

# Canadian Journal of Cardiovascular Nursing

## Revue canadienne de Nursing cardiovasculaire



### **In this issue:**

#### A Qualitative Analysis of the Experience of Uncertainty while Awaiting Coronary Artery Bypass Surgery

*A qualitative examination of the phenomenon of uncertainty in patients awaiting CABG surgery found that the lengthy waits experienced by some patients can create significant psychological disturbance including anxiety and uncertainty about the future.*

*Une approche qualitative du concept de l'incertitude chez des patients en attente d'une chirurgie cardiaque de revascularisation révèle que le délai d'attente prolongé vécu par certains patients peut engendrer une perturbation psychologique significative, au niveau de l'incertitude et l'inquiétude concernant l'avenir.*

#### Increasing Patient-Initiation of Cardiac Rehabilitation Referral in Female Percutaneous Coronary Intervention Patients

*A psycho-educational intervention, designed to increase patient-initiation of cardiac rehabilitation (CR) referral discussion with their physician, increases the frequency with which women discuss CR with a health care provider. There was a trend toward increased referral when compared to control patients.*

*Une intervention psycho-éducative, ayant pour objectif de favoriser chez le patient l'amorce à une discussion avec le médecin traitant d'une consultation en réadaptation cardiaque, a démontré un effet favorable chez les femmes.*

#### Gender Differences in Functional Capacity Following Myocardial Infarction: An Exploratory Study

*Both men and women demonstrate significant increases in functional capacity from discharge to six weeks post-MI although the levels were lower for women than men.*

*Une étude exploratoire portant sur la capacité fonctionnelle d'hommes et de femmes après un infarctus du myocarde a révélé une augmentation significative de la capacité fonctionnelle évaluée sur une période de 6 semaines après le congé de l'hôpital, bien que cette augmentation ait été moins importante chez les femmes.*



## 2005 CALL FOR ABSTRACTS CCCN Scientific Sessions

In conjunction with the Canadian Cardiovascular Congress

Montreal, Quebec: October 22-26, 2005

Abstracts related to any aspect of cardiovascular and/or cerebrovascular nursing are invited for presentation at the Scientific Sessions of the Canadian Council of Cardiovascular Nurses. Submissions are invited for presentation in French or English. New this year, abstracts are invited in **three** presentation formats:

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- **Oral:** Paper presentations will be 15 minutes in length with five minutes for questions.
- **Poster:** Posters will be displayed throughout the two days of CCCN conference activities, and presenters will be requested to be present with their poster for a one-hour period on one of the two days.

Submissions will be peer-reviewed in one of two broad categories: research and non-research. An abstract submission will be reviewed in the "research" category if it describes some aspect of an original piece of research. The "non-research" category includes theoretical, clinical application, literature reviews, etc. (i.e., submissions that do not describe an original piece of research).

Please note: CCCN has moved to an on-line submission process. All abstracts must be submitted on the CCCN website, [www.ccn.ca](http://www.ccn.ca). For more information, visit the website or contact: Charlene Kennett, Administrative Assistant, Tel: (613) 321-0132, e-mail: [ckennett@cccn.ca](mailto:ckennett@cccn.ca)

**New this year! All abstracts to be submitted on-line at: [www.ccn.ca](http://www.ccn.ca)**

**Deadline:  
February 15, 2005**

*Please note: Abstracts that have been previously presented at CCCN Scientific Sessions will not be accepted.*



## DEMANDE DE COMMUNICATIONS POUR 2005

### Assemblée annuelle et séances scientifiques du CCINC

conjointement avec le Congrès canadien  
sur la santé cardiovasculaire

Montréal, Québec : du 22 au 26 octobre 2005

Nous invitons la soumission de communications traitant de n'importe quel aspect des soins infirmiers cardiovasculaires ou cérébrovasculaires, lesquelles seront présentées dans le cadre des séances scientifiques du Conseil canadien des infirmières(iers) en nursing cardiovasculaire. Les communications peuvent être présentées en français ou en anglais. Il y a du nouveau cette année, car les communications peuvent être présentées dans l'un de **trois** formats :

- **Atelier :** Ce type de présentation est offert pour la première fois. La présentation d'un atelier fournira l'occasion d'avoir une discussion et une analyse plus approfondies sur des sujets cliniques et des questions reliées à la pratique professionnelle dans le contexte d'un forum d'au moins 60 minutes. Les communications destinées aux ateliers doivent satisfaire aux mêmes critères que les autres communications présentées; en outre, les objectifs et le contenu projeté de l'atelier doivent être précisés.
- **Exposé oral :** La présentation du rapport durera 15 minutes et sera suivie d'une période de questions de cinq minutes.
- **Affiche :** Les affiches seront exposées tout au long des deux jours de la conférence du CCINC, et les personnes qui les présenteront devront se trouver sur les lieux de leur affichage pendant une période d'une heure au cours de l'une des deux journées de la conférence.

Les communications feront l'objet d'une évaluation par les pairs avant d'être réparties en deux grandes catégories: recherche et autres que la recherche. Une communication sera incluse dans la catégorie « recherche » si elle décrit un aspect quelconque de travaux de recherche originaux. La catégorie « autres que la recherche » comprend les sujets théoriques, les applications cliniques, les analyses d'articles, etc. (autrement dit, les communications qui ne décrivent pas des travaux de recherche originaux).

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**Date limite : le 15 février 2005**

*À noter : Les communications présentées antérieurement dans le cadre des séances scientifiques du CCINC ne seront pas acceptées.*

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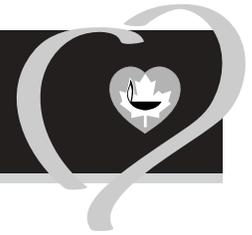
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## Cardiovascular Nursing Research – Whence From Here?

Preparing the content for a graduate course in nursing research that I am teaching this winter has forced me to give some thought to nursing research priorities and, specifically, to what our priorities should be in cardiovascular nursing research. A wide range of research topics are presented each year at the CCCN's annual scientific sessions and some topics have appeared regularly since these sessions started. The research papers presented at this year's conference, sorted broadly by study type, are listed in Table 1.

In a quick search of the published literature, I found results of prioritization exercises in critical care, emergency, midwifery, nephrology, oncology, paediatric, and respiratory nursing as well as for specific organizations. No articles on priorities in cardiovascular nursing appeared.

The National Institute of Nursing Research (NINR) in the United States has been setting research funding priorities since the late 1980s. A National Nursing Research Agenda (NNRA) was implemented to set research priorities for nursing research and funding. Initially, seven priority areas were identified: low birth weight (mothers and infants), HIV infection (prevention and care), long-term care for older adults, symptom management (pain), nursing informatics (enhancing patient care), health promotion for older children and adolescents, and technology dependency

across the lifespan. This initial set of priorities was developed at a conference on research priorities by a diverse group of nurse scientists who represented the breadth of nursing research. The 2004 research priorities for the NINR were: chronic illnesses or conditions (chronic illness self-management and quality of life), behavioural changes and interventions (decreasing low birth weight infants among minority populations, enhancing health promotion among minority men), and responding to compelling public health concerns (end-of-life: bridging life and death, nursing research training and centres).

**Table 1**

### Research papers presented at the CCCN 2004 scientific sessions

#### Qualitative research

- Feeling unsure in patients living with cardiovascular disease
- Impact of technology on nurse-patient communication
- Recovery after PCI
- The experience of diabetes and CVD in First Nations people
- Understanding why persons with cardiac disease smoke
- Women's quest for treatment of their cardiac symptoms

#### Quantitative research

##### *Descriptive*

- Adults with non-traumatic chest pain presenting to emergency
- Concerns and problems of CABG patients
- Effect of exogenous vasopressin on vasoconstrictive mediated events in CABG patients
- Evaluation of cardiac surgery in individuals with heart failure
- Management of chylothorax in paediatric patients following cardiothoracic surgery
- Patients' understanding of risk factors
- Quality of life and burden of disease for adults with congenital heart disorders
- Structure and staffing of heart failure clinics

##### *Exploratory or Explanatory*

- Hypoglycemic events to the intensive insulin therapy protocol
- Pain perception during epicardial pacing wire removal
- Presenting symptoms in acute coronary syndromes
- Role of sex and depression in perceptions of caregiving
- Sex differences in AMI presentation

##### *Outcomes*

- Efficacy of oral N-acetylcysteine and intravenous hydration in decreasing contrast-induced renal dysfunction
- Evaluation of a standardized insulin infusion protocol
- Hemodynamic and oxygenation effects of first-time dangling in CABG patients
- Impact of controlling temperature of fluid intake on nausea in CABG patients
- Interactive voice response in following cardiac surgery patients

A similar institute to the NINR does not exist in Canada, but both the Canadian Institute for Health Research and the Canadian Health Services Research Foundation have targeted monies for nursing research. Research priorities which cross disciplines are posted on an ongoing basis by CIHR and are tied to funding opportunities. The CIHR has supported high-quality applied health services/policy and nursing research aimed at strengthening the Canadian health care system since 1997. The projects component of the CHSRF's Open Grants Competition was transferred to CIHR in the fall of 2004, and the partnership program arising from this transfer has as its key nursing research theme Nursing Leadership, organization and policy. This includes research, resources and events related to managing nursing. The nursing research fund resides at the CHSRF. Most of these monies are for health system-type research, but \$500,000 is targeted for clinical nursing research; this is funded through the Nursing Care Partnership Fund, and administered by the Canadian Nurses Foundation (CNF). No priorities or themes appear to have been set by the CNF. Nursing research trends which have been developing over the past decade or so include an increased focus on outcomes research, the promotion of evidence-based practice, the development of a stronger knowledge base through replicating studies in different patient populations, and improved dissemination of research findings.

Many of the research papers presented at our scientific sessions do appear to fit within the priority areas identified by the NINR, but these are extremely broad and provide little direction for cardiovascular nurse scientists. Only one research paper focused on the CHSRF theme of nursing management. Five papers focused on outcomes, but these represent only one-fifth of the papers presented. Most of the non-research presentations focused on the collection and use of evidence to guide practice. We appear to be left with the situation that "If you don't know where you are going, any road will get you there." (Carroll, Lewis, 1832-1898, British Writer Mathematician).

Since it is difficult to do research without funding, the areas of research undertaken by cardiovascular nurses can be strongly influenced by the priorities set by funding bodies. There are a variety of ways in which these organizations set research priorities, but they might also be (and have been in the past) receptive to suggestions from nursing organizations about what those research priorities should be. I spoke with a number of people at our scientific sessions about undertaking a collaborative research project – something in which cardiovascular nurses across the country could participate. What about an exercise in priority setting? We could start with where we have been and move forward from there. ♥

**A. Kirsten Woodend, RN, MSc, PhD**  
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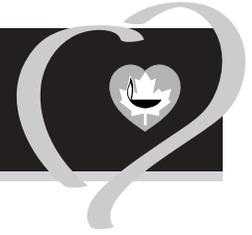
**CJCN CALL FOR PAPERS - SPECIAL ISSUE - August 2005**  
**WOMEN'S HEALTH AND CARDIOVASCULAR NURSING**

Guest Editor - Lynne E. Young, RN, PhD

CJCN invites submission of papers for a special issue on women's health and cardiovascular care. The editor is seeking theoretical, methodological, and empirical papers. Papers can be a maximum of 20 pages in length, including tables, figures, illustrations and references, and follow the guidelines in CJCN's information for authors ([www.cardiovascularnurse.ca](http://www.cardiovascularnurse.ca)).

In addition, the issue will include one short article on clinical innovations, thus submissions related to nursing innovations that support women's health are invited for peer review.

- The deadline for submissions for this issue is May 13, 2005



## Changes in Cardiac Surgery

Sandra Matheson, RN, MN, MEd, CCCN(C), CCN(C)

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### Introduction

Practice changes to improve patient and family care for cardiovascular surgery have been implemented throughout the past decade. Sometimes amidst all the changes, it is difficult to remember how things used to be! A few months ago, a patient and his family arrived for their pre-admission clinic appointment in preparation for his second coronary artery bypass (CABG) surgery. The patient and family were feeling quite well-prepared for the upcoming surgery having successfully gone through the experience 14 years ago. During the clinic visit, it became apparent to the patient, family and staff just how much had changed in the care of open-heart surgery patients before and following surgery. Same-day admission, choice of bypass conduit, use of cardiopulmonary bypass and rapid recovery are a few of the modifications that have been implemented to help improve patient and family cardiac surgery care. The information is from one institution's perspective, however the author believes it is consistent with the changes in cardiac surgical centres across Canada.

