

Canadian Journal of Cardiovascular Nursing

Revue canadienne de Nursing cardiovasculaire



In this issue:

Pain in Adults Post Surgical Repair of Congenital Heart Defects

Adults who have undergone surgical repair for congenital heart defects report mild to moderate pain post surgery which is variable in sensations, decreased over time, and adequately managed.

Les personnes ayant subi une chirurgie cardiaque corrective pour une anomalie congénitale rapportent des douleurs après la chirurgie qui sont variables en terme de sensations, qui diminuent avec le temps, et qui seraient adéquatement contrôlées.

Comment influencer la pratique de l'activité physique chez des personnes atteintes d'une maladie coronarienne?

In people adjusting to coronary disease, the intention to regularly engage in physical activity is high although only 38 % of subjects admit to regularly engaging in physical activity.

Bien que les personnes atteintes d'une maladie coronarienne démontrent une grande volonté à s'engager dans des activités physiques, seulement 38% s'engagent réellement dans de telles activités.

Biventricular Pacing and Cardiac Resynchronization Therapy: A Fresh Approach to Heart Failure and Intraventricular Conduction Delay

Recent evidence on the efficacy of biventricular pacemakers, cardiac resynchronization therapy, and the pathophysiology underlying the use of these therapies is reviewed.

Les stimulateurs bi-ventriculaires, la thérapie cardiaque de re-synchronisation et la pathophysiologie associée à ces thérapies est revue à la lumière des récentes publications.

Evaluating Treatment-Seeking for Acute Myocardial Infarction in Women

Women living in Greater Vancouver have not yet personalized AMI risk information and say they need more information pertaining to symptom recognition for AMI; they are also largely unaware that females may experience AMI differently than do males.

Les femmes vivant dans la région de Vancouver n'auraient pas personnalisé l'information sur les facteurs de risque de l'infarctus du myocarde. Elles souhaiteraient recevoir plus d'information sur la reconnaissance des symptômes et ignorent jusqu'à maintenant que l'expérience de l'infarctus du myocarde peut être vécu de façon différente pour les femmes comparativement aux hommes.



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Patient Safety – A recycled buzzword or a new approach?

On December 3 (2003), Judy Costello and I represented the CCCN at a Canadian Nurses Association workshop entitled “Patient Safety: Developing the Right Staff Mix”. Canadian nurses have identified such factors as workload/pace, staff shortages, and other human resource issues as most frequently contributing to risk (Nicklin & McVeety, 2002). This survey finding and work by the National Steering Committee on Patient Safety (2002) and

others have led CNA to believe that issues of staff mix need to be addressed in order to optimize patient safety.

Patient safety increases as the number of nurses increases. McGillis Hall and Doran (2001) have found that higher proportions of RNs and RPNs on medical/surgical and obstetrical units are associated with improved patient outcomes such as functional status, and decreased pain at discharge. Higher proportions of RNs in the staff mix have also been associated with positive outcomes such as shorter

Certification 2003

CCCN would like to recognize the following nurses who have achieved certification through the Canadian Nurses Association. Congratulations to all of you.

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lengths of stay, lower UTI rates (Needleman, Buerhaus, Mattke, Stewart & Zelevensky, 2002) as well as lower 30-day mortality rates (Tourangeau, Giovannetti, Tu & Wood, 2002). There has also been some work demonstrating better patient outcomes when nurses are baccalaureate-prepared (Aiken, Clarke, Cheung, Sloan & Silber 2003; O'Brien-Pallas et al., 2001; O'Brien-Pallas et al., 2002). One of the workshop presenters, Linda McGillis Hall, reviewed a large number of other Canadian and American studies dating back to 1998 with similar findings, but she pointed out that many of these have been published in non-nursing journals.

Despite the relatively large body of research on patient safety and staff-mix, there are still both methodological and research gaps. Little exploration has been done to determine the optimal mix of RNs and RPNs/LPNs, the specific impact of RPN/LPNs on patient outcomes, and the impact on patient outcomes of nurses working to their full scope of practice. Some of the participants at the CNA workshop identified methodological issues which may be barriers to research in this area such as: measuring/quantifying the experience, skills and education of the care team, determining how nurses function within teams and within the system of care, and developing common databases of nurse-sensitive outcomes to permit comparisons between care environments.

A number of Canadian studies have been initiated to investigate the impact of nurses (RNs and LPNs) working at their full scope of practice. In 2003, the CHSRF funded a study by Besner and Doran to examine the scope and boundaries of practice of nursing personnel in three regions of Alberta and Saskatchewan, and the CNA has initiated a study to evaluate the impact of RNs and LPNs working at the full scope of practice.

After presentations from various stakeholders and researchers, the workshop participants held group discussions and, at the end of the day, tried to identify regulatory issues and concerns related to skill mix and patient safety, and came up with a list of suggestions for how these issues can or should be addressed. I came away realizing that patient safety as an issue is not recycled – it is an important problem that we clearly have not solved. The message I heard at the CNA workshop was very different from the individual and punitive approach that we older nurses have experienced. The new approach incorporates an understanding that patient safety is also a system issue and that there is a need to undertake research and to change the care environment to enhance patient safety.

While I am on the topic of patient safety, I'm sure most of you know about the new Canadian Patient Safety Institute which will be based in Edmonton. The National Steering Committee on Patient Safety issued a report in 2002 (*Building a Safer System*) in which it recommended an integrated national strategy for improving patient safety and the establishment of a Canadian Patient Safety Institute. This institute will foster the sharing of knowledge about optimal patient safety practices and models. Among the members of this new institute's founding board of directors is Wendy Nicklin, the operating officer and vice-president of nursing at the Civic Campus of the Ottawa Hospital. Wendy is a registered nurse with a Bachelor of Nursing and Masters of Science (Applied) who has a background in cardiovascular nursing. ♥

Kirsten Woodend,
Editor, CJC/N

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The Current Status of Cardiovascular Disease in Canada – A Call to Action

Anna Svendsen, RN, MS, CCN(C)

The Heart and Stroke Foundation of Canada, in collaboration with the Centre for Chronic Disease Prevention and Control as well as the Canadian Cardiovascular Society, recently published a report on "The Growing Burden of Heart Disease and Stroke in Canada 2003". This article will review some of the information contained in this report, as well as the nursing implications. The burden associated with cardiovascular disease continues to increase for a number of different reasons. Risk-provoking behaviours are

increasing, despite growing knowledge of the consequences associated with these actions. In fact, the health of our future generation is now being threatened with these uncontrolled risk behaviours. The cost of providing cardiovascular care remains high. Treating this disease entity requires a multifactorial approach. Nurses are in key positions to effect change in treating cardiovascular disease by addressing risk-provoking behaviours from multiple levels and, therefore, to make a significant change in these statistics for future reports.

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Introduction

In May 2003, the Heart & Stroke Foundation of Canada in collaboration with the Centre for Chronic Disease Prevention and Control and the Canadian Cardiovascular Society published the latest information on the status of cardiovascular disease in Canada (HSFC, 2003). This article will highlight some of the information from this report as well as the implications for each of us as Canadian citizens, and as nurses providing care for patients.

The burden of cardiovascular disease continues to increase for a number of different reasons. Canada's population continues to age – according to 2001 statistics, almost 13% of Canada's population was over the age of 65, and this is projected to increase to 15% by 2011 and 20% by 2025 (HSFC, 2003). Advances in medical and surgical options continue to improve quality of life, treat symptoms, and decrease early death, however, the underlying cardiovascular disease continues to progress. Also, many unwise lifestyle choices result in consequences which contribute to the increased burden associated with cardiovascular disease.

Risk factors

Risk factors continue to abound within the population. Prevention of cardiovascular disease is aimed at multiple layers: primary (decrease the incidence of

disease by controlling risk factors); secondary (decrease prevalence of disease by early diagnosis and treatment); and tertiary (limit the progression or complications of already established disease). A fourth level of prevention, called primordial, examines social, economic, and cultural patterns of living that contribute to an increased risk of heart disease. By addressing these four categories, a more comprehensive holistic approach to prevention is achieved, whereby risk factors, behaviours, and conditions are factored into the treatment of a multifaceted complicated disease.

Cardiovascular nurses routinely assess these various layers of prevention and treatment. Much attention is paid to primary, secondary and tertiary prevention, but the inclusion of the primordial category will enable nurses to identify social environments in which the individual resides (such as poverty, social support system, as well as feelings of powerlessness), and to mobilize appropriate available community resources. Since risk factors are more prevalent in lower income groups, interventions need to be increased for this population. Could we as individual nurses, community members, or as CCCN members mobilize resources and develop routine community-based risk programs? Nurses need to act as role models – we need to examine our own individual risk factors and

possibly make some lifestyle changes. In addition, as a national group of cardiovascular nurses, we need to become more politically involved and actively lobby the health policy makers to encourage the implementation of policies which address these socioeconomic determinants of cardiovascular health.

Risk factors are increasing despite increased knowledge that many of these hazards are preventable. Approximately 80% of Canadians have at least one risk factor (smoking, physical inactivity, overweight, hypertension, or diabetes) while 10% have three or more. Ethnicity also has an impact on mortality associated with cardiovascular disease - as new immigrants adopt the unhealthy lifestyle of their new country, they experience an increased incidence of cardiovascular disease. In fact, there is a difference in the type of disease, with South Asians and Eastern Europeans being vulnerable to heart disease and Chinese being more susceptible to stroke (HSFC, 2003). Therefore, preventative programs need to be developed using culturally sensitive information. They need to be delivered in a language understood by each culture, within their neighbourhood environment.

Children are now being threatened with these uncontrolled risk factors. There is an increased incidence of childhood obesity associated with a decline in physical activity. The 1998/99 statistics show that 37% of children aged two to 11 were overweight and 18% were classified as obese (HSFC, 2003). Forty per cent of teenaged girls are not physically active. Smoking also continues to be high, with 20 to 25% of older teenagers smoking on a daily basis. It is small wonder that we are seeing cardiovascular disease at younger ages. In fact, Dr. David Katz, a keynote speaker at the recent Canadian Cardiovascular Congress, suggested that this generation is the first which will experience younger death rates than their parents due to many of their lifestyle choices and the resultant consequences (Katz, 2003). This horrifying statistic should set off every alarm - prevention must become a key focus to protect our future generation. Younger people need to be targeted for aggressive prevention programs. Media emphasis should be placed on healthy behaviours instead of promoting risk-provoking behaviours (such as fast foods, "supersizing", prolonged inactivity associated with technology such as computer games, etc.).

Hospitalizations

Cardiovascular disease continues to be a major cause for hospital admission. Although statistics indicate that the overall hospitalization rate has decreased (except those for congestive heart failure), it is expected this will reverse in the future due to an aging population. In addition, the lowered hospitalization rate may be due,

in part, to an increased incidence of outpatient testing and procedures which is not captured in the hospitalization data. Gender differences exist in the treatment of cardiovascular disease. Males are hospitalized more frequently, receive more testing and procedures (such as angioplasty, coronary artery bypass or valve surgery) when compared to females.

Cardiac care is being provided more frequently in community settings. Many tests and procedures, formerly done on an inpatient basis, are now performed on an outpatient basis. In addition, the length of hospital stays has decreased. Canada spends approximately \$4 billion annually on hospitalization (HSFC, 2003). Indirect costs associated with outpatient testing and procedures, prescriptions, and home care are not factored into this figure. Programs which meet the needs of the community and are cost-effective must be readily available. They need to be responsive to meet the needs of the entire care continuum - from prevention (be that primary, secondary, tertiary or primordial), to needs associated with increased outpatient testing and procedures, to earlier discharges resulting in decreased lengths of stay, to needs associated with chronic illness such as heart failure, and finally to palliative care as the mortality rate from cardiovascular disease increases.

