate and effective interventions. In our study, many stressors that occurred before surgery could be addressed readily, and doing so could lower anxiety. Our results suggest that reducing anxiety before the CABG procedure should decrease anxiety levels after surgery and after discharge. Some issues related to cancellations of surgery, however, may be difficult to address without system changes. Interventions before admission that address fears about pain and concerns about resuming roles must be evaluated in well-designed research projects. Although the literature on women’s needs when undergoing CABG surgery is flourishing, a need remains for further research to ensure that women’s issues are addressed and evaluated preoperatively.
Routine assessment of patients’ anxiety levels before surgery is recommended to determine which patients are at risk for increased anxiety after surgery, together with further investigation of the effect of preoperative anxiety on postoperative recovery in patients undergoing CABG. Routine assessment also means that resources can be focused on specific groups rather than most patients, who experience fairly low levels of anxiety. Future research should be focused on the influence of different methods on the validity and reliability of the anxiety and stressor measures used in this study, both for clinical and research use. Research on intervention should target anxious patients so that treatments are more likely to be effective and measurable.

During hospitalization, efforts should be made to counter patients’ feelings of being away from home and promote comfort and ease in each patients’ bed and unit. Discharge planning should make pain management a primary focus and incorporate patients’ families so that pain is managed optimally while patients are developing self-management skills. Follow-up after discharge may be necessary for older patients.

**Conclusion**

The patients in this study reported anxiety in relation to stressors such as waiting to have CABG, being in pain or discomfort, having their personal things difficult to reach during the hospitalization, sleeping in a strange bed, and resuming their lifestyle. Many of these concerns are amenable to uncomplicated interventions that could be included in clinics before admission or via telephone sessions. Examples include providing realistic information about surgery schedules, pain management, and resuming their lifestyle after CABG and assessing anxiety levels. Special efforts should then be made to support women and other patients who have increased anxiety levels. Patients should be encouraged to bring familiar sleep items such as a pillow to the hospital. Patients’ lockers should be placed so that patients have easy access to often-used items. Finally, pain management should be optimized in the hospital, and patients and their families should be supported to provide better pain management at home after discharge.

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**REFERENCES**


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Stressors and Anxiety in Patients Undergoing Coronary Artery Bypass Surgery
Robyn Gallagher and Sharon McKinley

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