### Same-day admission

Same-day admission (SDA) for CABG surgery is an established practice, with some cardiac surgery centres achieving an 80% SDA rate (Lemmer, Richenbacher, & Vlahakes, 2003). The pre-admission clinic (PAC) provides out-patient services before admission to hospital, therefore patients remain at home until the day of surgery. Elimination of the pre-operative hospital stay has reduced costs and has improved patient satisfaction, as most patients are more comfortable in their home environment the night before surgery (Lemmer et al., 2003). However, as Scheidt (1999) identifies, this reduction in patient and family contact pre-operatively places a greater emphasis upon the pre-admission clinic visit. It is important to ensure that all pre-operative issues are addressed and that final preparations are carried out prior to surgery.

During the PAC visit, a history and physical examination is completed. The purpose of the medical history and physical exam is to identify disease processes and risk factors that may influence the cardiac surgery. For example, diabetic patients are associated with increased rates of post-operative complications including renal insufficiency, stroke and infection (Szabo, Hakanson & Svedjeholm, 2002). Patients with transient ischemic attacks or a previous stroke are at risk for neurologic complications and may require pre-operative carotid investigation (Puskas, Williams, & Duke, 2003). Common pre-operative laboratory and diagnostic testing includes a complete blood count, serum electrolytes, creatinine, blood urea nitrogen, glucose, liver function tests, albumin, coagulation parameters (prothrombin time, partial thromboplastin time, platelet count, INR), typing and cross match, urinalysis, chest x-ray and electrocardiogram (Lemmer et al., 2003).

The patient and family meet members of the cardiovascular health care team and have the opportunity to ask questions and discuss any concerns during the PAC visit. The surgeon discusses the surgical plan and operative risk with the patient prior to obtaining consent. An anesthesia evaluation is completed. Planning for nursing care and other services that may be required before the day of surgery and following discharge home are initiated. A major emphasis during the PAC visit is patient and family education utilizing written material, videotapes and one-on-one teaching to help prepare for surgery and the level of patient participation that is required during the post-operative recovery phase.

### Quiz Answers

Answers to cardiac surgery quiz on page 9...

1. d, 2. b, 3. a, 4. c, 5. d, 6. b, 7. a

While at home waiting for surgery, patients are encouraged to practise deep breathing and coughing exercises to prevent pulmonary complications post-operatively, and leg exercises to improve muscle strength and prevent blood thrombosis. Instruction on patient ambulation techniques (e.g., to be able to move from a supine position to sitting at the side of the bed and to get in and out of a chair) are provided, stressing the importance of sternal support for the sternotomy incision.

Specific information is provided to the patient and family regarding skin cleansing prior to surgery. Patients are instructed in the technique and importance of a pre-operative antiseptic shower using either an alcohol-based (ethanol) or an iodine-based product. Pre-operative skin preparation has demonstrated a positive impact on infection rates, specifically a significant reduction in normal and transient flora, allowing for wound closure in a prolonged state of skin antisepsis (Seal & Paul-Cheadle, 2004).

### **Bypass conduit**

Selecting the most appropriate conduit for a coronary artery bypass graft (CABG) is a decision made by the cardiac surgeon, taking into account the risks and benefits for each individual patient as well as long-term graft patency (Ghali, Quan, & Shrive, 2003). Variables affecting this decision include: patient age, ejection fraction, cardiac anatomy, medical history (e.g., timing of surgery, previous myocardial infarction) and comorbid conditions (e.g., diabetes, renal failure, pulmonary disease, obesity, hypertension) (Lemmer et al., 2003). Common conduits utilized for CABG are the left and right internal mammary artery, radial artery and saphenous vein.

Internal mammary artery (IMA) grafts have demonstrated excellent patency rates (80 to 95% at 10 years) as compared to saphenous vein graphs (40 to 60% at 10 years) and, as a result, the left IMA is a common conduit used to bypass the left anterior descending artery (Carrel, Horber, & Turina, 1996; Loop et al., 1986). The right IMA may also be used to bypass the left anterior descending artery as well as the posterior descending or right coronary artery. When multiple graphs are required, single or bilateral IMA grafts in combination with saphenous vein graphs can be used to accomplish complete revascularization (Stevens et al., 2004).

The mammary artery is the major blood supply to the sternum. Controversy still exists concerning the clinical advantages of bilateral IMA grafting due to the associated incidence of sternal wound infection, especially with patients who have diabetes, a history of chronic obstructive pulmonary disease or are morbidly obese (Stevens et al., 2004). Healing time for the

sternum is approximately six to eight weeks and patients recovering from CABG using an IMA graft may experience some numbness or tingling sensation of their chest wall. Post-operatively, patients are instructed not to lift, push or pull more than five to 10 pounds during this time period to maintain a stable sternum and enhance sternotomy wound healing.

The saphenous vein is the most common venous conduit for CABG. Historically, the traditional method for harvesting the saphenous vein was through a long incision along the medial aspect of the lower extremity. This leg incision was associated with substantial morbidity in terms of wound infection, pain and bleeding (Carpino, Khabbaz, & Bojar, 2000). Recent emphasis on minimal invasive surgical technique has resulted in endoscopic saphenous vein harvesting (EVH) for CABG patients. Research has demonstrated a significant reduction in morbidity using EVH, specifically a decreased incidence of wound infection (Hayward, Hey, & Newman, 1999). Additional benefits of a decreased incision length, earlier ambulation with decreased pain and improved cosmetic appearance have also been reported by Hayward et al. (1999).

Radial artery grafts were commonly used in past years, however post-operative complications of arterial spasm and poor short-term patency resulted in a decline in their utilization as a conduit. The introduction of calcium channel blockers to manage arterial spasm post-operatively has resulted in the increased utilization of radial artery graphs, although long-term patency has yet to be reported (Tatoulis, Royse, & Buxton, 2002). Potential complications following radial artery harvesting include hematoma, compartment syndrome and infection, therefore vascular assessment of the affected hand (e.g., colour, capillary refill and temperature) are very important. Patients recovering from CABG using the radial artery may complain of a sore and swollen arm and may experience difficulty with motor control of that affected arm.

### **Cardiopulmonary bypass**

The effectiveness of conventional CABG with cardiopulmonary bypass (CPB) and cardioplegia arrest for myocardial revascularization in patients with multivessel coronary artery disease has been well-established (Ghali et al., 2003). However, CPB is known to cause a complex of systemic inflammatory responses and has been associated with several adverse post-operative outcomes, including renal (dialysis), pulmonary (prolonged intubation), neurologic (stroke, delirium, cognitive dysfunction) and coagulopathic complications (Butler, Rucker, & Westaby, 1993). Looking to improve patient outcomes, off pump coronary artery bypass (OPCAB) was introduced as an



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alternative, therefore avoiding the problems associated with CPB. During this procedure, the heart continues to beat and the heart lung machine is not used. The development of new cardiac stabilization devices, improved anesthesia and surgical technique has resulted in OPCAB surgery being very successful and recognized as a safe surgical approach to revascularization (Khan, De Souza, & Mister, 2004).

Initially offered to relatively low-risk patients, OPCAB is now being advocated for high-risk patients (e.g., elderly, three vessel disease, depressed left ventricular function) who may benefit from the avoidance of CPB (Puskas et al., 2003). Studies have compared CABG to OPCAB focusing on important outcomes such as mortality, stroke, graft patency, renal dysfunction, and total costs associated with length of time to extubation and time in ICU, supporting that excellent results can be obtained with both surgical approaches (Puskas, Williams, & Mahoney, 2004; Parolari, Alamanni, & Cannata, 2003).

### **Rapid recovery**

Rapid recovery post-cardiac surgery is an area for quality improvement initiatives in many cardiac centres. Early extubation protocols to decrease the

intensive care and hospital length of stay following cardiac surgery have been reported, demonstrating reduced or no differences in mortality rates for uncomplicated CABG patients (Meade, Guyatt, & Butler, 2001; Cheng, Karski, & Peniston, 1996). Success of early extubation and rapid recovery protocols has been linked to adequate symptom management of post-operative pain and nausea. Common criteria for early extubation include: hemodynamic stability, minimal inotropic support, conscious, ability to demonstrate muscle strength and follow commands (e.g., maintain head lift), minimal chest tube drainage and acceptable weaning parameters and blood gas results (Lemmer et al., 2003). Following extubation, patients are encouraged to sit up at the side of the bed, to deep breath and cough, preventing atelectasis and facilitating chest tube drainage. Ambulation is encouraged and increased following chest tube removal. Patient expectations include getting up to the chair for meals within 24 hours and achieving independent ambulation (e.g., walking, getting in and out of the chair) within two to three days following surgery, with discharge four to five days following an uncomplicated CABG surgery.

## Summary

The specific changes of same-day admission, choice of bypass conduit, use of cardiopulmonary bypass and rapid recovery have been highlighted to reflect current

changes in cardiac surgical care. Practice guidelines with respect to symptom management of post-operative pain, nausea and atrial fibrillation are future topics to be discussed reflecting additional practice changes in cardiac surgery. ♥

## References

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# Clinical practice questions



*CCCN is now pleased to offer you sample questions based on the Clinical Column found in this edition of the journal. These questions will test your knowledge and ability to apply information found in the article as well as critical thinking (similar to the types of questions you might find on the certification exam). Answers to the questions are located in the journal.*

1. Which one of the following factors is most important for the cardiovascular nurse to identify when considering the potential for development of post-operative complications following CABG?
  - a) Physically inactive
  - b) Dyslipidemia
  - c) Family history
  - d) Diabetes mellitus
2. Pre-operative skin cleansing has demonstrated which of the following: manifestations?
  - a) Increase in normal skin flora
  - b) Reduction in normal skin flora
  - c) Increase in patient comfort
  - d) Decrease in white cell blood count
3. Mrs. Smith is being discharged on post-op day four following CABG. She states she can't believe how well she is doing and is glad to be going home because her daughter is being married next month and she has so much to do. How should the cardiovascular nurse respond?
  - a) Explain that she must gradually increase her activity level
  - b) Suggest that the wedding may need to be postponed for six to eight weeks
  - c) Encourage her to resume all pre-operative activities when she gets home
  - d) Explain that she cannot engage in any physical activity for at least six weeks
4. Which of the following assessment parameters is most suggestive of impaired blood supply to the affected hand following radial artery harvesting?
  - a) Weak ulnar pulse
  - b) Elevated temperature
  - c) Capillary refill greater than five seconds
  - d) 1+ pitting edema of the extremity
5. On post-op day three, Mr. Jones's son expresses concern regarding his dad's recovery following CABG surgery. "When I visit, it is sometimes difficult to carry on a conversation. Dad can't seem to pay attention and remember what we were just talking about". What should the cardiovascular nurse tell Mr. Jones's son?
  - a) Explain that this is a concern and you will notify the physician immediately
  - b) Explain that you will continue to observe Mr. Jones's behaviour
  - c) Explain that this is related to the surgery and will resolve in 24 hours
  - d) Explain that mild memory loss and poor concentration is common and should resolve over time
6. Which of the following findings is most important when considering extubation?
  - a) Hemodynamically stable, opens eyes in response to name
  - b) Hemodynamically stable, ability to perform head lift for five seconds
  - c) Minimal chest tube drainage, awake and opens eyes spontaneously
  - d) Minimal chest tube drainage, moves extremities to command
7. Pre-operative bloodwork identifies an elevated creatinine and glucose and normal albumin and liver function tests. Which of the following assessments would be most important to monitor following cardiopulmonary bypass?
  - a) Renal
  - b) Neurological
  - c) Gastrointestinal
  - d) Musculoskeletal

*Answers to questions are found on page 5.*

# A Qualitative Analysis of the Experience of Uncertainty while Awaiting Coronary Artery Bypass Surgery

Kim M. McCormick, RN, MN, Susan McClement, RN, PhD, and Barbara J. Naimark, RN, PhD

The aim of this article is to present a qualitative examination of the phenomenon of uncertainty in patients awaiting CABG surgery. Cardiac symptoms are presented as an antecedent to uncertainty and both positive and negative outcomes of uncertainty are discussed. Semi-structured interview questions, based on Mishel's Uncertainty in Illness Theory, were developed to investigate the experience of waiting for CABG surgery and identify what patients were doing: to make their cardiac symptoms more manageable, to relieve their own anxiety while waiting, and to identify why patients felt having CABG surgery would benefit them. Telephone interviews were conducted with a self-selected sample of 25 participants. The qualitative results presented are part of a larger multimethod study examining the psychosomatic experience of waiting for CABG surgery. Data collected from telephone interviews were analyzed using content analysis and constant comparison techniques. Content analysis identified three conceptual categories: i) taking responsibility; ii) getting my life back; and iii) getting it over with. Strategies associated with

each of these categories, the consequences of the strategies, and factors that facilitate or constrain their use were also identified. Participants were actively trying to lessen the impact of their cardiac symptoms and were very aware of their own bodies and what actions would exacerbate symptoms or relieve symptoms if they occurred. Participants envisioned physical and psychological improvements for post-CABG surgery. Participants also identified actions they took to limit their anxiety while waiting. Anxiety levels were influenced by family members as well as stories they had heard from friends, family, or acquaintances who had also experienced CABG. This study concluded that the lengthy waits experienced by some patients can create significant psychological disturbance including anxiety and uncertainty about the future. In addition, patient symptom status requires attentive monitoring.