Direct and indirect costs associated with cardiovascular care could potentially be diminished with more aggressive risk factor modification. In addition, many of these risk factors contribute to other disease entities (Appendix A). Instead of addressing the management of risk factors individually, if cardiovascular care, cancer care, respiratory care as well as diabetes care were to pool resources and coordinate strategies, a common preventative approach could be developed that would make a significant impact. What a wonderful opportunity for cardiovascular nurses to link with other nurses to address a common problem!

Outcomes

Cardiovascular disease is the underlying cause of death in 33% of Canadians. Although this mortality statistic is staggering, 5.7% of Canadians and 25% of patients over the age of 70 live with heart disease (HSFC, 2003). However, as we all know, cardiac disease affects the family as well as the patient. Thus, the quality of life for these patients and their families is altered (feeling unwell, potential restriction on activities, and the need for assistance with activities of daily living). In Canada, males are more likely to die from ischemic heart disease and acute myocardial infarction, while women die from congestive heart failure and cerebrovascular disease. Income also affects mortality - people with the lowest income experience the highest mortality rate from cardiovascular disease

and have an increased incidence of diabetes when compared to people with higher incomes. Lower income may force people to make unhealthy lifestyle choices (e.g. using cigarettes to cope with stress, purchasing cheaper foods which are often unhealthy) or they may lack sufficient income to afford medications.

The Heart and Stroke Foundation report on the burden of cardiovascular disease suggests that not enough information is available on the impact of cardiovascular disease on quality of life or on treatment outcomes. Who better to evaluate these factors than cardiovascular nurses? The challenge is to use evidence-based information, develop appropriate research projects, and publish the results. What about pooling resources and developing a multi-centre trial? We can also continue to work with health policy makers to make smoking more difficult – i.e. banning smoking in public places where many people in the lower income group often work (restaurants, malls, etc.).

Conclusions

Treating cardiovascular disease requires a multifactorial approach. A shift in the focus from reacting to the consequences of already-established disease to one of primary prevention incorporating socioeconomic and cultural factors, is going to require a major societal change in attitude. However, as Elinor Wilson indicated in a discussion of smoking prevention at the Health Promotion Breakfast at the 2003 annual Canadian Council of Cardiovascular Nurses conference (Wilson, 2003), if every nurse in Canada was successful in influencing change in two to three people, this would constitute a significant change in statistics associated with risk-provoking behaviours. Nurses are in key positions within the community, as well as the workplace, to create effective change. Cardiovascular nurses can make a difference in the current status of cardiovascular disease in Canada. We need to respond to this call for action! ♥

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Appendix A

The eight major modifiable risk factors for cardiovascular diseases and other leading noncommunicable diseases

Risk Factor	Condition			
	Cardiovascular Disease	Diabetes	Cancer	Chronic Obstructive Pulmonary Disease
Tobacco Use	X	X	X	X
Alcohol	X		X	
Physical Inactivity	X	X	X	
Nutrition	X	X	X	
Obesity	X	X	X	X
Raised Blood Pressure	X	X		
Dietary Fat/ Blood Lipids	X	X	X	
Blood Glucose	X	X	X	

Source: Heart and Stroke Foundation of Canada (2003). *The growing burden of heart disease and stroke in Canada 2003*, p. 20. Ottawa, Canada.

Pain in Adults Post Surgical Repair of Congenital Heart Defects

Louise Jensen, RN, PhD, Darlene Rebeyka, RN, MSN, Gayle Urquhart, RN, MN, and Sylvia Roschkov, RN, MN Candidate

The purpose of this study was to describe pain in adults post surgical repair for congenital heart defects. What is the intensity, sensory, and affective dimensions of pain experienced post-operatively? What is the trend in pain experienced post-operatively over time? What is the effectiveness of post-operative pain management strategies? What factors influence the dimensions of post-operative pain experienced? A descriptive prospective repeated measures design was used with 30 adult congenital heart (ACH) post-operative patients. Pain assessments using the McGill Short Form Questionnaire (MSFQ), a visual analogue pain scale (VAP), and recordings of other variables (analgesic, anxiety, activity level, non-pharmacologic intervention) were performed three times daily until hospital discharge. Mean pain intensity scores ranged from 2.44 ± 1.31 following extubation to 1.30 ± 0.66 on post-operative day (POD) five (scale, 0-5). Mean MSFQ scores ranged from 9.26 ± 7.21 following extubation to

4.40 ± 5.22 on POD five (scale, 0-45). Mean VAP scores ranged from 50.77 ± 25.79 following extubation to 18.76 ± 18.50 on POD five (scale, 0-100). Mean number of narcotic doses per day ranged from 4.61 ± 2.01 to 1.88 ± 1.98 on PODs one and five, respectively. Anxiety predicted VAP and MSFQ scores on PODs one and two; anxiety and analgesia doses predicted VAP and MSFQ scores on POD three; analgesia doses predicted MSFQ scores, analgesia and anxiety predicted VAP scores on POD four; analgesia doses and anxiety predicted VAP and MSFQ scores on POD five. No relationships were found among pain and other demographic, treatment, or clinical variables. Overall, pain was reported as mild to moderate intensity, variable in sensations, decreased over time, and adequately managed.

Key words: pain, post-operative pain, congenital heart surgery

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Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” by the International Association for the Study of Pain (Merskey & Bogduk, 1994, p.210). Unmanaged post-operative pain can seriously compromise the status of cardiac patients and slow recovery (Wild, 1992; Puntillo & Weiss, 1994). To date, no research has investigated the pain experience of ACH patients post surgical correction. The ACH population will only increase in number as medical technology improves. Current standards of pain management are based on conventional cardiac surgical procedures, with these findings extrapolated to the ACH surgical population. Thus, the uniqueness of the ACH surgical population is not taken into consideration. By having a better understanding of the ACH patient’s perception of their post-operative pain, nurses may be better able to assess and relieve pain and, in turn, enhance recovery.

Identifying factors related to pain experienced in ACH post-operative patients provides a foundation for future studies to assess pain management strategies to promote optimal surgical recovery in the ACH population.

Background

Pain has been described as a complex and multidimensional phenomenon that can be further defined as an experience that is personal and subjective (Puntillo, 1988; Melzack & Katz, 1992). Numerous theories subscribe to the multidimensionality of the pain experience. The well-known Gate Control Theory postulates that pain is a complex phenomenon that incorporates sensory-discriminative, motivational-affective, and cognitive components. Dynamic interactions occur between ascending and descending neural systems along with a balance of inhibitor-excitatory mechanisms (Melzack & Wall, 1965; Melzack & Casey, 1968). Pain as a personal subjective

experience is not predictable, but rather is influenced by pain intensity, sensitivity, tolerance, and previous experiences with pain (Melzack & Dennis, 1978).

Although there have been many advances in the field of pain management over the past 20 years, study findings continue to suggest that post-operative pain remains inadequately controlled (Carr, 1990; Carroll, Atkins, Herold, Mlcek, Shively, Clopton, & Glaser, 1999). Studies specific to the cardiac surgery population in the acute care setting report that patients experience considerable unrelieved pain (Ferguson, Gilroy, & Puntillo, 1997; Kuperberg & Grubbs, 1997; Valdix & Puntillo, 1995; Watt-Watson & Stevens, 1998). Age, gender, surgical procedure, anxiety, analgesic administration, and pain assessment have been identified as factors affecting pain management (Carroll et al., 1999; Ferrell, 1991; Ferguson, Gilroy, & Puntillo, 1997; Higgins, Turley, Harr, & Turley, 1999; Klinger & Spaulding, 1998; Lay, Puntillo, Miaskowski, & Wallhagen, 1996; Puntillo, 1990; Puntillo & Weiss, 1994; Watt-Watson, Garfinkel, Stevens, Gallop, & Streiner, 1996).

With few exceptions, studies conducted on conventional cardiac surgery patients revealed that patients continue to report moderate to severe levels of pain and receive inadequate analgesic despite prescribed treatment regimens (Puntillo, 1990; Maxam-Moore, Wilkie, & Woods, 1994). Using a numerical rating scale (0-10), Valdix and Puntillo (1995) found patients' mean rating for worst pain intensity 36 hours after surgery was 7.2 ± 2.6 . Similarly, a small study of 20 coronary artery bypass surgical patients by Kuperberg and Grubbs (1997) found patients' ratings of pain intensity to be moderate to severe. A descriptive correlational study by Ferguson et al. (1997), reported a trend in patients' pain intensity to worsen over time in 43 coronary artery bypass surgical patients. However, there is one unique group of cardiac surgery patients, the adult congenital heart patients, for which pain perception and management have not yet been explored.

The accepted prevalence of congenital heart defects based on American statistics is eight cases per 1,000 live births per year, and it is estimated that approximately 200,000 Canadians have congenital heart defects (Canadian Adult Congenital Heart Network, 1997). Significant advances in medical follow-up and surgical techniques have permitted greater numbers of children with congenital heart anomalies to reach adulthood. It is predicted that ACH surgical patients will significantly increase and possibly

double over the next decade (Dore, Glancy, Stone, Menashe, & Somerville, 1997; Hearne, Wilson, Harrison, & Bashore, 1994). As a result, adolescents with congenital heart defects are expected to comprise over 90% of the ACH surgical patients in the future (Canadian Adult Congenital Heart Network, 1997).

Examples of cardiac anomalies in the ACH population that may require surgery include: (1) atrial septal defects, (2) ventricular septal defects, (3) coarctation of the aorta, (4) patent ductus arteriosus, (5) Tetralogy of Fallot, (6) anomalous pulmonary venous drainage, and (7) a variety of valvular defects (Higgins & Reid, 1994). The course of treatment for ACH patients can be very extensive, depending on the complexity of the anomaly. Staged corrective surgery is not uncommon. ACH patients may undergo as many as three or four surgeries during their lifetime. Furthermore, cardiac surgery involves many pain-sensitive structures, including a median sternotomy or thoracotomy with invasion of subcutaneous muscle and visceral tissues (Raj & Brannon, 1993; Watt-Watson & Stevens, 1998). With respect to the ACH population, the location of the defect and complexity of the surgical intervention often necessitate more extensive manipulation and retraction of the sternum, thereby potentially increasing the severity of post-operative pain (McRae, Rourke, Imperial-Perez, Eisenring, & Ueda, 1997).

Purpose of the study

Due to the expertise required in caring for this complex patient population, only 10 Canadian cardiovascular centres offer adult congenital cardiac surgery, including the University of Alberta Hospital (Canadian Adult Congenital Heart Network, 1997). Because of the possible multiple surgeries and the complexity of the anomaly, the perceived needs of ACH patients in the area of pain management require exploration. The purpose of this study was to identify and describe the dimensions of acute pain in the adult population post surgical repair for congenital heart defects. The specific research questions examined were: (1) What are the intensity, sensory, and affective dimensions of pain experienced by ACH patients post-operatively? (2) What is the trend in pain experienced by ACH patients post-operatively over time? (3) What is the effectiveness of pain management strategies used for ACH post-operative patients? (4) What factors influence the dimensions of pain experienced by ACH post-operative patients?

Methods

Design

A descriptive prospective repeated measures design was used to assess the dimensions of pain experienced during the course of the ACH patient's post-operative hospital stay at the University of Alberta Hospital (UAH). Each subject had pain assessments performed three times daily (every eight hours) post surgery until the day of discharge (Figure 1). Adult surgical repairs for congenital heart defects included atrial and ventricular septal defects, valvular repair or replacement, and coarctation of the aorta (Table 1).

Data collection

Ethical clearance was obtained from the Health Research Ethics Board. The research assistant identified subjects from the cardiac surgery booking schedule and subjects were approached in the pre-admission clinic. Informed consent was obtained after an explanation of the study protocol. Demographic data was collected and the McGill Short Form Pain Questionnaire (MSFQ), a pain visual analogue scale (VAP), and an anxiety visual analogue scale (VAA) were administered to provide a baseline assessment. Prior to subjects completing the MSFQ, VAP, and VAA, a standard explanation for completing the scales, including a return demonstration, was provided (Flaherty, 1996; Melzack, 1987).

Following cardiac surgery and return to the cardiovascular intensive care unit, variables identified from the literature (demographics, analgesia, activity level, non-pharmacologic interventions such as massage, music, meditation, deep breathing) to affect post-operative pain were recorded. Two hours post endotracheal extubation, the first assessment of pain and anxiety using the MSFQ, the VAP, and the VAA were conducted. At 0800, 1600, and 2400 hours following endotracheal extubation, and then on each consecutive post-operative day until hospital discharge, continued assessment of pain and contributing variables occurred. The time periods were chosen as the morning assessment occurred after a night of rest, the afternoon appraisal after several hours of activity including a rest period, and

Table 1

Characteristics of the Sample (N=30)

	N	%
Sex		
Male	14	47
Female	16	53
Ethnicity		
Caucasian	21	70
East Indian	1	3
Middle Eastern	1	3
Native Indian	3	10
Asian	1	3
Other	3	10
Surgical Procedure		
ASD Repair	2	7
Valve Replacement/Repair	5	17
Combined Procedures	23	77
Surgical Incision		
Thoracotomy	1	3
Median Sternotomy	29	97
Previous Surgery		
Cardiac	20	67
Non-Cardiac	6	20
None	4	13
Post-operative Complications		
Pulmonary	5	17
Infection	1	3
Other	6	20
Combination	4	13
None	14	47
	Mean(SD)	Range
Age (years)	34 ± 15.2	17 - 69
Weight (kilograms)	67 ± 14.8	41-98
	Median	Range
Hospital Stay (days)	6	4-10

Figure 1

Study design

B	X1	X2	X3	X4	X5	X6	X7	...	Xd
B represents baseline measurements at hospital pre-admission visit									
X1 represents first assessment at 2 hours post endotracheal extubation									
X2 represents second assessment at 0800 hours									
X3 represents third assessment at 1600 hours									
X4 represents fourth assessment at 2400 hours									
X5 X6 X7 represents replication of X2 and X3 and X4 daily until hospital discharge									
Xd represents discharge interview on day of discharge									

the night appraisal after beginning to rest for the night. If sleeping, the patient was recorded as such, and not disturbed. On the day of discharge, a structured interview (Perceived Pain and Pain Relief Satisfaction Interview Guide) took place to obtain qualitative data on pain relief satisfaction.

Instruments

MSFQ. While numerous pain assessment tools have been developed, the McGill Pain Questionnaire is a tool used in a variety of medical and surgical settings for self-assessment of multiple dimensions of pain (Melzack, 1975; Melzack, 1987; Melzack & Katz, 1992). The original questionnaire measures three dimensions of pain; however, the instrument takes approximately five to 30 minutes to complete (Flaherty, 1996; Melzack, 1975, Melzack, 1987; Melzack & Katz, 1992). Therefore, the MSFQ was developed, which measures 11 sensory and four affective dimensions of pain, as well as present pain intensity (PPI). The MSFQ takes two to 10 minutes to complete (Flaherty, 1996; Melzack, 1987; Melzack & Katz, 1992; Puntillo & Weiss, 1994; Valdix & Puntillo, 1995). Sensory and affective dimensions of pain in the MSFQ are assessed on a four-point Likert scale ranging from none to severe pain. Sensory scores range from 0 to 33, while affective scores range from 0 to 12 (Flaherty, 1996; Puntillo & Weiss, 1994; Valdix & Puntillo, 1995). The subject indicates the appropriate descriptors for pain present at the time of assessment, and then indicates the level of pain. If the descriptor is not applicable, the rank is 0 (Melzack, 1975; Melzack, 1987; Valdix & Puntillo, 1995). The subscores are summed within the two dimensions, as well as a sum of the two subscale scores to obtain a total score (Melzack, 1975, Melzack & Katz, 1992). Finally, the number of words chosen (NWC) is determined. The NWC and the total score has correlated at $r=0.89$ (Melzack, 1975). The sensory and affective pain dimensions of the MSFQ have correlations of $r=0.65$ to 0.93 with the long form of the McGill pain questionnaire (Melzack, 1987). Reliability coefficients for the sensory and affective dimensions vary between $r=0.75$ to 0.87 (Puntillo, 1994; Puntillo & Weiss, 1994).

The six-point PPI scale of the MSFQ ranges from no pain to excruciating pain (Flaherty, 1996; Melzack, 1987; Melzack & Katz, 1992). Subjects are asked to indicate, with a single mark, the level of pain experienced at the time of assessment. The PPI and sensory and affective dimensions of the MSFQ have correlations of $r=0.29$ and $r=0.40$ to 0.42 , respectively (Graham, Bond, Gerkovich, & Cook, 1980; Melzack, 1975). The MSFQ total score and PPI have correlations of $r=0.32$ to 0.70 (Melzack, 1987). As well, the PPI has correlated with the NWC ($r=0.32$) (Melzack, 1975).

VAP. Pain intensity was also assessed with a vertical visual analogue scale (VAP). The VAP is a straight vertical line that is 100 millimetres in length. The bottom of the VAP is labelled *no pain*, while the top is anchored as *worst possible pain* (Carr, 1990; Carr & Thomas, 1997; Hancock, 1996; Flaherty, 1996; Kitson, 1994; Klinger & Spaulding, 1998; Melzack, 1987; Melzack & Katz, 1992). The subject is asked to indicate, with a sliding cursor, the level of pain experienced at the time of assessment. The researcher then measures this mark from the bottom of the scale in millimetres (Flaherty, 1996; Klinger & Spaulding, 1998). For purposes of this study, the VAP was presented in vertical alignment for its ease of use, particularly in the immediate post-operative period (Flaherty, 1996).

The VAP has demonstrated validity and reliability as a measure of pain intensity and has reported advantages over other scales (Jensen, Karoly, & Barver, 1986). Numerical rating scales and VAP have correlated from $r=0.82$ to 0.94 (Kuperberg & Grubbs, 1997; Puntillo & Weiss, 1994). The MSFQ total score and the VAP have correlated from $r=0.55$ to 0.86 (Melzack, 1987). The pain intensity scale of the MSFQ may lack sensitivity due to the limited number of choices, and the descriptors may have different meaning for each individual. However, the VAP is considered to have an infinite number of measurement points since there are no definite markings on the scale (Flaherty, 1996; Kitson, 1994; Melzack, 1975; Melzack & Katz, 1992).

VAA. Anxiety was assessed on a vertical visual analogue scale (VAA) that is 100 millimetres in length. The bottom of the line is labelled *no anxiety*, while the top is anchored with *worst ever anxiety*. The subject is asked to indicate, with a sliding cursor, the level of anxiety, fear, concern, or worry experienced at the time of assessment. The researcher then measures this mark from the bottom of the scale in millimetres.

Following repeated testing and validation, Huskisson (1983) described the analogue scale as being a simple, sensitive, and reproducible measurement. Others have since concurred with this evaluation (Lee & Kiekhefer, 1989; Wewers & Lowe, 1990). The VAA has been validated by comparison with the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1983), a well-recognized and established anxiety measurement tool. Vogelsang (1988) reported that VAA scores were positively correlated ($r=0.84$) with scores obtained from the State-Trait Anxiety Inventory. Heikkila, Paunonen, Virtanen, and Laippala (1998) found the VAA scores correlated 0.52 pre-coronary arteriography and 0.55 post-coronary arteriography with the State Anxiety scores.

Perceived Pain and Pain Relief Satisfaction Interview Guide. The patients' perceived pain experienced and pain relief satisfaction were assessed with a structured interview consisting of six open-ended questions: Can you describe the pain you experienced? Was the pain what you expected? What were you told about the pain before your surgery? Do you think your pain was adequately managed? Did you use any additional pain relief strategies? Can you suggest anything about pain management that would be helpful for others having surgery?

Results

Frequency distributions and measures of central tendency and variability were used to describe the ACH patient's demographic characteristics, variables identified to affect pain, the MSFQ scores (sensory, affective, and total scores), the PPI scores, the VAP scores, and the VAA scores. Repeated measure analysis of variance (ANOVA) was conducted to determine the change in mean MSFQ scores, PPI scores, VAP scores, and VAA scores over time. To determine the effect of factors identified to influence pain, analysis of covariance was conducted for continuous data or chi-square analysis for categorical data. Statistical significance was set at $p < .05$. Qualitative data from the Perceived Pain and Pain Relief Satisfaction Interview were subjected to content analysis. Key words were identified and responses coded into mutually exclusive nominal categories. Categories were labelled, descriptive summaries of the data categories conducted, and the fundamental themes explicated and described.

Characteristics of the ACH patients

A convenience sample of 30 patients undergoing ACH surgery participated. The patients had a mean age of 34 ± 25.2 years (range 17 to 69 years), were Caucasian (70%), and had previous cardiac surgery (66.7%). Nearly half of the sample ($n=14$, 47%) was female. The majority had combined surgical procedures such as repairs and/or valve replacements (77%) and had a median hospital stay of six days (range four to 10 days) (Table 1). Mean number of narcotic doses per day ranged from 4.61 ± 2.01 to 1.88 ± 1.98 on post-

Table 2

Mean narcotic doses

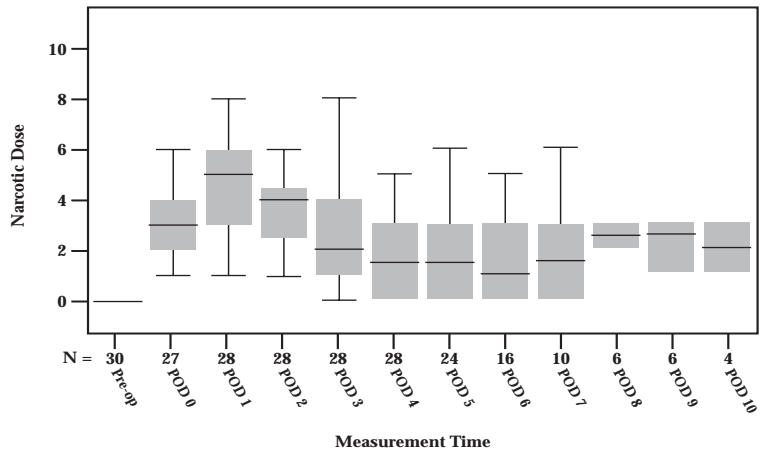


Table 3

Visual analogue anxiety (VAA) mean scores (scale, 0 - 100)