**Key words:** CABG, wait, uncertainty, symptoms, benefits, qualitative, telephone interviewing

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## Background

Coronary artery bypass graft (CABG) surgery is a treatment commonly prescribed to relieve the symptoms associated with coronary artery disease. Mortality and disability from coronary disease has decreased steadily since the introduction of this surgical procedure (Yusuf et al., 1994). In Canada, where health care is publicly funded, the demand for this treatment has outstripped the supply (Naylor et al., 1991) with the result that being booked for CABG surgery in Canada is often associated with the expectation that a long wait will precede treatment.

Uncertainty has been discussed as a significant component of the experience of patients waiting for CABG surgery (Fitzsimons, Parahoo, & Stringer, 2000). Mishel defines uncertainty as, "the inability to determine the meaning of illness related events"

(Mishel, 1988, p. 225). Mishel (1984) says that uncertainty can be generated by events or situations that can be characterized as vague, ambiguous, unpredictable, unfamiliar, inconsistent, or lacking information. Not knowing when the surgery date will be set may be a significant factor leading to uncertainty for patients waiting for surgery. There is also the unpredictable potential of death or sudden adverse coronary event, such as myocardial infarction, which may influence the patient's waiting experience. Vague, ambiguous, unpredictable and inconsistent characteristics of cardiac symptoms experienced while waiting may create uncertainties. There may also be a lack of familiarity with the CABG surgery procedure and the technology involved with the recovery process (Hawley, 1998). Unpredictability of the future is a key component of the waiting experience (Fleury, Kimbrell, & Kruszewski, 1995; King & Jensen, 1994).

Waiting for surgery has been reported to have a negative effect on multiple areas of patients' lives including work, social activities, leisure activities, home management, family relationships, sexual relationships, and financial status (Jonsdottir & Baldursdottir, 1998; Pieper, Lepczyk, & Caldwell, 1985; Radley, Green, & Radley, 1987; Underwood, Firmin, & Jehu, 1993). It has been observed that high proportions of waiting candidates experience moderate to severe levels of anxiety and depression (Cox, Petrie, Pollack, & Johnstone, 1996; Underwood et al., 1993). Underwood et al. (1993) noted that length of time on the waiting list significantly impaired ability to work, family relationships, private leisure activities and social activities and that there was a significant increase in anxiety and depression the longer a participant waited. Jonsdottir and Baldursdottir (1998) observed a non-significant trend where patient's conditions deteriorated with longer waits. Bengston, Herlitz, Karlsson, & Hjalmarson (1994) found that longer waits produced a significant increase in nervous symptoms such as restlessness and insomnia and a moderately significant increase in the use of sedatives and cigarettes. Researchers are beginning to recognize that long waiting times for CABG surgery are detrimental to the patients' psychological status and patients have indicated that uncertainty and anxiety are more troublesome symptoms in the waiting period than angina (Bengston, Herlitz, Karlsson, & Hjalmarson, 1996). Research exploring the experience of waiting on psychological and psychosomatic status of patients is limited and qualitative research examining the experience of waiting in the CABG population has been rare. This qualitative analysis was part of a larger multimethod study examining the psychosomatic experience of waiting for CABG surgery. A goal was to conceptualize this experience and guide further research. In addition, it is rare for a qualitative research study to overtly draw its research premise from a theoretical framework. This perspective makes this research unique.

## Conceptual Framework

This study was guided by Mishel's (1988) Middle-Range Nursing Theory of Uncertainty in Illness. This theory helps to explain how patients cognitively process illness-related stimuli and construct meaning from these events. Mishel proposed that symptom patterns act as an antecedent to uncertainty, and that uncertainty can be appraised as either a danger, leading to possible negative psychosocial consequences such as anxiety, or as an opportunity for an improved life or enlightened state of being. As such, it provided a sensitizing framework from which to develop interview questions designed to explore the experience of patients waiting for surgery. Based on this framework, semi-structured interview questions were developed (see Table 1) with an aim to examining what patients did to make their cardiac symptoms more manageable during their wait (symptom pattern), to relieve their anxiety (uncertainty as a danger), as well as explore why patients felt having CABG surgery would benefit them (uncertainty as an opportunity).

## Sample and Procedures

Following approval from the University of Manitoba Education/Nursing Research Ethics Board and access to the study population from the Winnipeg Regional Health Authority, participants were identified from an existing cardiac surgery waiting list database of patients waiting for surgery at the Health Sciences Centre located in Winnipeg.

The sample was restricted to patients waiting for first-time CABG-only surgery. Criteria for study inclusion were: 18 years of age or older, ability to read and write English, waiting at home or out of hospital for surgery, and willingness to participate in the study following informed consent. Access to a working telephone connection was also a requirement for participation.

Data collection took place over a five-month period from January 2001 to May 2001 with subject

**Table 1**

### Interview Questions Derived from Mishel's Model of Uncertainty in Illness

1. Some patients who wait for heart surgery need to manage symptoms such as chest pain/pressure, shortness of breath or fatigue. Are you doing anything specific to manage your heart-related symptoms while you have been waiting for your surgery? What have you been doing? If you have not been having symptoms, why do you think that is?
2. Why do you think that having bypass surgery will be a beneficial or a worthwhile undertaking? What do you expect will be different for you as a result of having the surgery?
3. Some people who are waiting for heart surgery have indicated that they feel anxious. Do you feel that way? What would you say has caused you the most anxiety during the waiting period for surgery? If you do not feel that you have been anxious, what things help you not to be anxious?

recruitment being done in two separate convenience samplings, (January 11, 2001 and April 26, 2001), to obtain a variety of participants who had waited varying lengths of time for CABG surgery. Sixty-six (66) patients (41 from the January and 25 from the April samplings) were approached to participate in the study which involved completing a mailed questionnaire package. The questionnaire package included an invitation to participate in a telephone interview. Twelve (12) participants (18%) were never mailed the study package due to refusal to participate (6) or because they had their surgery or were taken off the list before the packages could be mailed (6). From the remaining 54 potential subjects, 45 questionnaires were returned (response rate of 83.3%), and 28 (62.2%) agreed to telephone contact. Three participants who consented to telephone contact were eliminated because they did not meet the study criteria (2) or they were called for surgery before telephone contact was attempted (1).

Participants who agreed to telephone contact were telephoned within one week of the researcher receiving their mailed response. The interview was conducted either at that initial phone call or an alternate time was arranged based on participant availability. Telephone interview guidelines were established to secure informed consent from these participants. The voluntary nature of their participation was emphasized. Individuals interviewed by telephone were also informed that participation would not affect their medical or nursing care or alter the duration of their wait.

Twenty-five (25) telephone interviews were conducted with this self-selected sample and analyzed representing the waiting experiences of 21 male (84%) and four female (16%) participants. The mean age of participants was 65 years. The majority lived with a spouse or equivalent (73%), were retired (46%), had survived a heart attack (98%), were living with Class III angina or worse according to the Canadian Cardiovascular Society (73%), had ejection fractions of less than 50% (88%), and had three or more diseased vessels 81% (see Table 2 for a complete summary of demographic results).

Chapple (1999) has noted that it is possible to obtain rich, useful data through qualitative telephone interviewing. Telephone interviewing is increasing in popularity in qualitative research. Previous research has suggested that the data collected are often comparable to face-to-face interviewing, and that telephone interviewing can reduce participant attrition from studies (Carr & Worth, 2001; Sweet, 2002). Telephone interviewing is particularly helpful when collecting data from geographically dispersed populations (Chapple, 1999), as was the case in this

study where 38% of the study participants resided in rural communities outside the city of Winnipeg.

Interview questions were focused to investigate the experience of uncertainty on the waiting list and identify what patients were doing: to make their cardiac symptoms more manageable, to relieve their own anxiety while waiting, and to identify why patients felt having CABG surgery would benefit them. The interview questions were kept as direct and simple as possible to avoid a complex interview over the telephone (Table 1). The researcher recorded responses to the interview questions by taking extensive notes during the telephone conversation. Because responses were often brief or in list form, whenever possible, participants' statements were written out verbatim. With lengthier responses key phrases were used. Key phrases and content were repeated back to the participants during the interview to confirm that the participant's meaning was being understood. The handwritten notes taken by the interviewing researcher (K.M.) were summarized and elaborated on immediately after the interview was complete.

It is interesting to note that 100% of the female participants from the larger study agreed to participate in, and completed the telephone interview. No significant differences were observed between participants who consented to participate in the telephone interview and those who did not. The length of time spent for each telephone interview ranged from approximately eight minutes to 55 minutes and had a mean approximate interview time of 16.24 minutes.

Content analysis and constant comparison was undertaken to analyze the transcribed notes taken during and following the telephone interviews. A descriptive-exploratory design was used to access the experience of patients on a waiting list for CABG surgery. This type of approach is appropriate when little is known about a phenomenon and the relevant constructs and concepts are poorly understood within the context of the research. Given the paucity of empirical work examining the experience of waiting in this patient population, the qualitative approach used for this portion of the study was warranted (Struebert & Carpenter, 1999). Patient responses were categorized question-by-question. General themes emerging from the interview transcripts were also examined. The findings were then reorganized to present the data within conceptual categories.

Qualitative rigor was maintained by attending to the confirmability, auditability, credibility, and fittingness of the interview data (Sandelowski 1986). Confirmability was achieved through consistently maintaining the perspective of the theoretical

framework throughout the data collection and data analysis phase of the project.

In meeting the criteria for auditability, a clear decision-making trail was recorded during the analysis of the interview transcripts, outlining how the data were transformed from the transcripts, and how themes were chosen. The handwritten notes were typed into a word processing program and printed out. Colour coding was used to box or underline statements that were of similar content or meaning.

Credibility and fittingness were achieved through both triangulation with quantitative data in the larger study, and through questioning the fit of the data with observations made in clinical practice. Codes and themes arising from the content analysis of the telephone interview data were shared with two experienced researchers, the first an expert on cardiac care and the second an expert in qualitative methods and cancer research. Both researchers identified with the initial themes identified from the transcript and suggestions were made regarding the organization of the conceptual categories. Both researchers felt there was a credible fit of these data to their own experiences with patients and pointed to the transferability of these results to other patient populations (e.g., cancer patients) who also experience uncertainty, anxiety, and symptoms, and are forced to wait at some point during their medical care.