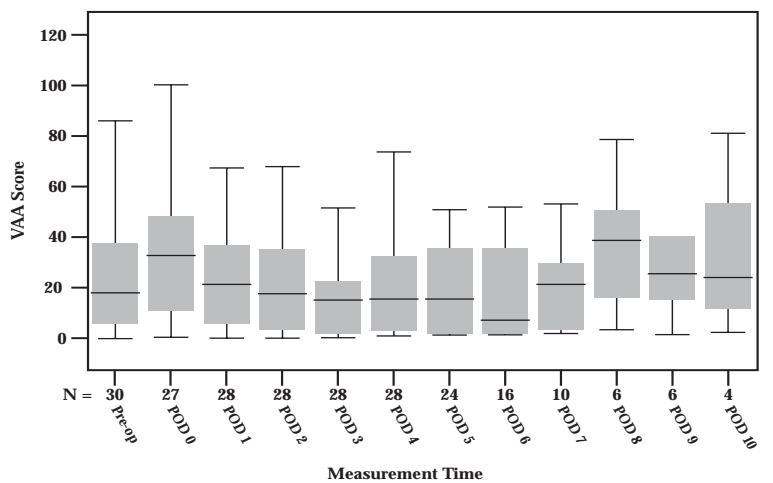


Table 4

Present pain intensity (PPI) mean scores (scale, 0 - 5)

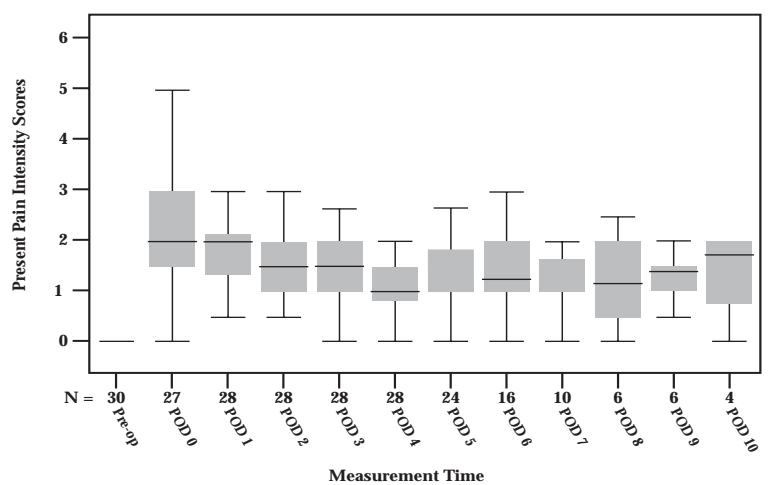
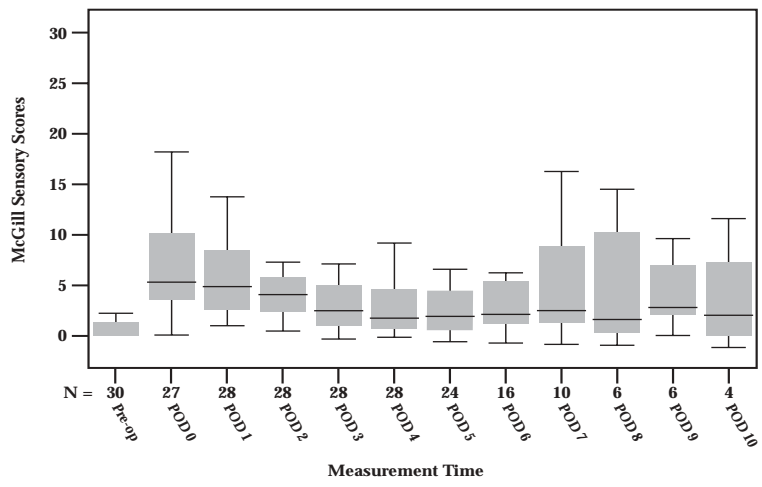
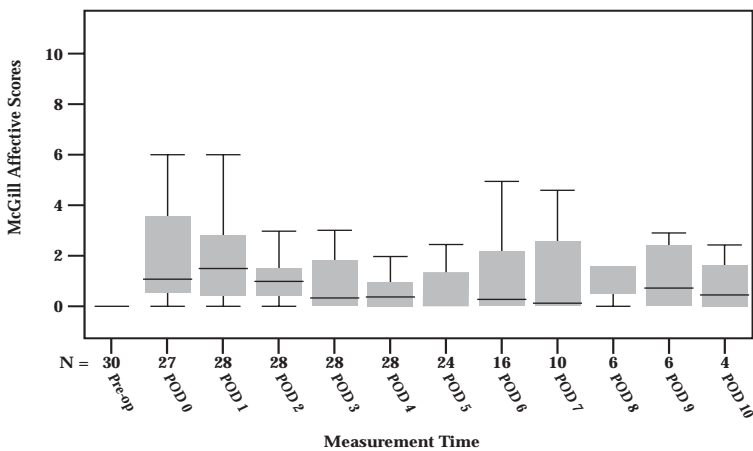
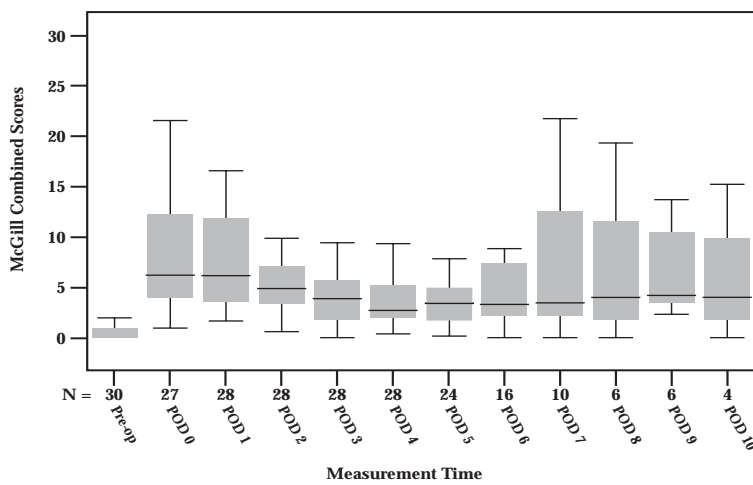


Table 5**Sensory dimension (MSFQ) mean scores (scale, 0 – 33)****Table 6****Affective dimension (MSFQ) mean scores (scale, 0 – 12)****Table 7****Combined MSFQ mean scores (scale, 0 – 45)**

operative day (POD) one and five respectively ($F=13.75$, $df=11$, $p=0.000$) (Table 2). Anxiety scores were relatively low. The mean VAA score (scale, 0-100) was 26.47 ± 25.98 pre-operatively; 33.00 ± 29.15 at extubation; and continued to decrease from 23.66 ± 19.93 on POD one to 18.11 ± 21.63 on POD five ($F=1.26$, $df=11$, $p=0.249$) (Table 3).

Post-operative pain perception of ACH patients

Pain scores generally indicated a moderate level of pain. Mean present pain intensity (PPI) scores (scale, 0-5) ranged from 2.44 ± 1.31 following extubation on POD 0 to 1.30 ± 0.66 on POD five ($F=9.755$, $df=11$, $p=0.000$) (Table 4). This trend was also consistent with mean MSFQ and mean VAP scores. Mean sensory MSFQ scores (scale, 0-33) ranged from 7.15 ± 5.61 following extubation to $3.39 \pm$ on POD five ($F=4.123$, $df=11$, $p=0.000$) (Table 5); mean affective MSFQ scores (scale, 0-12) ranged from 2.11 ± 2.17 following extubation on POD 0 to 1.01 ± 1.59 on POD five ($F=2.84$, $df=11$, $p=0.002$) (Table 6). Mean total MSFQ scores (scale, 0-45) ranged from 9.26 ± 7.21 following extubation on POD 0 to 4.40 ± 5.22 on POD five ($F=4.208$, $df=11$, $p=0.000$) (Table 7). Mean VAP scores (scale, 0-100) ranged from 50.77 ± 25.79 following extubation on POD 0 to 18.76 ± 18.50 on POD five ($F=7.858$, $df=11$, $p=0.000$) (Table 8).

Table 9 illustrates the pain scores over the three daily time assessments. There was generally a decrease in pain over the post-operative period. Of note, the pain increased at night on POD three, POD five, and POD seven.

In response to the Perceived Pain and Pain Relief Satisfaction interview conducted at hospital discharge, 15 patients did not find the pain as bad as expected, while 10 thought it was as they anticipated, and seven described it as the most excruciating pain experienced. Most ($n=12$) experienced pain/discomfort when changing positions and described the pain as sharp, stabbing, or burning ($n=6$) in the chest or sternal area. The majority ($n=21$) thought their pain had been adequately managed, and 16 respondents indicated they used such strategies as massage, music, deep breathing, or meditation to manage their

pain. Twelve patients indicated that no pain management information had been provided pre-operatively, and 14 were informed that analgesics would be provided for the pain. Not surprisingly, teaching (n=15) and alternative comfort measures (n=19) were suggestions given for pain management strategies.

Predictors of pain experienced

Factors such as number of analgesics, anxiety, activity level, non-pharmacologic interventions, and demographic characteristics were analyzed to determine the effect on the post-operative pain experienced. Anxiety was found to predict VAP scores (p=0.000; p=0.000) and MSFQ scores (p=0.003; p=0.000) on POD one and

Table 8

Visual analogue pain (VAP) mean scores (scale, 0 – 100)

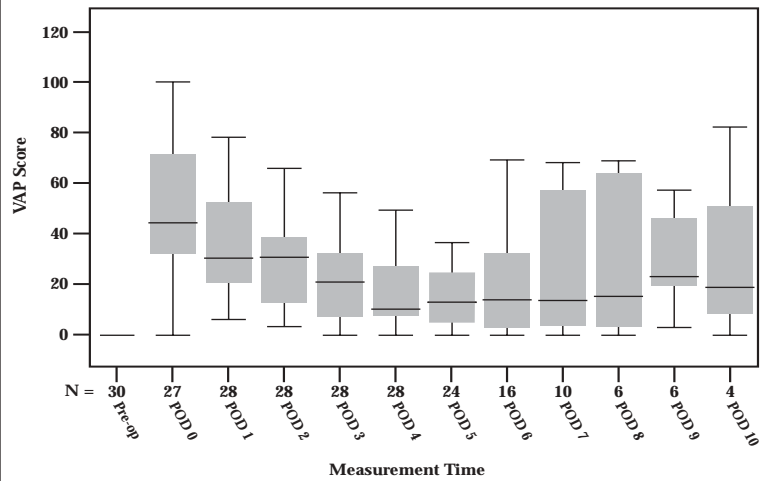


Table 9

Trend in mean pain scores post-operatively

Post-operative day (POD)	Pain Assessment (Scale)	Time of Assessment			
		0800 hours	1600 hours	2400 hours	24 hour Mean
POD 0 (Post Extubation)			(n=27)		(n=27)
	PPI (0-5)		2.44		2.44 *
	Sensory MSFQ (0-33)		7.15		7.15 *
	Affective MSFQ (0-12)		2.11		2.11 *
	Combined MSFQ (0-45)		9.26		9.26 *
	VAP (0-100)		50.77		50.77 *
POD 1		(n=13)	(n=24)	(n=24)	(n=28)
	PPI (0-5)	2.15	2.04	1.63	1.93 *
	Sensory MSFQ (0-33)	6.46	5.58	5.08	5.74 *
	Affective MSFQ (0-12)	1.77	2.21	1.38	1.91 *
	Combined MSFQ (0-45)	8.23	7.79	6.46	7.65 *
	VAP (0-100)	32.08	39.75	35.88	36.66 *
POD 2		(n=28)	(n=27)	(n=17)	(n=28)
	PPI (0-5)	1.86	1.48	1.18	1.54 *
	Sensory MSFQ (0-33)	5.61	4.22	3.29	4.46
	Affective MSFQ (0-12)	1.29	1.00	1.35	1.17
	Combined MSFQ (0-45)	6.89	5.22	4.65	5.63
	VAP (0-100)	34.43	28.07	24.12	29.51 *
POD 3		(n=28)	(n=26)	(n=18)	(n=28)
	PPI (0-5)	1.00	1.50	1.58 *	1.45 *
	Sensory MSFQ (0-33)	3.89	3.08	5.17	3.69
	Affective MSFQ (0-12)	0.86	0.92	1.08	0.92
	Combined MSFQ (0-45)	4.75	3.92	6.25 *	4.58
	VAP (0-100)	15.00	24.15	28.83	22.49 *
POD 4		(n=25)	(n=24)	(n=10)	(n=28)
	PPI (0-5)	1.04	1.46	0.70	1.19 *
	Sensory MSFQ (0-33)	3.44	3.29	1.50	3.36
	Affective MSFQ (0-12)	0.64	1.08	0.30	0.80
	Combined MSFQ (0-45)	4.08	4.38	1.80	4.16
	VAP (0-100)	17.52	18.47	12.18	18.77 *