Conducting the qualitative interviews over the telephone posed limitations to this portion of the data collection. Telephone contact is less personal than face-to-face contact and may have influenced the responses provided by the participants, either in the length of responses given or in the participant's level of comfort while building rapport with the researcher (Carr & Worth, 2001). Chapple (1999) also identified that telephone interviewing is limited by the participants' comfort level with

<b>Table 2</b>	
<b>Characteristics of the Sample N = 26*</b>	<b>Mean (SD)</b>
<b>Age (years)</b>	65 (8.3)
	<b>N (%)</b>
<b>Age (categorical):</b>	
45-60	10 (38%)
61-70	9 (35%)
>71	7 (27%)
<b>Gender:</b>	
Male	22 (85%)
Female	4 (15%)
<b>Living Situation:</b>	
Alone	4 (15%)
With Spouse or Equivalent	19 (73%)
With Spouse and Children	3 (12%)
<b>Education:</b>	
High School or Less	15 (58%)
Some College/University or More	11 (42%)
<b>Work Status:</b>	
Working Part Time	4 (15%)
Working Full Time	3 (12%)
Stopped Working Because of Their Health	4 (15%)
Retired	12 (46%)
Other	1 (4%)
Not Answered (N/A)	2 (8%)
<b>Residence:</b>	
City of Winnipeg	16 (62%)
Rural Community/Outside Winnipeg	10 (38%)
<b>History of Myocardial Infarction:</b>	
None	2 (8%)
One	11 (42%)
Two	12 (46%)
>Two	1 (4%)
<b>Canadian Cardiovascular Society Angina Classification:</b>	
Class II	7 (27%)
Class III	12 (46%)
Class IVa	7 (27%)
<b>Left Ventricular Ejection Fraction:</b>	
>50%	2 (8%)
35-49%	18 (69%)
20-34%	4 (15%)
<20%	1 (4%)
N/A	1 (4%)
<b>Number of Diseased Vessels:</b>	
One	1 (4%)
Two	4 (15%)
Three	7 (27%)
>Three	14 (54%)
* Includes one participant who agreed to telephone contact but could not be reached prior to surgery.	

speaking on the telephone or their hearing ability. Telephone interviewing also does not allow the researcher to see the participant's facial expressions or body language, which are pertinent components of communication. The researcher is also not able to assess the participant's social or cultural context, which may be important to the research question. Although care was taken to be as accurate as possible when hand recording the participants' responses to the questions, the telephone interviews were not tape-recorded or transcribed verbatim. This may have inadvertently resulted in an alteration in the meaning of some of the participant's statements. To correct this limitation, clarification techniques (described above) were used by the interviewing researcher.

## Findings

Three conceptual categories emerged from the data following content analysis: (1) taking responsibility; (2) getting my life back; and (3) getting it over with. Each of these conceptual categories had specific strategies associated with it as well as factors that existed to facilitate or constrain the use of the strategies. In addition, there were also consequences to taking specific actions associated with each conceptual category. Table 3 presents a summary of the conceptual categories. Interview numbers have been placed in brackets after each significant statement from a participant. Since the interview was not tape recorded, consider the comments from participants below as statements rather than direct quotations, however strong efforts were made to accurately represent participants' responses to the research questions.

### *Conceptual Category: Taking Responsibility*

The category of 'taking responsibility' relates to actions that participants took to take care of themselves while waiting for their surgery, specifically in the management of coronary symptoms. Five strategies associated with 'taking responsibility' were identified from patient responses: using medications, changes in activity pattern, changes in work status, risk factor management and embracing alternative therapies.

With the strategy of 'using medications', patients described taking daily oral medications, wearing a nitroglycerine patch, as well as using nitroglycerine pills or spray as necessary to relieve chest pain. For most participants, the use of medications was a successful way to manage their heart-related symptoms. As one participant noted:

*Since I have started wearing the patch and taking the heart pills, I have noticed that I haven't been having as much pain. (12)*

Taking medications is a standard way of controlling the symptoms of coronary artery disease. By discussing

their need to take medications, the participants of this study recognized the importance of these medications in limiting cardiac symptoms and maintaining comfort while waiting for surgery.

The second strategy, 'changes in activity pattern', was implemented as a recommendation from his/her physician, a purposeful self-limitation to prevent symptoms, or as a way of slowing down to stay below the pain threshold. A common statement from participants was: "I just don't do much, that is all." Other comments that participants made illustrating this strategy included, "take it easy", "slow down", "do what I feel is most comfortable", and "pace myself."

'Change in work status' was also discussed as a way to avoid symptoms. Similar to change in activity pattern, changing the nature of their work involved the need to slow down to avoid symptoms. Several participants mentioned quitting work, either on the advice of their physician or as a self-imposed change. Other participants changed the nature of their job to something that was less strenuous, such as one participant who converted his active job into more of a desk job.

'Risk factor management' was the fourth strategy of active efforts participants made to manage their symptoms. The risk factors that participants mentioned consciously modifying during their wait were: reducing or avoiding stress, continuing, where possible, to maintain a light walking program, quitting smoking, and changing their diets to reduce cholesterol.

Two participants actively mentioned the use of 'alternative therapies' as a way of managing their heart-related symptoms. Both participants used a herbal remedy known as Strauss's herbal drops which claim to help improve circulation and open blood vessels. One of the two participants using the herbs claimed a resounding success to the extent that he had made a decision to delay his surgery.

*Last summer, I couldn't do anything without getting chest pain. I haven't had to use nitro since September when I started using the drops. I can walk two to three kilometres and use an exercise bike. I have been able to shovel snow and carry in wood. I was told not to vacuum, mow the lawn, carry loads, but I have been doing a lot of this stuff. (13)*

The second participant did not have the same success:

*It has given me better blood circulation. I had problems with cold feet at night and now I have no tingles in the legs. But I have been needing more nitro more often and I know I am getting worse. I have had two stress tests since starting [the drops] and they have not made a bit of difference to the results. (14)*

A third patient mentioned that he looked into other therapies such as these herbal drops and Chelation therapy, but made a conscious decision not to pursue this avenue because of lack of medical support:

*I have decided not to follow any of that and my doctors, of course, are against it anyway because they say that it doesn't reverse the disease. (24)*

For these participants, alternative medicines proved to be an adjunct therapy to attempt to relieve symptoms during the wait for surgery. The differing responses of individual participants to the success of these therapies emphasizes the need to use caution and inform a physician when choosing to use herbal remedies or other alternative therapies.

<b>Conceptual Categories arising from Qualitative Data Analysis</b>			
<b>Conceptual Category</b>	<b>Strategies associated with conceptual category</b>	<b>Factors that exist to facilitate or constrain the use of these strategies</b>	<b>Consequences of Taking Actions</b>
<b>Taking Responsibility</b>	<ol style="list-style-type: none"> <li>1. Using medications</li> <li>2. Changes in activity pattern</li> <li>3. Changes in work status</li> <li>4. Risk factor management</li> <li>5. Embracing alternative therapies</li> </ol>	<ul style="list-style-type: none"> <li>• Physician recommendation</li> <li>• Self-initiated choices</li> </ul>	<ul style="list-style-type: none"> <li>• Limiting cardiac symptoms</li> <li>• Increased awareness of their bodies</li> </ul>
<b>Getting My Life Back</b>	<ol style="list-style-type: none"> <li><b>1. Envisioning physical improvements:</b> <ul style="list-style-type: none"> <li>• Increasing activity tolerance/return to prior activities</li> <li>• Returning to work</li> <li>• Relieving symptoms/return to health</li> <li>• Prevention of death/MI</li> </ul> </li> <li><b>2. Envisioning psychosocial improvements:</b> <ul style="list-style-type: none"> <li>• Enjoyment of life</li> <li>• Forgetting about problems</li> <li>• Freedom from worry</li> <li>• Feeling safe</li> <li>• Not having to take medications</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• Information received from physician</li> <li>• Fear</li> </ul>	<ul style="list-style-type: none"> <li>• A sense of normalcy or control over their situation</li> </ul>
<b>Getting it Over With</b>	<ol style="list-style-type: none"> <li><b>1. Cognitive strategies:</b> <ul style="list-style-type: none"> <li>• avoidance (trying not to think about it)</li> <li>• realization and acceptance of the need for surgery</li> <li>• faith in God</li> <li>• trust in doctors</li> <li>• comparisons with others</li> </ul> </li> <li><b>2. Behavioural Strategies:</b> <ul style="list-style-type: none"> <li>• keeping busy</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• Support of family (both facilitating and constraining)</li> <li>• Word of mouth stories of the experiences of others (both facilitating and constraining)</li> <li>• Presence of symptoms</li> <li>• Systemic factors within the medical system that cause increased waiting times</li> <li>• Uncertainty of the impact of the waiting period on possible disease progression</li> <li>• Fear of dying</li> </ul>	<ul style="list-style-type: none"> <li>• Peace of mind</li> <li>• Protecting family members</li> </ul>

As factors that existed to facilitate or constrain the use of strategies of 'taking responsibility,' it is clear from the above discussion that many took the medications and the actions that they did, or avoided specific actions on the advice of physicians. As well, many of the choices that participants made to change their work status, modify risk factors, take a specific herbal remedy, or change their activity pattern were self-initiated actions.

Consequences of the actions participants took to avoid their cardiac symptoms were also clear from the interview data. Many patients, during the course of their interview, commented on the success or lack of success of the methods they were using to help limit their cardiac symptoms. "I feel I have been successful in slowing attacks" (2). The quotations above from the two participants using the herbal remedies are more specific examples of these observations.

Participants also reported a self-awareness of their bodies when asked about controlling their cardiac symptoms, and were clear about what activities or situations caused them to develop symptoms and what they needed to do to make their symptoms go away. As one participant noted:

*When I get carried away, I end up having to sit down and take big breaths to get away from the tightness. (16)*

For other participants, bodily awareness was a heightened sensation:

*Since this diagnosis [I] have become more aware of my own feelings. I start to notice things that might be indigestion – "Is this indigestion, or is this an event?" – [I have] heightened awareness now of what this is. (15)*

These statements reinforce that patients waiting for heart surgery are becoming more in touch with their bodies, the nature of their pain and other symptoms, and what activities are successful in preventing and limiting these symptoms. As a result, participants were proactively taking steps to limit the component of their symptoms which could lead to illness uncertainty.

### **Conceptual Category: Getting My Life Back**

The conceptual category of 'getting my life back' represents the expressed desire by many participants to get back to normal. Participants commonly responded, "I just want to be back to normal," or, "give me my life back again." Waiting to get their life back involved the strategy of envisioning how they hoped life would be in the future after they had recovered from surgery. Within this conceptual category, participants used the strategy of envisioning improvements that were either physical or psychological. Physically, participants hoped to increase their activity tolerance and return to prior activities, return to work, relieve symptoms and

return to health, and prevent death/MI. Psychologically, enjoyment of life was a primary goal.

As a part of envisioning physical improvements, 'increasing activity tolerance' included returning to leisure activities, increasing the strenuousness of what they were able to do, making activities of daily living easier, improving sexual activity, exercising, working on hobbies, and taking vacations. As one participant responded:

*I want to be able to do all the things I am not doing now. I feel that I could do them, but I am limiting myself. (1)*

Another participant was more specific on how activity limitations had changed his life:

*My lifestyle is doing things, it is being active and able to move as opposed to sitting on the Internet and reading. (15)*

Interestingly, there were a few participants who commented that, although they expected life to go back to normal, they did not expect to be able to do anything new. For example: "I don't expect to be doing things that, at my age, would be out of place" (2), and, "I don't think too much will change. I don't do active sports" (16).

'Return to work' included both work outside the home and work inside (housework or homemaking), and around the home (yard work and home maintenance). Many participants continued to do as many of these duties as possible while they waited, but were often limited in their speed and efficiency due to symptoms. One female participant noted that when she cleaned her house she did it "one room at a time" (23). A male participant (12) described that his "biggest job" was going downstairs to throw a couple of logs in the furnace.

A third identifiable envisioning strategy was 'relief of symptoms'. 'Relief of symptoms' encompassed a general wish to "feel better" or "return to health" as well as the more specific desire to decrease pain. Relieving symptoms was a primary reason why patients chose to consent to surgery and was described as an important way that these waiting participants could feel they had their life back.

'Prevention of death or myocardial infarction (MI)' was also a common benefit that participants discussed during their interviews. As the participants stated:

*I'm hoping it will do me better and I can do work and survive longer. Not get an attack in something I am doing, maybe. (11)*

*I want to prevent damage to the heart muscle. (25)*

*It's the right thing to do. I don't want to have another heart attack. (1)*

'Prevention of death or MI' introduces a fear factor into the experience of waiting as well as acts as an indication of the participants' confidence in the CABG procedure itself. Participants who made these statements believe that having surgery will reduce the potential for adverse events.

Psychologically, enjoyment of life was the primary goal in getting their life back to normal. Enjoyment of life included: forgetting about problems, peace of mind, freedom from worry, having a "new lease on life", and the general desire for life enjoyment. As the participants noted: "it's just the idea of feeling safer" (18), and, "I need to have surgery to free me from worrying" (8).

As part of envisioning the future, not having to take medications was another strategy that would help achieve the goal of enjoying life. As one male participant described:

*It plays havoc on me that I have to take all these pills and I don't like it. I will do anything to get off these pills. (24)*

Taking medications was yet another burden these participants faced that kept them from "getting back to normal." Having surgery was a way to ease their mind and lift the weight of their health problems off their shoulders. Despite the uncertainty of the wait and surgical outcome, participants were able to foresee opportunities which would directly allow them to "enjoy life" once again.

One factor that facilitated the envisioning process was that participants believed that they could 'get their life back' because their surgeon, cardiologist or other physician had told them that CABG surgery would be beneficial. As one participant stated:

*I was told [by a doctor] that I may have a stroke or die if I continued without having surgery. (4)*

A female participant said:

*The [surgeon] told me I am 78 years old and it is worth it. (9)*

The information received from physicians about the potential success of CABG surgery in assisting these participants to 'get their life back' was a powerful facilitator of the envisioning process. Their physician's word gave these participants permission to envision the future benefits afforded by having surgery. Simultaneously, as is evident in the above discussion, physicians also had the power to constrain the envisioning process by opening the patient up to fear of death or other adverse consequences if they did not have this operation.

As a consequence of envisioning strategies of 'getting my life back,' participants were able to gain a sense of

normalcy and control over the future. As one participant stated: "I try to carry on with how life was before I knew I had to have surgery" (3). Feeling 'normal' gave the participants the power to have some relief over their waiting anxiety. Avoidance of anxiety is also key in the third conceptual category of 'Getting it over with.'

### *Conceptual Category: Getting it Over With*

For the majority of participants, there was an overwhelming sense that having surgery would create a great sense of relief. As one participant stated:

*I would like to get it done and over with. I would like to get my life back to the way it was rather than sitting around and doing nothing. (16)*

In the conceptual category of 'getting it over with,' strategies that helped the participants work through the need to "get their surgery over and done with", or in other words, relieve their anxiety, fall within the cognitive and behavioural domains. Cognitive strategies included: trying not to think about the surgery, realization and acceptance of the need for surgery, faith in God, looking forward to the future, trusting their physicians, and comparing themselves with others. Behaviourally, participants tried to keep busy in order to avoid the emotions they were experiencing while waiting.

When the participants were asked about the things that helped them to feel less anxious, many simply stated: "I try not to think about it". Psychological avoidance of the inevitable shows a 'realization and acceptance of the need for surgery'. As one participant stated:

*I have a realization that it needs to be done. I am not in physical distress. If I was getting chest pain and couldn't do anything, then I would be more anxious. What my subconscious is doing with all this, I don't know. I don't dream or have nightmares or anything like that. (25)*

In a similar fashion, many patients used their 'faith in God' as a strategy to relieve the anxiety associated with wanting to get their surgery over with. Others put their faith and 'trust in the doctors' that would be involved in the surgery:

*The [surgeon] I have been talking to has made me feel so confident about things. (4)*

*The big turning point for me was the pre-op when I found I was dealing with professionals. (20)*

Other strategies associated with relief of anxiety included 'making comparisons with other waiting candidates' as an altruistic way of rationalizing a long wait over which they had little or no control. In the participants' words:

*I am an impatient person and I like to get things done. But then I realize that there are cases much more serious than mine. (4)*

*So many people have waited so long. I have only waited four months so I don't feel that is that long yet. (12)*

While the above cognitive strategies provided significant relief of anxiety, behavioural strategies were also employed. A key behavioural strategy associated with relieving anxiety was keeping busy:

*You try to keep busy with something you are still capable of doing. You are limited physically, but you can still keep busy with your mind. (10)*

By keeping busy, participants were able to distract themselves from thoughts of the surgery itself and from thinking about the long uncertain wait.

The factors that facilitated and constrained the relief of anxiety were primarily outside influences or people in the participants' lives who supported them during their wait. Family and friends played a large role in the participants' psychological well-being while waiting for surgery in both a positive and negative fashion. While some participants saw family as easing the waiting process, ("My wife is the best part of it all and has made things 100% easier" (22)), others described their awareness of their family's own anxieties and, at times, family anxiety influenced the participant's anxiety.

*I feel anxious when I see my family members are uptight about the situation. Get more phone calls of concern and it kind of reverts back to me. (2)*

*My family and wife are more worried about it than I am. (4)*

While family support and impressions about the waiting period were important factors in influencing these participants' anxiety levels, there were consequences to the inevitable involvement of family. Often the participant made a conscious effort to hide their anxiety from their family members or protect their family members from parts of their experience that the participant knew would increase the family member's anxiety:

*My strongest asset is self-discipline. Just between you and me, I don't like to show [how anxious and distressed] I am to my family and friends. (24)*

*I try to be quiet when I get my [nitro] pills [in the middle of the night], but sometimes I disturb my wife and worry her. Once, she heard me and got up and got dressed saying, "I know what comes next. [Going to the hospital]". (2)*

The anxiety and worry of family members was a primary concern to many of the interview participants. They spoke of how family and friends were always

asking about them and their situation. These examples clearly illustrate how the concern of family members is an important component of the waiting experience.

Word of mouth stories that the participants had heard during their waiting period about others who had also had the surgery also acted as both a facilitating and a constraining factor in the experience of waiting anxiety. Many of the facilitating stories related positive experiences of surgical success and provided hope and relief to the waiting patient:

*Knowing people who have gone through it, they seem to forget about their problems. (2)*

*My brother seemed to get along better after it. (3)*

*There are fears – "I will survive" – then you hear all the positives of people who have had it. (9)*

*By all reports I should be as good as new – anyone who has had it says that. (22)*

Although many participants took comfort from the success stories of others, not all stories were ones of success and these stories were more constraining on participants' ability to relieve their anxiety:

*The longer you wait, you get more nervous. Then you start hearing stories – lots of success, but some not. (8)*

*I know people who have had it and feel good after, and I know people who have blocked up very quickly afterward. (13)*

One male participant found that the stories he heard, though well intentioned, were something that forced him to think about his situation and the upcoming operation when he would have rather been thinking of something else:

*I try to keep this quiet [telling others that I am having this operation], because I don't know how long I will be waiting. I hear stories – my mother, cousin, my nephew, will be getting it. I would rather be talking about something on TV or sports. (2)*

With the increasing numbers of CABG surgeries being performed, waiting participants are more and more likely to have friends, relatives, and acquaintances who have also had the surgery. Their stories become featured in the waiting candidate's experience and influence the anxiety level of the patient both in a positive and negative fashion.

Other constraining factors in the participants' wish to 'get their surgery over with' and relieve their waiting turmoil include the things that the participants identified as their chief sources of waiting anxiety: presence of cardiac symptoms, the experience of waiting itself including the systemic factors within the medical system which increase waiting times, the

impact of waiting on possible disease progression, and the fear of dying.

The discussion of symptoms as a chief source of anxiety for the waiting CABG candidate is not a surprising one given that symptom management is the primary reason that patients are offered CABG surgery. As the participants stated:

*When I am awake I can deal with the attacks. As long as I am awake, I have a fighting chance. (7)*

*If I forgot my nitro, I would become quite scared, I think. When the pain goes away, it helps relieve anxiety. (14)*

*As long as I sit around and don't have any chest pain that part relaxes me. I know everything is OK as long as I don't exert myself. (16)*

*It is one of the best feelings when the pain goes away. (2)*

For the participants who mentioned their 'symptoms' as the chief source of waiting period anxiety, the presence of symptoms brought on the anxiety and the absence of symptoms was equivalent to being anxiety free. Participants recognize the seriousness of their symptoms and, therefore, symptoms become an important factor influencing waiting period anxiety.

The wait itself was also a frequently mentioned cause of these participants' anxiety because of the frustration present in having little control over the health care system factors which often work to increase waiting times rather than decrease them. Several participants commented on these systemic influences:

*I was told one to three months and it is already past my three months.*

*I don't blame anybody about it. Our system is just not able to cope with it all. (2)*

*I wish they shortened the waiting. Shortage of nursing I can't do nothing about, but the government can. (8)*

*It is really bad now because you don't know what is going on... I have had the whole situation explained to me and you don't know who to be mad at – the minister of health? I don't know – there is nothing that you can really do... I am quite sure there are a lot of frustrated people. (17)*

While participants know how to prevent and control their symptoms and they know what helped them distract themselves from the stress of waiting, one piece of information would remain elusive: the date of surgery. As one participant stated: "[It's] just the waiting and not knowing what or when it is going to happen" (5). Frustration with the system is part of what made participants feel powerless to overcome those issues over which they had no control.

Another frustrating issue related to the wait was the potential risk of disease progression that might occur while waiting. As one participant said:

*Not doing anything, just sitting in the house and wondering when they are going to call. I have no idea if my arteries are getting plugged worse or what. (11)*

Waiting represents uncertainty and not knowing what kind of effect the wait, (are my arteries becoming more blocked?), and the surgery will have on both their present and future well-being.

The possibility of dying while waiting or dying during the surgery was an additional fear expressed by the participants:

*I am afraid of it in a way because something could go wrong. (16)*

*The thoughts – I never really realized what depression was, but it is really easy to get down and slip into negative thinking. What if something happens to me while I am waiting here? (24)*

Thoughts of potentially dying were claimed by several participants and most indicated that these thoughts contributed to waiting period anxiety. Some patients used these thoughts to try and analyze their own risk:

*You do address questions of mortality and what happens after you die... Most people who die have a lot more wrong with them than a bad heart. (20)*

The fear of dying while waiting or during the surgery is a reality faced by all patients awaiting CABG surgery. Anxiety from this source is a realistic burden to waiting patients.

As a consequence of wanting to get the surgery 'over with' yet maintain a sense of normalcy, patients achieved peace of mind by being able to actively participate, cognitively and behaviourally, in limiting their own waiting anxiety despite the uncertainty present in their situation.

## Discussion

Mishel (1984) stated that uncertainty can be generated by events or situations that can be characterized as vague, ambiguous, unpredictable, unfamiliar, inconsistent, or lacking information. Many of these characteristics of uncertainty were seen in the conceptual categories identified within the qualitative analysis. Participants described vague or ambiguous symptoms, discussed their fears of dying or having a heart attack while waiting, agonized over not knowing when their surgery would be, and envisioned an unpredictable future. Several other qualitative studies examining cardiac populations have also identified evidence of uncertainty as a component of their participants' experience (Hawley,

1998; Fitzsimons et al., 2000; Lindsay, Smith, Hanlon, & Wheatley, 2000; Winters, 1999). This study's results affirm that recurrent qualitative findings of uncertainty as a central experience of cardiac patients is evidence of both the universality of uncertainty and the transferability of these results (Fitzsimons et al., 2000).

### *Symptoms as an Antecedent to Uncertainty*

As predicted by Mishel's theory, symptoms emerged as a primary theme in the waiting experience. Participants identified ways in which they were 'taking responsibility' to manage their symptoms while on the waiting list and described how they self-evaluated the success of both the medications and treatments prescribed to them by physicians, and their self-initiated choices in symptom management. Participants were also familiar with the activities they could and could not do, how their bodies would respond if they "overdid it," and knew what to do to alleviate their personal pain if they did develop symptoms. An interesting finding was that some patients discussed a 'heightened awareness' of their bodily sensations. The ambiguousness of symptoms caused patients to question any abnormal sensation within their body: "Is this indigestion or is this an event?" Mishel (1984) discusses such ambiguity as a component of illness uncertainty. Participants' attentiveness to their symptoms as an attempt to eliminate this source of uncertainty further strengthens the stated relationship of the symptom pattern acting as an antecedent to uncertainty.

### *Appraisal of Uncertainty as a Danger or an Opportunity*

The appraisal process of the uncertainty experience involves the patients' accommodation of uncertainty into their environment as either a danger or an opportunity (Mishel, 1988). Anxiety emerged as a strong desire to 'get the surgery over with'. Key sources of anxiety for these patients were symptoms, the waiting itself, fear of death or myocardial infarction, as well as uncertainty about the possibility of disease progression while waiting. These results parallel those discussed by Bradley and Williams (1990) and Carr and Powers (1986) who examined stressors and concerns of cardiac surgery patients. Fitzsimons et al. (2000) and Fitzsimons, Parahoo, Richardson and Stringer (2003) also identified anxiety as an important theme associated with waiting for CABG surgery. In the current study, participants described employing various strategies to help relieve their anxiety including avoiding thoughts about the surgery and keeping busy.