POD two, respectively. On POD three, anxiety and number of narcotic doses predicted VAP scores ($p=0.000$; $p=0.001$, respectively) and MSFQ scores ($p=0.001$; $p=0.008$, respectively). On POD four, number of narcotic doses ($p=0.007$) predicted MSFQ scores, and number of narcotic doses ($p=0.014$) and anxiety ($p=0.008$) predicted VAP scores. Finally, number of narcotic doses and anxiety predicted VAP scores ($p=0.000$; $p=0.000$, respectively) and MSFQ scores ($p=0.001$; $p=0.003$, respectively) on POD five.

No relationships were found among reported pain and demographic characteristics or other clinical variables such as activity level and use of non-pharmacologic interventions.

Discussion

The pain experienced by a consecutive cohort of ACH surgical patients was examined in this study. This cohort represented typical adults with a congenital heart anomaly undergoing surgical repair. The median age was 30 years (range = 17 to 69 years), equally divided between males ($n=14$) and females ($n=16$), and subjects were predominantly Caucasian (70%). As expected in this type of cohort, 67% had previous cardiac surgery. The mode was five days for length of hospital stay, with 47% having no post-operative complications. The mean number of analgesics administered daily in the post-operative period decreased from 4.6 doses on POD one (range = 1 to 8) to 1.9 doses on POD five (range = 0 to 6).

Table 9, continued...

Post-operative day (POD)	Pain Assessment (Scale)	Time of Assessment			
		0800 hours	1600 hours	2400 hours	24 hour Mean
POD 5		(n=24)	(n=16)	(n=6)	(n=24)
	PPI (0-5)	1.50	0.94	1.67 *	1.30 *
	Sensory MSFQ (0-33)	3.83	3.44	5.67	3.39
	Affective MSFQ (0-12)	1.17	1.13	1.17	1.01
	Combined MSFQ (0-45)	5.00	4.56	6.83 *	4.40
POD 6	VAP (0-100)	21.42	17.69	27.17	18.79 *
		(n=15)	(n=11)	(n=5)	(n=16)
	PPI (0-5)	1.33	1.45	1.40	1.38
	Sensory MSFQ (0-33)	4.93	5.45	6.20	5.26
	Affective MSFQ (0-12)	1.13	2.00	1.20	1.31
POD 7	Combined MSFQ (0-45)	6.07	7.27	7.40 *	6.58
	VAP (0-100)	21.20	29.27	25.60	24.07
		(n=10)	(n=7)	(n=3)	(n=10)
	PPI (0-5)	1.10	1.00	1.33 *	1.07
	Sensory MSFQ (0-33)	5.60	4.14	8.33	4.87
POD 8	Affective MSFQ (0-12)	1.20	1.29	2.67	1.27
	Combined MSFQ (0-45)	6.80	5.43	11.00 *	6.13
	VAP (0-100)	26.00	28.00	42.67	26.27
		(n=6)	(n=6)	(n=1)	(n=6)
	PPI (0-5)	1.17	1.17	2.00 *	1.22
POD 9	Sensory MSFQ (0-33)	5.17	5.00	3.00	5.14
	Affective MSFQ (0-12)	1.17	1.17	2.00	1.19
	Combined MSFQ (0-45)	6.33	6.17	5.00	6.33
	VAP (0-100)	29.33	26.67	23.00	28.14
		(n=6)	(n=3)	(n=2)	(n=6)
POD 10	PPI (0-5)	1.17	1.33	1.50	1.31
	Sensory MSFQ (0-33)	5.50	3.00	3.00	4.78
	Affective MSFQ (0-12)	1.00	1.33	0.50	1.17
	Combined MSFQ (0-45)	6.50	4.33	3.50	5.94
	VAP (0-100)	27.50	39.00	19.50	29.14
POD 10		(n=4)	(n=3)	(n=0)	(n=4)
	PPI (0-5)	1.25	1.33		1.38
	Sensory MSFQ (0-33)	5.00	4.67		4.50
	Affective MSFQ (0-12)	1.00	0.67		0.88
	Combined MSFQ (0-45)	6.00	5.33		5.38
VAP (0-100)	28.00	37.67		30.38	

* $p < 0.05$

Cardiac surgical patients have reported moderate degrees of pain during their first three post-operative days. Reported VAP scores range from 22 to 49 for critically ill cardiac surgical patients (Broscious, 1999; Mehta, Swaminathan, Mishra, & Trehan, 1998; Miller & Perry, 1990) and from 20 to 30 for patients who had coronary bypass graft surgery (Vanstrum, Bjornson, & Ilko, 1998). Similarly, in this study, the ACH patients reported relatively low VAP scores that ranged from 36.6 on POD one to 18.8 on POD five; PPI scores from 1.9 to 1.3 on POD one and POD five, respectively; and total MSFQ scores from 7.6 on POD one to 4.4 on POD five. However, the intensity of post-operative pain and the distress associated with this pain varied considerably between ACH patients. This variability points out the need for regular, frequent pain assessments to assure that pain is adequately attended to in a timely manner.

Only a few previous studies included descriptors of post-operative cardiac surgical pain (Valdix & Puntillo, 1995). The ACH patients in this study were consistent in the sensory nature of the pain that was reported. On POD one, the pain was generally described as throbbing, splitting, stabbing, and sharp. The descriptors used from POD three to POD five were aching, heavy, and tender. Tiring/exhausting was a descriptor used throughout the hospital stay that is consistent with reports of altered sleep patterns during hospitalization for surgical patients. Half (n=15) of the ACH patients stated, however, that the pain was not as bad as anticipated. The overall magnitude of reported sensory and affective pain was relatively low. Furthermore, pain was reported as being adequately managed by the majority (n=21) of ACH patients, although they reported the existence of pain. Of note, half (n=16) of the patients reported using non-pharmacologic strategies to manage their pain such as self-administered massage, music, deep breathing, and meditation. In addition, as 12 patients reported receiving no pre-operative pain management information, not surprisingly, 15 suggested pre-operative education as an important

pain management strategy. Thus, simply to provide more pain medication may be an inappropriate or undesirable method of pain management. Other dimensions of the pain experience need to be understood and addressed.

Anxiety scores in this ACH post-operative cohort were relatively moderate, ranging from 23.7 on POD one to 18.1 on POD five. Acute pain was found to be related to anxiety from POD one to POD five, as was acute pain and the number of narcotic doses on POD three to POD five. No other demographic or clinical variables predicted the pain scores in this study.

Conclusion

Current standards of pain management are based on conventional cardiac surgical procedures, with these findings extrapolated to the ACH population. Thus, the uniqueness of the ACH surgical population is not taken into consideration. Overall, pain experienced by adults undergoing a congenital heart defect surgical repair was reported as mild to moderate intensity, yet variable among individuals. The dimensions of pain generally decreased throughout the day and into the night, as well as over the post-operative days. Pain was reported as adequately managed, with alternative pain management strategies being used and important to the ACH surgical patients. With increasing numbers of ACH patients undergoing corrective surgery, pre-operative education should incorporate comprehensive post-operative pain management programs that include pharmacologic and non-pharmacologic strategies to promote optimal recovery in this population. ♥

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Comment influencer la pratique de l'activité physique chez des personnes atteintes d'une maladie coronarienne ?

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Cette étude, de type descriptif-corrélationnel, a été réalisée auprès de personnes atteintes d'une maladie coronarienne en processus de réadaptation. En effet, tous les sujets (N= 109) étaient membres de l'Association des cardiaques de la Mauricie. Le cadre théorique utilisé était basé sur la Théorie du comportement planifié de Ajzen (1985) ainsi que la Théorie des comportements interpersonnels de Triandis (1977). Cette recherche décrit **l'attitude, la norme subjective, la perception du contrôle comportemental, l'habitude et l'intention** d'un comportement de santé chez cette population. Le comportement étudié était la pratique de l'activité physique soutenue d'une durée minimale de 20 minutes au moins trois fois par semaine durant les temps de loisir. L'étude a également permis d'explorer des relations possibles entre les variables précédemment nommées.

Résultats

L'échantillon est constitué principalement d'hommes (74.1 %) et la moyenne d'âge est de 65 ans avec un écart type de 9.3 ans. Les résultats descriptifs sont présentés à partir d'une échelle sémantique à 7 niveaux. Selon cette étude, les personnes atteintes d'une maladie coronarienne possèdent une attitude positive (moyenne = 6.39) face à la pratique de l'activité physique régulière telle que définie ci-haut. L'attitude est influencée principalement par leurs croyances plutôt que par la valeur accordée aux conséquences du comportement.

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Les sujets se sentent encouragés par leur entourage (moyenne = 6.2), et ce, particulièrement par les personnes impliquées dans le domaine de la santé. Ces personnes ont une bonne perception du contrôle comportemental (moyenne = 6.24), c'est-à-dire qu'ils se sentent capables d'effectuer le comportement suggéré. Par contre, les résultats expliquent peu ce qui influence cette perception de contrôle. L'intention de pratiquer l'activité physique régulièrement est élevée (moyenne = 6.1) bien que seulement 38 % des sujets admettent pratiquer l'activité physique tel que défini. 76.8 % des sujets considèrent avoir l'habitude de pratiquer une activité physique régulière. Les analyses de régression démontrent que seule la perception de contrôle comportemental possède un lien significatif avec l'intention de comportement. Aucun lien significatif n'a été établi entre, d'une part, la perception du contrôle comportemental, l'intention ainsi que l'habitude et d'autre part, le comportement. Toutefois, les croyances des sujets ont un lien significatif avec l'attitude, la norme subjective et la perception de contrôle comportemental. D'autres recherches sont nécessaires afin de mieux déterminer ce qui influence le comportement de pratiquer l'activité physique régulière.