King, Porter, Norsen, and Reis (1992) asked post-operative CABG patients, "Was it worth it?" and found that those patients who believed that CABG was worth it because it saved them from death scored lower in life satisfaction and mood than those patients who believed that surgery was worth it because it improved their functional status. The results of the present study suggest a hypothesis parallel to the results obtained by King et al. Patients who appraise uncertainty as a danger will focus primarily on the possibility of dying if they do not have surgery, and patients who appraise uncertainty as an opportunity will focus on surgery as a chance to return to former activities. The conceptual category of 'getting my life back' best illustrates this finding. The interview question that preceded the development of this conceptual category asked participants to envision why they felt that CABG surgery would be a beneficial or worthwhile undertaking. While some participants discussed the 'danger' aspect of CABG benefit, (prevention of death or MI), others described the 'opportunity' component of CABG benefit (improved functional and symptom status, enjoyment of life, and psychological uplifting). Some participants discussed both the danger and the opportunity component of CABG surgery and indicated that, while they perceived anxieties and 'dangers' in their wait, they also envisioned life improvements. The possibility that uncertainty could be appraised as both a danger and an opportunity simultaneously has been suggested (Babrow, Kasch, & Ford, 1998) and these study results confirm this possibility. The basic benefits that patients hoped to achieve from CABG surgery parallel those found by Gortner, Gilliss, Moran, Sparancino, and Kenneth (1985), Gortner et al. (1989), and Gortner, Jaeger, Harr and Miller (1994) in their studies examining expected and realized benefits with CABG and other cardiac surgery patients.

### *Areas for Future Research*

This analysis highlights several areas for future research. Simultaneous examination of the experience of the family members' of waiting patients is an area for future study. A sub theme in these research results was that family played a large role in influencing the patient's waiting experience. The qualitative experience of symptoms requires further evaluation, in particular, the role of cardiac symptoms in creating a heightened bodily awareness. Word-of-mouth stories about others who have also experienced CABG may have a specific influence on anxiety and uncertainty levels in the waiting patient. Last, the process of using qualitative research to help clarify a theoretical framework may also prove to be an enlightening method of clarifying patient experience with a concept of illness such as uncertainty.

### *Nursing Implications*

The patient's experience of symptoms was an important source of anxiety and uncertainty for patients waiting for surgery and the absence or relief of symptoms was a significant factor in anxiety relief. Nurses in contact with patients waiting for surgery are in an ideal position to provide formal regular assessments of symptoms while the patient waits. Regular assessments would help identify if a patient's cardiac status is remaining stable during their wait. Although participants in this sample provided evidence that they were 'taking responsibility' for their symptom management, assessments at intervals may help patients to recognize a gradual deterioration of condition that may otherwise go unnoticed during self assessment. These assessments would be especially important in cases where patients are expected to be on the waiting list for four to six months or longer. A more detailed examination of the symptom status of waiting patients in this study has been previously reported in McCormick, Naimark, and Tate (2002).

Currently in this region, only one nurse is responsible for monitoring the health status of patients waiting at home for cardiac surgery. The large number of patients waiting for surgery at any time necessitates that the majority of patient-nurse contact during the waiting period is patient initiated. It is possible, however untested, that regular nurse-initiated contact may have a positive effect on the psychosocial status of patients on waiting lists for cardiac surgery.

### *Study Limitations*

In addition to the limitations to performing unrecorded interviews by telephone (discussed above), the use of a self-selected convenience sample limits the generalizability of these research findings. However, patient populations at other centres with similar demographic characteristics (Table 2) may have similar experiences. Media reports about the lengthy waits of cardiac surgery patients were ongoing during the period of data collection and may have influenced patient anxiety. Changes in surgical personnel within the cardiac surgery program towards the end of the study period may have also influenced patient psychosocial status.

### **Conclusion**

While the current body of literature examining the experience of patients waiting for CABG surgery is small, collectively, researchers, including the authors of the present study, agree that the lengthy waits experienced by some patients can create significant psychological disturbance including anxiety and uncertainty about the future. In addition, patient



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symptom status requires attentive monitoring. Undoubtedly, the negative psychological consequences of waiting may also affect post-operative psychological and physical recovery. Nurses working with waiting CABG patients are in an ideal position to assess and monitor the status of these patients and lessen the psychosocial impact of waiting for surgery. ♥

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# Increasing Patient-Initiation of Cardiac Rehabilitation Referral in Female Percutaneous Coronary Intervention Patients

Sherry L. Grace, PhD, Alexandra Evindar, MS, Dina Brooks, MSc(PT), PhD, Susan Jaglal, PhD, Beth L. Abramson, MD, FRCP(C), FACC, and Robert Nolan, PhD, CPsych

Substantial health risks continue following coronary revascularization, and cardiac rehabilitation (CR) plays a large role in enhancing prognosis. However, fewer women than men are referred to and participate in CR. This study prospectively evaluates a psycho-educational intervention designed to increase patient-initiation of CR referral discussion with their physician. It was hypothesized that an educational brochure along with a motivational interview would facilitate the discussion of CR between physicians and female patients, ultimately resulting in increased referral of women to CR when compared to a control group. Eighty female percutaneous coronary intervention patients were

recruited from two acute care sites in Toronto, Ontario. Eight weeks later, a second research assistant blind to condition telephoned participants to assess aftercare and CR referral processes. Results showed that patients in the experimental group more often discussed CR with a health care provider ( $\chi^2(1)=5.99, p=.01$ ), and there was a trend toward increased referral when compared to control patients ( $\chi^2(1)=2.83, p=.09$ ). Gaps in secondary prevention are noted, and areas for improved referral of women patients to CR are discussed.

**Key words:** cardiac rehabilitation, female, referral, patient education

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Cardiovascular disease (CVD) is the leading cause of death and disability for women and men in developed countries. Substantial health risks continue following coronary events and procedures, and cardiac rehabilitation (CR) plays a large role in enhancing prognosis. However, most research demonstrates inequality in access to CR, particularly lower referral among women than men. CR referral requires actions on behalf of physicians and patients: physicians are required to make the referral, and patients are required to follow through.

There are only two published interventions to increase CR referral and participation. The first utilized phone calls to patients to solicit interest in CR, with subsequent contact with the local CR program or primary care physician to facilitate enrolment. The second was a theoretically-based

intervention using two letters designed to increase a patient's intention to attend CR and, ultimately, their enrolment. Neither of these interventions were targeted at women and, in the latter intervention, the female participants were still significantly less likely than the male participants to enrol (although reason for this was not explicated due to the small sample of women).

The focus of this intervention was a psycho-educational brochure designed to: (1) teach female cardiac patients about CR and its benefits, and to (2) serve as a tool to motivate patient-initiation of CR referral discussion with a health care provider (HCP). Patients first require the knowledge of CR and its benefits, then require the motivation and desire to discuss CR participation with their HCP. The patient served as the focus of this intervention considering patient request has been shown to be a

strong determinant in physician practice. This is demonstrated in studies of HCPs and their patients of varying ages and health status, which show an effect of patient request on physician behaviours such as diagnostic testing (Krupat et al., 1999, Nakar, Vinker, Neuman, Kitai, & Yaphe, 2002), treatment decisions (Baggs & Schmitt, 1995; Krupat et al., 1999), and even referral (Albertson et al., 2000). It was hypothesized that the gender-tailored psycho-educational brochure plus a motivational interview would facilitate the discussion of CR between HCPs and patients and, ultimately, result in increased referral of female patients to CR when compared to a control brochure.

## Methods

### *Participants*

We approached a convenience sample of 80 female patients admitted for percutaneous coronary interventions (PCI) at the University Health Network (UHN) Toronto General Hospital and St. Michael's Hospital, Toronto, Ontario, between July 2002 and March 2003<sup>1</sup>. Inclusion criteria consisted of female PCI patients greater than 18 years of age. Patients were excluded if they were unable to read or speak English, had previously attended CR, had significant ambulatory impairment (e.g., wheelchair bound, amputee), were medically unstable due to complications, or were otherwise ineligible for a complete course of CR (e.g., severe psychological impairment or neuromuscular condition).

### *Procedure and design*

This study utilized a prospective controlled design. The UHN and St. Michael's Hospital Research Ethics Boards approved the study. A.E. recruited eligible patients in the hospital the morning following the procedure just prior to discharge. Those who met study criteria and agreed to participate signed a consent form and were provided with either a control or intervention brochure. Control brochures were disseminated until 40 patients had been recruited, at which point the intervention brochure was provided to all subsequent participants. This design was used to prevent contamination<sup>2</sup> of referral procedures at either site.

Control patients were provided with a female-centred brochure created by the Heart and Stroke Foundation of Canada, which presented heart

healthy lifestyle advice. This was done to control for contact time with the research assistant, ensuring that it was comparable in both groups. The intervention consisted of a psycho-educational brochure tailored for women, which was developed based on the literature and key informant interviews. The key points addressed included: (1) the importance of health behaviour change for secondary prevention; (2) gender differences in referral to CR; (3) CR services and locations in the area; and (4) the importance of patient-provider discussion about aftercare to ensure CR referral. Readability statistics confirmed a Flesch-Kincaid grade level  $\leq 6$  for the final brochure. CR professionals and a cardiologist reviewed the medical content to ensure accuracy. The brochure was then field-tested for readability, comprehension, credibility, and relevance on a convenience sample of eight female CR patients at the Women's Cardiovascular Health Initiative (Sunnybrook and Women's College Health Sciences Centre). A brief motivational interview was also conducted with the administration of the brochure, encouraging participants to think about goals for recovery and returning to previous lifestyle.

The oral commentary accompanying the dissemination of the brochures was standardized and included a brief explanation of the purpose of the booklet to improve aftercare for female heart patients, and a request for participants to read it prior to any visits with a HCP. Patients were informed that there would be a follow-up telephone interview in eight weeks to ascertain whether or not the booklet affected aftercare. Note that the script referred to "aftercare" rather than "CR utilization" to attempt to control for bias. A second research assistant (blind to study design) administered the post-test survey.

### *Measures*

The telephone survey included sociodemographic and CR items. Sociodemographic data included date and place of birth, ethnocultural background, marital status, highest education, family income, work status and living situation. The CR items included Likert-type, categorical, and open-ended questions to identify the nature of patient-provider communication about aftercare and CR, and to investigate CR referral processes.

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1. Patient recruitment was suspended for several months during the SARS outbreaks.
  2. Where intervention patients initiate CR referral discussion with a HCP while a control patient is in the same room, or HCPs remember to refer a control patient because an intervention patient recently requested a CR referral.

## Results

Patient characteristics are presented in Table 1. Eleven patients who initially participated were lost to follow-up, such that we had a retention rate of 86% at eight weeks (N=69). There were no significant sociodemographic or medical differences between control and experimental participants. All patients who participated were discharged home.

### CR referral

Twenty of the 69 (29.4%) participating patients reported that they had discussed CR with someone. Most often this was a physician (n=12, 60%), followed by an allied health professional (n=4, 20%), or another person (i.e., fellow patient, family member). Most patients described the recommendation to attend CR as positive (n=17, 85%), but some described it as neutral (n=3, 15%), and none described it as negative in tone. When asked why they did not discuss CR with a HCP, 16 (42.1%) responded that the HCP did not mention it, 13 (34.2%) responded that they did not feel they needed CR, two (5.3%) responded that they had a comorbid condition which would preclude them from attending, and seven (18.4%) provided another reason (e.g., living in a retirement home).

With regard to aftercare more generally, 35 (53%) responded that a HCP had discussed exercise with them, 23 (34.8%) responded that a HCP had

discussed nutrition, 55 (82.1%) had discussed medication, 13 (20%) had discussed psychosocial risk factors such as social support and stress, and 18 (26.9%) HCPs discussed other lifestyle modifications (i.e., smoking cessation where applicable) with patients.

Of the total number of patients who participated, 17 (25%) were referred to CR. These patients were most often referred by a cardiologist (n=13), followed by a family doctor, and were referred to 11 different CR sites. Where patients were not referred, only six patients were provided with a reason why they were not referred. These reasons included leaving the referral to another HCP, lack of a program in the area, the belief that CR is not necessary, and that the HCP did not perceive the patient was ready.

Fourteen of the 17 patients referred to CR had attended their CR assessment by eight weeks post-PCI. Their range of travel time to the CR site was between five and 90 minutes, with a mean of 28.44 (SD=23.93). Thirty-one (45.6%) of the 69 patients who participated in the study expressed intention to participate in CR. When the remaining patients were asked why they did not intend to participate in CR, 12 (36.4%) cited travel time or transportation barriers, eight (24.2%) responded the lack of physician encouragement, six (18.2%) reported time constraints, three (9.1%) reported a comorbid condition, and other responses included trying to recover on their own.