Mots clés : réadaptation cardiaque, activité physique, maladie coronarienne, intention, attitude, norme subjective, perception de contrôle comportemental

Problématique

Les maladies coronariennes comptent parmi les grands fléaux de notre société. En plus d'affecter la qualité de vie des personnes et des familles qui en souffrent, ces maladies sont au premier rang des causes de mortalité au Canada. La communauté scientifique reconnaît bien l'importance de l'adoption de saines habitudes de vie afin de réduire l'impact de la maladie coronarienne tant au niveau de la qualité de vie, qu'au niveau de la morbidité et de la mortalité. Selon la déclaration de Victoria, les principales habitudes de vie ciblées sont l'amélioration des habitudes alimentaires, l'éradication

du tabagisme, la réduction des facteurs psychosociaux nuisibles et l'accroissement des activités physiques (Santé Canada, 1992). Toutefois, le manque d'assiduité envers ces comportements minimise considérablement leurs effets sur la santé, et ce, particulièrement chez les personnes atteintes d'une maladie coronarienne.

Des recherches ont permis d'expliquer en partie le manque d'assiduité aux recommandations thérapeutiques chez les personnes souffrant d'une maladie coronarienne. Il a été démontré que le fait de savoir qu'il est important d'adopter de saines habitudes de vie ne suffit pas à changer un

comportement de santé (Desmarais, 1996). Derenowski (1991) souligne que l'assiduité peut être liée au niveau de motivation des personnes à adopter des comportements de santé. La littérature permet de constater que la motivation semble être le facteur qui explique le mieux le degré d'engagement des personnes dans l'adoption et le maintien de comportements de santé (Cox & Wachs, 1985; Fleury, 1992; Kelly, Zyzanski & Alemagno, 1991; McEwen, 1993). Toutefois, afin de pouvoir agir efficacement sur le niveau de motivation, il est nécessaire de connaître les facteurs qui l'influencent. Godin (1988) mentionne qu'avant de mettre sur pied des interventions visant la modification des comportements des individus, il semble particulièrement important d'identifier au préalable les facteurs psychosociaux qui déterminent l'adoption ou non d'un comportement donné. Les facteurs psychosociaux qui semblent avoir le plus d'influence sur la motivation d'adopter des comportements de santé à différentes phases de la réadaptation cardiaque sont: le système de soutien social ou l'influence sociale, la perception de contrôle ou la perception d'auto-efficacité et les croyances en matière de santé (Derenowski, 1988; 1991; Fleury, 1992; Fushs, 1996; Johnson & Morse, 1990; Kelly, Zyzanski & Alemagno, 1991). Il serait maintenant intéressant d'identifier et de décrire des facteurs de motivation qui influencent un comportement de santé spécifique.

La présente étude est donc orientée vers un seul comportement de santé. Nous avons choisi d'étudier les facteurs qui influencent le comportement de pratiquer l'activité physique sur une base régulière chez les personnes atteintes d'une maladie coronarienne. Ce comportement a été retenu notamment, grâce à ses avantages sur l'amélioration de la capacité fonctionnelle (Ehsani et al., 1981; Ehsani et al., 1982), sur la réduction de la symptomatologie reliée à la maladie coronarienne (Thompson, 1988), sur le contrôle des facteurs de risque (Farchadi, 1988; Gossard, Lette & Fish, 1993) et sur la réduction du taux de mortalité après un infarctus du myocarde (Juneau, 1993). Afin d'atteindre ces différents objectifs, il est important de pratiquer l'exercice sur une base régulière. Par exemple, la personne doit exécuter un minimum de 20 minutes (consécutives ou par tranches de dix minutes) d'exercice aérobique, trois à cinq fois par semaine.

Cadre théorique

La théorie du comportement planifié de Ajzen (1985) a servi de base théorique à l'étude. Cette théorie a été retenue puisque plusieurs de ses composantes se sont avérées significatives dans la prédiction de la pratique de l'activité physique dans la population. Selon cette dernière, le déterminant immédiat du comportement est l'*intention* de la personne de faire ou ne pas faire l'action. L'intention est influencée par l'*attitude* de la

personne en regard du comportement et par la *norme subjective*. Cette théorie tient également compte de la *perception du contrôle* physique et psychologique sur le comportement à adopter. De plus, afin d'améliorer la valeur prédictive de cette théorie, une autre variable tirée de la Théorie des comportements interpersonnels (Triandis, 1977), a été ajoutée au modèle théorique principal. La variable ajoutée est l'*habitude*. Le choix de cette variable est fondé sur de nombreuses études qui ont démontré son importance dans la prévision de l'intention et du comportement de pratiquer l'activité physique (Godin, Valois, Jobin et Ross, 1991; Godin, Valois, Shephard & Desharnais, 1987; Valois, Desharnais et Godin, 1988).

Buts de l'étude

Les buts de l'étude sont : 1- décrire l'attitude, la norme subjective, la perception du contrôle comportemental, les habitudes antérieures et l'intention de comportement envers la pratique de l'activité physique chez des personnes atteintes d'une maladie coronarienne, 2- explorer certaines relations possibles entre ces variables.

Méthodologie

Il s'agit d'une étude de type descriptif-corrélationnel. Les variables choisies, tirées du modèle de Ajzen (1985), ont toutes été étudiées en regard de la pratique de l'activité physique régulière, tel que définie ci-bas, chez des personnes souffrant d'une maladie coronarienne. Ces variables ont été considérées simultanément en vue d'explorer leurs relations mutuelles.

Définitions des variables

D'abord, la définition du comportement a été élaborée en fonction des quatre éléments proposés par Fishbein & Ajzen (1980) soit : l'action (le comportement visé), la cible (objet d'attitude concerné), le contexte (situation spécifique dans laquelle le comportement est réalisé) et le temps (moment où l'on s'attend à ce que le comportement soit réalisé). La *pratique régulière de l'activité physique* est donc définie comme étant le comportement de pratiquer (action) une activité physique (cible) soutenue d'une durée minimale de 20 minutes consécutives ou par tranches de 10 minutes à une fréquence d'au moins trois fois par semaine (contexte) durant les temps de loisir au cours de la prochaine année (temps). Une activité physique soutenue fait référence à une activité physique qui fait augmenter la fréquence respiratoire tout en étant capable d'entretenir une conversation. La pratique de l'activité physique est évaluée à l'aide d'un questionnaire auto-administré qui sera décrit plus loin.

En référence à la théorie de Ajzen (1985), l'*intention* (I) correspond à la volonté d'une personne à adopter ou non un comportement. Il s'agit du déterminant immédiat de cette action. Quant à l'*attitude* (Aact), elle

se définit par l'analyse subjective de l'ensemble perçu des bénéfices et des inconvénients à réaliser un comportement. La *norme subjective* (NS) se définit par le degré d'acceptation de l'entourage en regard du comportement visé. La *perception du contrôle comportemental* (PBC) se définit par la croyance de la personne concernant le degré de facilité ou de difficulté auquel elle pense être confrontée. Enfin, l'*habitude* est définie par Triandis (1977) comme étant l'histoire d'apprentissage de l'individu et son niveau d'habitude en ce qui concerne la difficulté de la tâche à accomplir.

Instrument de mesure

Un questionnaire auto-administré a été utilisé afin d'évaluer les variables à l'étude. Ce questionnaire a été développé par l'investigatrice en respectant les démarches proposées par Ajzen (1985). Les étapes importantes de validation et de vérification de la fidélité du questionnaire ont été respectées. Cette démarche est justifiée par le fait qu'il n'existe pas de questionnaire standardisé pour le type d'étude proposé, ce qui permet de considérer les particularités culturelles de la population cible.

Afin d'élaborer le questionnaire, une étude préliminaire, soumise à des tests de validation, a permis d'identifier auprès d'une population comparable à celle étudiée certaines croyances saillantes. La dernière version du questionnaire a été soumise à une étude de fiabilité (vérification-contre vérification) faite à deux semaines d'intervalle. Afin d'obtenir les coefficients de stabilité temporelle pour les données continues, des corrélations de Pearson (r) ont été effectuées. Les résultats des analyses statistiques démontrent que la majorité des coefficients de stabilité varient entre 0.7 et 0.9 ($p < 0.001$). Une seule valeur démontre un coefficient de stabilité à 0.53 ($p < 0.05$), il s'agit de l'évaluation des croyances quant à la présence ou l'absence de facteurs qui facilitent l'adoption du comportement. De plus, des analyses d'items ont été effectuées afin de vérifier la consistance interne des énoncés du questionnaire puisque chaque variable du modèle de Ajzen (1985) a été mesurée à l'aide de plusieurs questions. La technique utilisée afin de faire cette vérification est le coefficient alpha de Cronbach. Les valeurs des coefficients alpha de Cronbach pour les échelles utilisées se situent entre 0.80 et 0.94.

Le questionnaire compte au total 29 questions. Les questions relatives à l'évaluation indirecte de l'attitude (Aact), de la norme subjective (SN) et de la perception du contrôle comportemental (PBC) sont composées de plusieurs items. Chaque variable possède une **mesure directe**, c'est-à-dire une question mesurant la variable d'une façon générale. De plus, les variables psychosociales sont également mesurées à l'aide d'une **mesure indirecte** puisque ces variables sont des

concepts. Nous retrouvons donc une forme de mesure indirecte pour l'attitude, la norme subjective et la perception de contrôle comportemental. Les variables psychosociales sont mesurées à l'aide d'échelles sémantiques différentielles à sept points. D'autre part, le comportement de la pratique de l'activité physique, l'habitude ainsi que les données socio-démographiques sont mesurées à l'aide de questions objectives à plusieurs niveaux.

Quatre questions ont été utilisées afin d'évaluer le comportement de la *pratique de l'activité physique*. L'ensemble de ces questions permet d'évaluer chaque élément de la définition du comportement. Premièrement, le répondant devait identifier le type d'activité physique qu'il pratique actuellement (ex : marche, vélo, course, etc.) puis la durée moyenne de cette (ces) activité(s) physique(s) (ex : moins de 10 minutes consécutives ou de 10 à 20 minutes consécutives ou plus de 20 minutes consécutives). Ensuite, il devait identifier sa perception de l'effort en moyenne de l'activité physique qu'il pratique (ex : facile, aucun essoufflement ou légèrement difficile, un peu d'essoufflement mais capable d'entretenir une conversation ou difficile, essoufflement et incapable d'entretenir une conversation). Enfin, le répondant devait mentionner à quelle fréquence par semaine il pratique cette (ces) activité(s) physique(s) (ex : moins de 1 fois par semaine, de 1 à 2 fois par semaine et 3 fois par semaine et plus).

L'intention a été mesurée directement à l'aide d'une question comprenant les quatre éléments de la définition du comportement à l'étude. Cette précaution est nécessaire pour assurer une concordance entre l'intention et le comportement (Ajzen et Fishbein, 1980). La question est donc posée ainsi : « *Au cours de la prochaine année, avez-vous l'intention de pratiquer une activité physique soutenue d'une durée totale de 20 minutes (consécutives ou par tranches de dix minutes) à une fréquence d'au moins trois fois par semaine dans vos temps de loisirs ?* ». Il est à noter que le terme *activité physique soutenue* est expliqué au début du questionnaire afin que ce terme soit le plus objectif possible. Le terme « *activité physique soutenue* » fait référence à une activité physique qui fait augmenter la fréquence respiratoire mais n'empêchant pas les sujets d'entretenir une conversation. Les sujets doivent répondre à partir d'une échelle sémantique à sept points variant d'*extrêmement probable* (7) à *extrêmement improbable* (1).