<b>Participant Characteristics, N=69</b>			
	Control (n=36)	Experimental (n=33)	Test Statistic
Age in years (mean (SD))	67.8±(12.1)	63.2±(11.4)	t (6) =1.6
Marital Status (% married or common-law)	19 (52.8%)	22 (68.8%)	χ <sup>2</sup> (1)=1.81
European-Canadian Background	32 (88.9%)	27 (84.4%)	χ <sup>2</sup> (1)=.30
Education Level (% highschool only)	20 (55.6%)	14 (43.8%)	χ <sup>2</sup> (1)=.94
Gross Family Income (% under \$30,000 CAD)	13 (48.1%)	5 (55.6%)	χ <sup>2</sup> (1)=.15
Work Status (% working or caregiving)	11 (30.6%)	13 (40.6%)	χ <sup>2</sup> (1)=.75
Living Arrangements (% live alone)	9 (25.0%)	6 (18.8%)	χ <sup>2</sup> (1)=.39
Self-reported complications since discharge	12 (33.3%)	11 (33.3%)	χ <sup>2</sup> (1)>.01
Self-reported comorbid condition	24 (66.7%)	24 (72.7%)	χ <sup>2</sup> (1)=.30

**Note:** There are no significant differences in participant characteristics based on experimental group.

### *Intervention effects*

Significantly more patients in the intervention group (43.8%) discussed CR with a HCP than the control group (16.7%;  $\chi^2(1)=5.99$ ,  $p=.01$ ). When asked who initiated the discussion of CR, a significantly greater number of patients in the intervention group (80%) initiated the CR discussion compared to controls (20%;  $\chi^2(1)=5.23$ ,  $p=.02$ ). There was a trend whereby patients in the intervention group (34.4%) were more likely to be referred to CR compared to control patients (16.7%;  $\chi^2(1)=2.83$ ,  $p=.09$ ).

### **Discussion**

Access to CR for patients in general and women in particular has been inconsistent at best. Studies examining referral and participation in CR show that physician recommendation to attend is the strongest predictor of CR access and participation. Thus, it is imperative to increase access of female patients to CR by physician referral. Several agencies have developed clinical practice guidelines to guide decision-making regarding CR. However, the mere availability of these guidelines has not been successful in increasing the uptake of CR. The present study implemented an intervention to increase patient-initiation of CR discussion with a HCP. Results reveal a significant increase of CR discussion among HCPs and their patients, and a trend toward increased CR referral following the intervention compared to control.

While this has resulted in increased discussion of CR with a HCP, we found only a trend toward increased referral. This could be due to patient ineligibility for CR, physician attitudes toward or knowledge of CR, geographic distance from CR sites, or a failure in patient-provider communication. With the advent of effective home-based CR programs which would preclude distance or wait list referral barriers, it is unclear why physicians did not refer patients who initiated CR discussions. Future research is required to understand physician factors affecting referral of female heart patients, and to evaluate further interventions to ensure equitable access to CR. Other potential interventions to increase equitable utilization of CR services include automatic referral. This refers to the systematic, non-manual enrolment of all eligible cardiac patients (based on clinical practice guidelines from acute care to CR). The use of health informatics to ensure referral may counteract or offset HCP referral failure. Moreover, the role of nursing and other allied health professionals in ensuring female patient referral should be optimized.

Similar to other studies, we found gaps in cardiovascular care provided to female patients. While upward of 45% of patients who participated in the study would be willing to participate in CR, only 25% were referred. Moreover, HCPs did not discuss some of the important risk factors or health protective behaviours for recurrent events with their patients. Only approximately half of the participating patients reported that any HCP had discussed exercise with them, and only 20% reported that a HCP had discussed psychosocial factors such as depression, anxiety, support or hostility, which are factors integral to cardiac prognosis.

Caution is suggested in interpreting the results of this study. As it is set within a universal health care system, generalizability to other systems is unclear. Furthermore, participating patients were not randomized to condition to prevent contamination on the units, however, significant differences in patient characteristics between the experimental groups were not noted. Yet, considering we did not assess factors such as CR beliefs, patient-provider relations, the length of the clinic visit, and the availability of transportation for example, we cannot rule out the possibility that these factors may serve as confounders. Finally, physicians were not contacted to determine their reason for not referring patients to CR, nor were referrals independently verified with the CR sites. Similarly, patients were not followed in order to verify whether they participated in CR once referred. Replication in a larger scale study is warranted because patient-initiation of CR discussion shows promise. In conclusion, these results reveal a gap in physician CR referral of female patients which can be addressed by targeting both physician and patient behaviour. Encouraging and teaching female patients early on to take a more active role in their treatment plans should enhance the care offered to them, as well as motivate their own interest and ability in contributing to their cardiovascular recovery. Active participation of female patients in consultation with their HCPs, in conjunction with 'demand-driven' patient education can stimulate the exchange of information between the HCP and patient. This could result in improved patient satisfaction, and may ultimately increase CR referral and participation. ♥

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# Gender Differences in Functional Capacity Following Myocardial Infarction: An Exploratory Study

Loretta A. Jarrell, RN, MSc, Sylvia J.M. Hains, PhD, Barbara S. Kisilevsky, RN, PhD, and C. Ann Brown, RN, PhD

This study examined functional capacity and hemodynamic responses to exercise in men and women during early recovery after myocardial infarction (MI). Participants were tested at hospital discharge and six weeks following discharge. At each testing time, they completed the Beck Depression Inventory and a symptom-limited graded exercise test (SL-GXT). Functional capacity, expressed in metabolic equivalents (METs), was estimated from performance on the SL-GXT. Hemodynamic response measures included heart rate (HR), systolic blood pressure

(SBP), and rate-pressure product (RPP). Both men and women demonstrated significant increases in functional capacity from discharge to six weeks later although the levels were lower for women ( $M = 2.8$  METs) than men ( $M = 7.3$  METs). This indicates a need for gender-sensitive counselling for unsupervised exercise rehabilitation during early recovery following MI.

**Key words:** functional capacity, myocardial infarction, graded exercise test, heart rate

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This study examined functional capacity and hemodynamic responses to exercise in men and women during early recovery after myocardial infarction (MI), a potentially life-threatening complication of ischemic heart disease. The incidence of MI is 26% in men and 25% in women (Heart & Stroke Foundation of Canada [HSFC], 1999), although in women the incidence lags approximately 10 years behind that in men. Following menopause, death rates in men and women due to MI become similar (Arnstein, Buselli, & Rankin, 1996; HSFC, 1999).

At discharge from hospital following MI, exercise is usually prescribed as part of rehabilitation, although in this and other rural and small urban communities, patient access to supervised, individually prescribed, cardiac rehabilitation is generally not possible due to the lack of availability of such programs. Moreover, attendance at available programs, which do not address the specific needs of women is highly variable (King, 2000; King, Humen, Smith, Phan, & Teo, 2001; Wieslander & Fridlund, 2001). Consequently, unsupervised home exercise is normally recommended at discharge. However, activity intolerance, i.e., the inability to endure or tolerate an increase in physical activity, is characteristic of MI patients during early recovery. Following MI, the ability to perform aerobic physical work is limited by the impaired ability of the heart to increase cardiac output to meet the  $O_2$  demands of exercising skeletal muscles (Brzostek et al., 1994; Yuasa et al., 1995). The functional impairment is due to reduced peak stroke volume and impaired cardiac

contractility (Folta & Potempa, 1992; Haskell & Durstine, 1993; Saunamaki & Andersen, 1987; Yuasa et al., 1987).

During aerobic exercise, there is typically a linear increase in oxygen ( $O_2$ ) consumption, cardiac output, heart rate and oxygen extraction, but stroke volume increases by only 10 to 25%. Due to a general decrease in arterial compliance in aging people as well as increased sympathetic activity during exercise, MI patients may experience a higher arterial pressure and myocardial  $O_2$  demand at a lower  $O_2$  uptake than expected. The increase in myocardial  $O_2$  demand must be matched by an increase in coronary blood flow to maintain the supply/demand balance (Fardy & Yanowitz, 1995). The heart can tolerate only a small  $O_2$  deficit without undergoing irreversible damage (Thadani, 1996). However, exercise tolerance is impaired until substantial myocardial healing has been accomplished (Franklin, Gordon, & Timmis, 1992; Haskell & Durstine, 1993; Yuasa et al., 1987). Thus, the increase in myocardial  $O_2$  demand during physical activity may exceed myocardial  $O_2$  supply, leading to myocardial ischemia or infarction until spontaneous improvement in functional capacity occurs (between three and 11 weeks following an uncomplicated MI as the myocardium heals) (Franklin et al., 1992).

The most practical available means to test cardiac perfusion and function is aerobic exercise (Froelicher & Pashkow, 1993), the most common human physiologic stress. Prior to discharge after MI, a submaximal, symptom-limited, graded exercise test (SL-GXT) on a motorized treadmill is usually conducted to determine

cardiac responses to exercise and to estimate functional capacity. Submaximal tests were developed in which heart rate response can be plotted against exercise intensity, and  $O_2$  uptake is estimated from the intensity of the exercise (Mahler, Froelicher, Houston Miller, & York, 1995). Functional capacity is expressed in multiples of metabolic equivalents (METs), with 1 MET equal to  $3.5 \text{ ml} / \text{kg}^{-1} / \text{min}^{-1}$ , representing the body  $O_2$  requirements at rest in the supine position (McKirnan & Froelicher, 1993). Myocardial  $O_2$  demand is estimated non-invasively from the product of heart rate and blood pressure, i.e., the rate-pressure product (RPP).

One of the psychosocial factors that can modify functional capacity following MI is depression (Carpenito, 1989; Frasure-Smith, Lesperance, & Talajic, 1993; Griego, 1993; Legault, Joffe, & Armstrong, 1992). The rate of depression in patients with coronary heart disease (15 to 20%) is higher than that found in the general population (Milani, Littman, & Lavie, 1993; Travella, Forrester, Schultz, & Robinson, 1994). The presence of depressive symptoms is associated with lower levels of functional improvement during the first year following MI and may influence activity level and hence recovery (Ladwig, Kieser, Konig, Briethardt, & Borggreffe, 1991; Travella et al.).

The question of whether functional capacity improves at the same rate, or to the same level in men and women has not been addressed in the literature, and differences in men and women in the effects of depression as a contributing factor to decreased functional capacity have not been reported. Therefore, the purpose of this study was to determine differential functional capacity and hemodynamic responses to submaximal exercise over time from discharge to six weeks following MI in men and women as well as to ascertain whether depressive symptoms influence functional capacity.

## Methods

### *Participants*

At the time of discharge following MI, 41 eligible patients (34 men and 11 women) who volunteered to participate in the study and gave written informed consent were tested. Of the patients tested at discharge, 20 (14 men, six women) returned for testing six weeks following discharge and served as the sample for this longitudinal study. There were no differences in age, gender, or discharge SL-GXT results between those who dropped out and those who continued in the study. Drop-out occurred because of coronary artery bypass graft surgery, angioplasty, or no follow-up testing. There was no significant difference in age between the men (mean age = 55 years, SEM = 2) and the women (mean age = 60 years, SEM = 4).

Participants met the following inclusion criteria: age 40 to 75 years, ability to comprehend English, ability to walk unassisted, and ability to perform a symptom-limited GXT prior to discharge. Exclusion criteria included impaired mobility or cognition (e.g., inability to provide informed consent), and any unstable medical condition that prevented the performance of a GXT (Ishii, 1995). These included unstable angina, uncontrolled congestive heart failure, serious cardiac dysrhythmias, acute myocarditis or pericarditis, endocarditis, severe aortic stenosis, severe left ventricular dysfunction, acute pulmonary embolus or pulmonary infarction, and any acute or serious non-cardiac disorder. The study was approved by the Queen's University Health Sciences Research Ethics Board.

### *Instruments*

#### **The revised Beck Depression Inventory (BDI)**

The revised BDI is a 21-item, self-report screening questionnaire that measures both presence and intensity of depressive symptoms in adults. A full-scale score was obtained by summing the ratings given by the participants for each of the 21 items. The maximum score possible is 63; a score (10 is indicative of depression, with increasing scores indicative of an increasing level of depression. Reliability of the BDI is high in non-psychiatric samples with internal consistencies ranging from 0.73 to 0.94 (Beck, Steer, & Garbin, 1988; Campbell, Burgess, & Finch, 1984; Tanaka-Matsumi & Kameoka, 1986). The BDI has been shown to differentiate between psychiatric and non-psychiatric subjects and between normal subjects, psychiatric patients, and medical patients (Beck et al., 1988; Campbell et al., 1984; Tanaka-Matsumi & Kameoka, 1986). Concurrent validity was shown when the BDI was compared to clinical ratings,  $r = 0.55$  to  $0.73$ , and other instruments measuring depression, such as the Hamilton Depression Rating Scale,  $r = 0.73$  to  $0.80$  (Beck et al., 1988).

#### **Graded exercise test (GXT)**

Subjects performed a SL-GXT on a programmable motorized treadmill at discharge and six weeks following discharge using a standard incremental exercise stress test. Quantifiable work is performed when walking up a slope, and the energy expended during the SL-GXT can be calculated based on treadmill incline (per cent grade) and vertical distance travelled (American College of Sports Medicine [ACSM], 2000; Powers & Howley, 1996). The Bruce Protocol is the most commonly-used treadmill protocol consisting of six incremental stages, involving a change in speed and grade every three minutes, beginning at 1.7 mph and 10% grade and ending at 6.0 mph and 22% grade (ACSM, 2000; Mahler et al., 1995; Sharma & McLeod, 2001). In accordance with standard practice, the Modified Bruce Protocol was used at discharge to

allow for a gradual increase in workload. The standard modification consists of the addition of two stages at the beginning of the Bruce Protocol: stage one at 1.7 mph at 0% grade for three minutes, and stage two at 1.7 mph at 5% grade for three minutes, followed by the regular Bruce Protocol (ACSM, 2000).

### **Procedure**

Eligible patients who gave written informed consent were studied at discharge and six weeks after discharge following hospitalization for acute MI. At each testing time, the participants completed the revised BDI to determine the presence and severity of depressive symptoms. Following this, they completed a medically supervised SL-GXT in the cardiovascular laboratory of the hospital for the purpose of estimating functional capacity and measuring hemodynamic responses to acute exercise. At discharge, patients performed the Modified Bruce Protocol; six weeks following discharge, the regular Bruce Protocol. Heart rate and rhythm were monitored continuously by electrocardiogram (ECG); blood pressure (BP) was measured prior to and at the end of the test. SL-GXTs were stopped for the following signs or symptoms of exercise intolerance: ECG evidence of ischemia (ST segment depression > 1 mm), symptoms of fatigue, angina, shortness of breath, or subject's desire to stop.

### **Data reduction**

Maximum O<sub>2</sub> uptake (VO<sub>2 max</sub>) for walking was estimated from the final grade and speed of the treadmill on the SL-GXT. During walking, approximately 0.1 ml O<sub>2</sub> is needed to move each kg of body mass per meter of horizontal distance covered, i.e., 0.1 ml / kg<sup>-1</sup> / min<sup>-1</sup>. The O<sub>2</sub> demand of raising body mass against gravity at sea level is 1.8 ml / kg<sup>-1</sup> / min<sup>-1</sup>. Estimation of the energy expenditure during the SL-GXT is based on the final treadmill incline (per cent grade) and vertical distance travelled, using standard equations that incorporate body weight (ACSM, 2000; Powers & Howley, 1996). Functional capacity, or O<sub>2</sub> uptake, is expressed in metabolic equivalents (METs) with 1 MET equal to 3.5 ml / kg<sup>-1</sup> / min<sup>-1</sup>, representing the body O<sub>2</sub> requirements at rest in the supine position (McKirnan & Froelicher, 1993). Heart rate and rhythm were monitored continuously by ECG; BP was measured prior to and at the end of the test. Rate pressure product (RPP), the major determinant of myocardial oxygen demand, was determined by the product of systolic BP (SBP) and HR using the formula HR x SBP x 10<sup>-2</sup>.

## **Results**

### **Participant characteristics**

Fourteen men and six women completed testing at discharge and six weeks following discharge. There were no significant differences between men and women in

age, body mass index or ejection fraction (Table 1). Eleven men and five women had suffered a Q-wave MI. Most of the participants were taking cardiovascular medications at the time of testing: β-blockers (10 men and five women), angiotensin converting enzyme (ACE) inhibitors (three men and two women).

### **Beck Depression Inventory (BDI)**

The BDI scores of all but two participants were within the normal range. One man and one woman had scores above 10. The Mann-Whitney U test showed no gender differences in BDI scores at discharge or at six weeks following MI. Furthermore, BDI scores at discharge and functional capacity at six weeks following MI were not correlated.

### **Symptom-Limited Graded Exercise Test (SL-GXT)**

The mean values for the SL-GXT variables for the men and women at rest and at peak exercise, separately, can be seen in Table 1. A 1-between (gender), 1-within (time) analysis of variance (ANOVA) showed significant main effects of Time, F(1, 17) = 25.06, p < .01, and Gender, F(1, 17) = 21.10, p < .01, but no interaction.

The hemodynamic variables, HR, SBP and RPP, were measured at rest and at peak exercise and are shown in Table 1. Analyses of variance showed that peak exercise HR, F(1, 17) = 9.94, p < .05, SBP, F(1, 16) = 13.80, p < .01, and RPP, F(1, 16) = 15.42, p < .01, increased over time from discharge to six weeks. However, there were no gender or interaction effects in any analysis.

## **Discussion**

Regardless of gender, most participants scored <10 on the BDI that indicated no evidence of depressive symptoms. Two of the 20 participants demonstrated the presence of depressive symptoms (score > 10) at discharge, fewer than the 15 to 20% depression rate noted by others for patients with coronary heart disease (Forrester et al., 1992; Frasure-Smith et al., 1993; Griego, 1993; Milani et al., 1993; Travella et al., 1994). No relationship was found between functional capacity and scores on the BDI in contrast to others (e.g., Milani et al., 1993). In the present study, all participants experienced increased functional capacity and physical activity, and decreased fatigue.

The most important finding of this exploratory study was that, both at discharge and six weeks following discharge, men achieved a higher absolute functional capacity on the GXT than women. The significant gender differences and the pattern of differences that were consistent over time indicate a robust phenomenon. Physiological differences in men and women may have accounted for this difference. For example, it is known that differences between men and women exist in cardiac structure and function in that women have smaller left ventricular mass, lower cardiac

pump and myocardial muscle performance than men (Cowley et al., 1992). Normal physiological differences in women (i.e., a smaller O<sub>2</sub> carrying capacity, higher percentage of body fat, and smaller muscle fibre area) than men also may have contributed to the observed gender differences in aerobic capacity (Deltrano & Froelicher, 1988; Hutchinson, Cureton, Outz, & Wilson, 1991; Mitchell et al., 1992; Shangold & Mirkin, 1994).

At discharge, functional capacity for both the men and women was lower than the capacity of nine METs that is typically observed in sedentary individuals (Ainsworth et al., 1993). Although both the male and the female groups were overweight (mean BMI = 28.4 kg/m<sup>2</sup> and 27 kg/m<sup>2</sup> for men and women, respectively), they were not significantly different from each other. Moreover, the overweight factor would not be expected to have affected the results of the GXT, particularly in the early stages of an incremental test (Jones, 1988). In addition, the calculation of energy output in a treadmill test incorporates body weight into the equation (ACSM, 2000). From the MET levels shown in this study, one would expect that the functional capacity of the women at discharge allowed for only minimal activities of daily living (e.g., eating, dressing, undressing, and bathing) which require two METs, whereas the men should be able to perform such activities as showering, gardening,

or ironing which require four to five METs (Burek, Kirscht, & Topol, 1989; Fallen et al., 1995). The MET levels observed have implications for counselling at discharge regarding activities of daily living and exercise. Our results suggest that, during unsupervised recovery after discharge following MI, exercise counselling should be based specifically on the individual's discharge exercise test.

Six weeks following MI, both men (8.7 METs) and women (5.2 METs) achieved significant improvements in functional capacity, representing a 20% increase in men and an 86% increase in women. At this time, most participants stated that, although fatigue was still a concern for them, they were able to walk 20 to 30 minutes per day without symptoms of chest pain or fatigue. For the women, given their MET level of 5.2 at six weeks, they could perform routine activities such as vacuuming, gardening, or loading and unloading the washing machine (Fallen et al., 1995). For the men, given that their MET level of 7.3 at six weeks is near the level seen in healthy sedentary males, they could begin to participate in moderate intensity conditioning exercises such as stationary bicycling, walking/jogging, and perform household activities such as grocery shopping, carrying heavy groceries and stripping and making beds (Fallen et al.). Even six weeks following

<b>Table 1</b>				
<b>Summary of the average ("SEM) age, body mass index, cardiovascular and metabolic measures for the males and females, separately.</b>				
	Male (n=14) M (∓ SEM)		Female (n=6) M (∓ SEM)	
Age (years)	55 (2)		60 (4)	
Body Mass Index (kg/m <sup>2</sup> )	28.4 (1.1)		27.0 (2.6)	
<b>Cardiovascular and Metabolic Measures</b>				
Ejection Fraction (%)	48 (2)		49 (4)	
	Rest	Exercise	Rest	Exercise
Heart Rate (beatsCmin <sup>-1</sup> )				
Discharge	72 (3)	118 (6)	68 (4)	94 (7)
6 weeks after Discharge	68 (4)	130 (7)	70 (3)	108 (5)
Systolic Blood Pressure (mmHg)				
Discharge	127 (6)	158 (8)	114 (4)	137 (9)
6 weeks after Discharge	137 (6)	175 (8)	125 (5)	168 (13)
Rate Pressure Product (HRxSBPx10 <sup>-2</sup> )				
Discharge	91 (6)	187 (15)	76 (9)	127 (11)
6 weeks after Discharge	94 (7)	227 (19)	88 (5)	181 (15)
MET level				
Discharge		7.3 (0.5)		2.8 (0.5)
6 weeks after Discharge		8.7 (0.6)		5.2 (0.6)

MI, the functional capacity level of the women is still substantially lower than that of the men at discharge. Although the ability of the women to perform physical activity had improved, it remained at a level below that necessary for moderate intensity conditioning exercise that the men were now ready to perform. Clearly, the differential functional capacity levels demonstrated by men and women both at discharge and six weeks follow-up suggest that, in communities without supervised, structured cardiac rehabilitation programs, specific counselling should be given regarding type, intensity, duration and progression of exercise during early recovery following MI, using ACSM (2000) guidelines and principles. Moreover, this counselling should be based on objective data of functional capacity.

The increases over time in hemodynamic measures (HR and BP) at peak exercise, without ECG evidence of ischemia or symptoms of exercise intolerance, suggest that the myocardial O<sub>2</sub> supply/demand balance improved by six weeks. This improvement is necessary for progression of activity tolerance. Discharge results for the SL-GXT for the men were comparable to Burek et al. (1989) and Jain, Hunter Myers, Sapin and O'Rourke (1993), but lower than those obtained by Brzostek et al. (1994). Differences between this study and Brzostek et al. may have resulted because the participants in Brzostek et al.'s study discontinued their cardiac medications the night prior to treadmill testing. The absence of medications that affect HR (i.e.,  $\beta$ -blockers) may have accounted for the higher resting and peak exercise HR in the subjects in Brzostek et al.'s study, but does not explain the higher MET level at discharge. Six weeks following MI, however, the SL-GXT results for the male participants were consistent with others (Dressendorfer et al., 1995; Tavazzi & Ignone, 1991). No separate data on hemodynamic responses in women were presented in any of the above studies. Only Cottin et al. (1996) included female participants, but reported no separate data for them.

In summary, functional capacity five to six days and six weeks following acute MI was significantly and clinically greater in men than in women in this study, indicating a need to examine gender in future studies. The gender differences in functional capacity, and the pattern of

differences that were consistent over time indicate a robust phenomenon, particularly given the small sample size. The fact that our sample was relatively homogenous, as seen by no significant differences in age, BMI or EF, possibly contributed to these findings. The lack of significant difference in age between men and women was surprising, given that women who suffer MI are usually 10 years older than men.

The observation of significant gender differences has clinical implications for patients at discharge following MI. Specifically, there is an obvious need for individualized discharge teaching regarding unsupervised and unmonitored home exercise rehabilitation during the immediate post-discharge phase of recovery following MI that is based on objective data from GXT results. This includes counselling regarding the appropriate level of activities of daily living, the mode, intensity, and duration of physical exercise without symptoms of cardiac ischemia, the need for a gradual increase in the rate of progression of exercise, and methods of self-monitoring of heart rate and perception of effort following MI. ♥

### Author's note

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The nominee should be someone who:

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