Pour obtenir la **mesure directe** de l'attitude (Aact) envers le comportement, les répondants devaient identifier sur une échelle variant d'*extrêmement bon* (7) à *extrêmement mauvais* (1), comment serait selon eux le fait de *pratiquer une activité physique soutenue d'une durée totale de 20 minutes (consécutives ou par tranches de dix minutes) à une fréquence d'au moins trois fois par semaine*

durant les temps de loisir. Une série d'adjectifs et ses opposés n'ont pas été utilisés afin de mesurer directement l'attitude, contrairement à ce que ce qui est utilisé habituellement dans les études qui mesurent cette variable. Les raisons qui ont motivé la mesure de l'attitude en utilisant seulement le terme *bon* vs *mauvais* sont les suivantes : les limites de temps imposées par l'étude ne permettaient pas de faire tous les tests de validité de construit afin de constater si les adjectifs mesuraient bel et bien l'attitude et le questionnaire devenait trop lourd et long en présence de nombreux adjectifs, selon les commentaires des personnes de la population cible ayant évalué le questionnaire. Enfin, la majorité des personnes consultées ont jugé que le terme *bon* vs *mauvais* représentait globalement l'attitude envers le comportement. La **mesure indirecte** de l'attitude, quant à elle, s'est faite à l'aide des croyances comportementales (b) et de l'évaluation de la valeur de chacune d'entre elles (e). Les croyances comportementales (b) étaient représentées par une liste d'avantages et d'inconvénients à pratiquer une activité physique retenue à la suite de l'analyse de l'étude préliminaire. Au total, quatorze croyances comportementales ont été retenues suite à cette étude. Pour chacune de ces croyances, les répondants donnaient leur opinion quant à la probabilité que ces conséquences surviennent suite à l'adoption du comportement sur une échelle sémantique à sept points variant d'*extrêmement probable* (7) à *extrêmement improbable* (1). Ensuite, l'évaluation de la valeur accordée à chacune de ces croyances comportementales (e) s'est faite également à l'aide d'une échelle à sept points allant d'*extrêmement désirable* (7) à *extrêmement indésirable* (1). Pour cette échelle, le coefficient alpha de Cronbach correspond à 0,83. La mesure indirecte de l'attitude a été obtenue en faisant la sommation de la force de chacune des croyances comportementales (b), multipliée par la l'évaluation de la valeur accordée à chacune de ces croyances (e).

$$A_{act} = \sum b \cdot e$$

La **mesure directe** de la *norme subjective* (SN) a été obtenue en demandant aux sujets dans quelle mesure les personnes importantes pour eux approuveraient ce comportement. Une échelle sémantique à sept points variant entre *extrêmement en accord* (7) et *extrêmement en désaccord* (1) a été utilisée pour cette mesure. La **mesure indirecte** de la norme subjective (SN) a été obtenue à l'aide des croyances normatives (NB) et de la motivation à agir dans le sens exprimé par chacune des personnes influentes (MC). Les croyances normatives étaient représentées par une liste de personnes pouvant être influentes dans la décision de pratiquer une activité physique, liste qui a été retenue suite au questionnaire préliminaire. Cette liste était composée de sept items correspondant à des personnes jugées influentes par

des personnes atteintes d'une maladie cardiovasculaire. La croyance des sujets concernant la recommandation que feraient ces personnes quant à la pratique de l'activité physique a été mesurée à l'aide d'une échelle sémantique à sept points variant d'*extrêmement probable* (7) à *extrêmement improbable* (1). Pour cette échelle, le coefficient alpha de Cronbach correspond à 0,88. Ensuite, afin de mesurer la motivation à agir dans le sens exprimé par chacune de ces personnes, les répondants devaient mentionner s'ils seraient enclins à écouter l'opinion de chacune de ces personnes. Les sujets devaient répondre à partir d'une échelle sémantique à sept points qui varie entre *tout à fait* (7) et *pas du tout* (1). Pour cette échelle, le coefficient alpha de Cronbach correspond à 0,94. La mesure indirecte de la norme subjective a été obtenue en faisant la sommation de la force de chacune des croyances normatives (NB), multipliée par la motivation à agir dans le sens exprimé par chacune des personnes influentes (MC).

$$SN = \sum NB \cdot MC$$

Afin d'obtenir la **mesure directe** de la *perception du contrôle comportemental* (PBC), les répondants ont identifié dans quelle mesure ils sentent qu'ils pourraient réussir à pratiquer une activité physique soutenue d'une durée totale de 20 minutes (consécutives ou par tranches de dix minutes) à une fréquence d'au moins trois fois par semaine durant leurs temps de loisir au cours de la prochaine année. Les sujets devaient répondre à cette question en utilisant une échelle sémantique à sept points variant d'*extrêmement en accord* (7) à *extrêmement en désaccord* (1). Ajzen (1991) propose une méthode pour définir le concept de la **mesure indirecte** de la perception du contrôle comportemental (PBC). Elle consiste à effectuer la sommation de chacune des croyances que la personne a concernant les chances que certains facteurs nuisibles ou facilitateurs soient présents au moment de passer à l'action. On obtient donc la mesure indirecte de la perception du contrôle comportemental (PBC) en utilisant une liste de facteurs facilitateurs et une liste de facteurs nuisibles à la pratique de l'activité physique (c). Ces listes ont été obtenues suite à l'analyse des résultats du questionnaire préliminaire. Au total, 12 facteurs facilitateurs et 9 facteurs nuisibles ont été identifiés. Pour chacun de ces facteurs, les sujets devaient répondre quant à l'évaluation qu'ils font de la probabilité que ces facteurs facilitent ou nuisent à la pratique de l'activité physique tel que définie précédemment. Afin de mesurer les réponses, une échelle sémantique à sept points variant d'*extrêmement probable* (7) à *extrêmement improbable* (1) a été utilisée pour chacun de ces facteurs. Les coefficients alpha de Cronbach pour les facteurs facilitateurs et pour les facteurs nuisibles sont respectivement 0,88 et 0,84. La mesure indirecte de la perception de contrôle comportemental est donc

obtenue en faisant la sommation de la valeur des facteurs facilitateurs et des facteurs nuisibles à la pratique de l'activité physique.

$$PBC = \sum c$$

Concernant la variable *habitude*, seule une mesure directe est effectuée. Pour ce faire, les répondants devaient mentionner depuis combien de temps ils avaient l'habitude de pratiquer l'activité physique qu'ils avaient identifiée précédemment. Si la personne ne pratiquait pas d'activité physique, elle devait mentionner si elle a eu l'habitude antérieurement de *pratiquer une activité physique soutenue d'une durée minimale de 20 minutes consécutives à une fréquence d'au moins trois fois par semaine durant ses loisirs*.

Considérations éthiques

L'organisme au sein duquel ont été recrutés les sujets de l'étude n'avait pas de comité d'éthique officiel. Toutefois, les implications éthiques ont été discutées par les membres du conseil d'administration de l'Association des cardiaques de la Mauricie. Une attention particulière a été portée à deux considérations éthiques. D'abord, les questionnaires étaient entièrement anonymes et les données étaient confidentielles. De plus, les personnes étaient libres d'y répondre ou non. Un consentement tacite était obtenu lorsque la personne retournait le questionnaire qu'elle avait rempli.

Présentation des résultats

Échantillon

Les sujets ont été recrutés à partir de la liste des membres de l'Association des cardiaques de la Mauricie qui ont manifesté de l'intérêt à participer à ce type d'étude. Au

total, 220 sujets atteints d'une maladie coronarienne ont reçu par la poste une copie du questionnaire auto-administré. Parmi eux, 109 personnes y ont répondu et ont retourné les questionnaires dûment remplis. Tous les répondants étaient déjà traités pour une maladie coronarienne au moment où ils ont répondu au questionnaire. L'échantillon était composé de 25,9 % de femmes et de 74,1 % d'hommes. La moyenne d'âge était de 65 ans avec un écart type de 9,3 ans. La plupart des sujets, soit 73 % de l'échantillon, étaient mariés. Plusieurs d'entre eux (76 %) avaient participé au programme d'information sur la maladie coronarienne « À vous de jouer ».

L'activité physique soutenue d'une durée minimale de 20 minutes (consécutives ou par tranches de 10 minutes) à une fréquence d'au moins trois fois par semaine est rapportée par 38 % des sujets. Le type d'activité physique le plus souvent effectué est la marche avec 93,6 % des répondants suivi de la pratique du vélo avec 41,3 % des répondants. Le tableau 1 rapporte le détail des types d'activité pratiquée par les répondants. Il est à noter que la même personne peut pratiquer plusieurs types d'activité physique.

Analyses descriptives

Parmi les points saillants des résultats des analyses descriptives, notons que les sujets possèdent une attitude favorable en regard du comportement à l'étude avec une moyenne de la mesure directe à 6,39. L'attitude est influencée principalement par les croyances des répondants plutôt que par la valeur accordée aux conséquences du comportement. Les sujets perçoivent que la plupart des personnes importantes pour eux sont en accord avec le comportement tel que défini avec une moyenne de la mesure directe de la norme subjective à

Tableau 1

Fréquences relatives (%) des caractéristiques des activités physiques pratiquées

Caractéristiques des activités physiques pratiquées (N = 109)

Types d'activité		Durée totale des activités		Perception de l'intensité		Fréquence	
Marche	93,6 %	Moins de		Facile	20,2 %	< 1 fois/sem.	10,5 %
Vélo	41,3 %	10 minutes	2,9 %	Légèrement		1 à 2 fois/sem.	21,9 %
Danse	17,4 %	De 10 à 20		difficile	76,9 %	3 à 5 fois/sem.	54,3 %
Natation	14,7 %	minutes	26,2 %	Difficile	2,9 %	> 5 fois/sem.	13,3 %
Golf	12,8 %	Plus de					
Conditionnement	7,3 %	20 minutes	67 %				
Assouplissement	6,4 %						
Patin à roulettes	3,7 %						
Course à pied	0,9 %						
Autre	20,2 %						

6.2. Il est intéressant de noter que les sujets se sentent particulièrement encouragés par les personnes impliquées dans le domaine de la santé et qu'ils accordent de l'importance à leurs opinions. De plus, la majorité des sujets se sentent capable d'effectuer le comportement demandé. En effet, la mesure directe de la perception du contrôle comportemental correspond à une moyenne de 6,24. Enfin, 76,8 % des répondants estiment avoir l'habitude de pratiquer l'activité physique depuis plus de 1 an. Toutefois, seulement 38 % d'entre eux ont rapporté qu'ils pratiquaient l'activité physique selon les critères établis lors de l'application du questionnaire. Enfin, l'intention de pratiquer l'activité physique tel que défini est également assez importante

avec une moyenne de la mesure directe à 6,1. Le tableau 2 présente le détail des moyennes obtenues pour chacune des échelles utilisées pour les mesures indirectes des variables à l'étude.

Vérification du modèle théorique

En ce qui a trait à la vérification du modèle théorique, les croyances des sujets ont un lien significatif avec l'attitude (Aact), la norme subjective (NS) et la perception de contrôle comportemental (PBC). De plus, l'évaluation de la valeur des conséquences (b) associées au comportement étudié a également une relation significative, quoique faible, avec l'attitude (Aact) des sujets envers ce dernier. Enfin, nous observons un lien

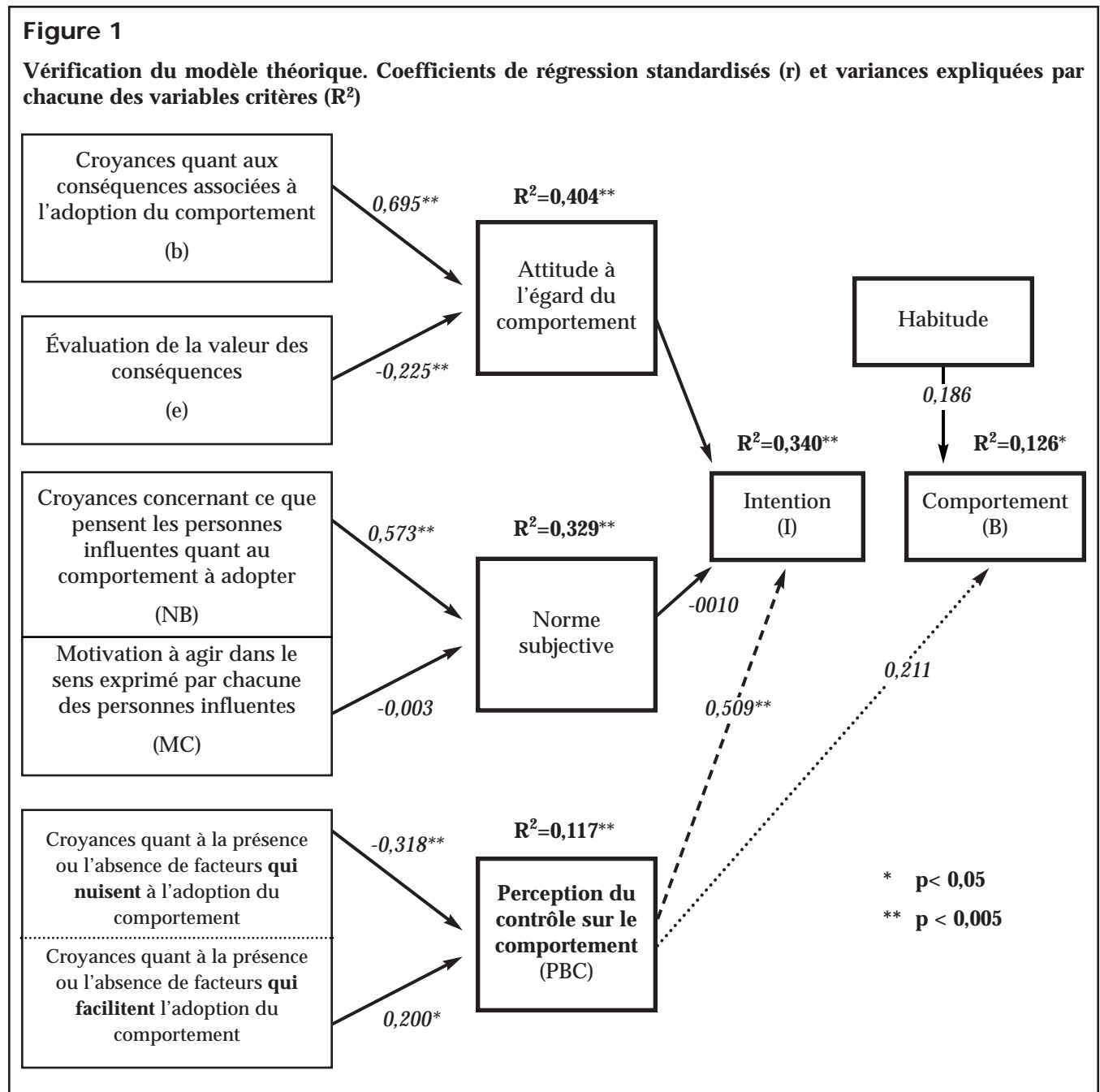


Tableau 2		
Résultats des analyses descriptives		
Attitude (N = 105)		Moyenne de la mesure directe = 6,39 (écart-type = 0,71)
Conséquences du comportement	Croyances quant aux conséquences du comportement	Évaluation de la valeur de ces conséquences
1. Améliore la santé cardiaque	6,5	6,7
2. Aide à se sentir bien dans sa peau	6,4	6,6
3. Permet d'avoir plus d'endurance physique	6,4	6,2
4. Améliore la souplesse	6,4	
5. Améliore la force musculaire		
6. Procure un meilleur sommeil		
7. Aide à contrôler le stress		
8. Contribue à la réduction du taux de cholestérol	6,4	
9. Améliore la respiration	6,3	
10. Permet de rencontrer des gens	5,8	
11. Permet de contrôler le poids		
12. Occasionne de la fatigue	4,5	5,4
13. Augmente les risques d'avoir une crise d'angine	3,9	
14. Donne des malaises physiques	3,6	5,4
Norme subjective (N = 105)		Moyenne de la mesure directe = 6.2 (écart-type = 0.83)
Conséquences du comportement	Croyances concernant ce que pensent les personnes influentes	Motivation à agir dans le sens exprimé par chacune de ces personnes
1. Votre cardiologue	6.5	5.5
2. La plupart des professionnels de la santé	6.49	5.4
3. Votre médecin de famille	6.42	5.2
4. Votre conjoint	6.26	4.32
5. La plupart des membres de votre famille		
6. La plupart de vos ami(e)s		3.9
7. La plupart de vos collègues de travail		3.1
Perception du contrôle comportemental (N= 105)		Moyenne de la mesure directe = 6.24 (écart-type 0.91)
Croyances quant à la présence ou l'absence de facteurs qui nuisent à l'adoption du comportement		Croyances quant à la présence ou l'absence de facteurs qui facilitent l'adoption du comportement
	SCORES	SCORES
1. La température extérieure	5.0	14. Avoir accès à un programme de réadaptation
2. Faire une activité qui procure du plaisir	6.16	15. La difficulté d'accès aux installations sportives
3. Le manque de motivation	4.4	
4. Avoir une bonne motivation personnelle	6.15	16. Avoir accès à des lieux qui facilitent l'exercice
5. Les situations de compétition		17. Le manque de temps
6. Se sentir suffisamment en forme physique	5.9	18. Disposer de plus de temps de loisir
7. Les inconforts physiques		19. Avoir des connaissances sur les choix d'activités physiques recommandées
8. Avoir une température extérieure confortable	5.8	20. Avoir un partenaire régulier d'exercice
9. La fatigue physique		21. Avoir des appareils d'exercice à votre disposition
10. Avoir de l'encouragement		
11. La présence d'une autre maladie		
12. Avoir la présence d'autres personnes		
13. La peur d'avoir des malaises cardiaques	3.79	
		Intention (N = 104) Moyenne de la mesure directe = 6.12 (écart-type = 1.09)

significatif entre la perception de contrôle comportemental (PBC) et l'intention (I). La figure 1 présente les résultats des analyses de régression.

Analyse et interprétation des résultats

L'*attitude* des sujets face au comportement étudié était très favorable. En effet, l'ensemble des sujets estimait très bon de pratiquer l'activité physique tel que défini. Toutefois, seulement 38 % des répondants effectuaient le comportement. Ce résultat permet de croire que ce n'est pas parce qu'une personne prétend qu'un comportement est bon qu'elle l'exécutera d'emblée.

En référence à la Théorie de Ajzen (1985), les croyances quant aux conséquences associées à l'adoption du comportement ainsi que l'évaluation de la valeur de ces conséquences influencent l'attitude. Les résultats obtenus vont dans le même sens. En effet, nous observons des résultats significatifs entre les croyances quant aux conséquences du comportement et l'attitude des sujets à l'égard de la pratique de l'activité physique. De plus, la relation de causalité est considérable avec un $r = 0,695$ ($p < 0,005$). Une relation significative a également été démontrée, quoique faible ($r = -0,225$; $p < 0,005$), entre l'évaluation de la valeur des conséquences et l'attitude à l'égard du comportement. Nous constatons ici que les croyances concernant les conséquences de l'acte comportemental ont une plus grande influence sur l'attitude que l'évaluation de la valeur de ces conséquences. Selon ce résultat, l'attitude des gens envers le comportement dépend plus des facteurs qui influencent les croyances que des facteurs qui déterminent l'évaluation de la valeur de ces conséquences. Par exemple, l'attitude peut être modifiée en améliorant les connaissances des gens envers le comportement dans la mesure où l'augmentation des connaissances influence les croyances. Par contre, l'attitude semble être peu influencée par l'évaluation de la valeur des conséquences. Toutefois, les interventions infirmières ont vraisemblablement moins d'emprise afin de modifier cette variable puisqu'il s'agit d'un aspect qui relève de l'échelle de valeurs personnelles.

Parmi les croyances qui semblent déterminer en partie l'attitude, les croyances les plus fréquentes ont une connotation positive tel que la croyance que l'activité physique améliore la santé cardiaque, permet d'avoir plus d'endurance physique et améliore la souplesse. Par contre, les croyances les moins fréquentes ont une connotation négative tel que la croyance que l'activité physique donne des malaises physiques, augmente les risques d'avoir une crise d'angine et occasionne de la fatigue. Par cette observation, nous pouvons comprendre l'attitude plutôt positive des sujets envers l'activité physique. Il est intéressant de constater que

les personnes atteintes d'une maladie coronarienne faisant partie de l'étude attribuent plus d'avantages que d'inconvénients à effectuer le comportement. Nous expliquons cette observation par le fait que les personnes sont en majorité bien informées des bienfaits de l'activité physique. En effet, 71 % des sujets ont assisté au programme d'information « À vous de jouer » et tous ont accès à de l'information via des conférences ou des dépliants distribués par l'Association des cardiaques de la Mauricie. De plus, l'éducation populaire encourage la pratique de l'activité physique pour ses bienfaits sur la santé.

Toutefois, les croyances auxquelles les personnes accordent le plus de valeur sont un peu différentes des croyances les plus fréquentes, à part l'amélioration de la santé cardiaque et de l'endurance physique. En effet, les sujets accordent également beaucoup d'importance aux croyances suivantes : la réduction du taux de cholestérol, le contrôle du stress et l'amélioration de la respiration. Ces croyances ne figurent pas parmi les plus fréquentes. Il est probable que les gens attribuent ces conséquences à plusieurs facteurs et non spécifiquement à la pratique de l'activité physique. Par exemple, on reconnaît que la réduction du taux de cholestérol est influencée non seulement par l'exercice physique mais également par l'alimentation et, dans certains cas, par la médication. Autre exemple, le contrôle du stress peut être relatif à d'autres facteurs psychosociaux tel que la personnalité, le système de soutien social, etc. Enfin, plusieurs personnes peuvent souffrir d'une affection pulmonaire en plus de leur problème cardiaque, ce qui augmente les difficultés respiratoires.

Concernant la *norme subjective*, les sujets perçoivent que la plupart des personnes importantes pour eux seraient en accord avec le comportement tel que défini. Selon la théorie de Ajzen (1985), la norme subjective est déterminée par la croyance normative de la personne, c'est-à-dire par l'importance que celle-ci accorde à l'opinion de certaines personnes ou groupes de personnes et par sa motivation à se conformer à leur opinion. Dans la présente étude, la plupart des sujets perçoivent qu'il est très probable que les personnes de leur entourage les encouragent à effectuer le comportement suggéré. De plus, une corrélation positive et significative a été démontrée entre les croyances des sujets concernant ce que pensent les personnes influentes quant au comportement à adopter et la mesure directe de la norme subjective. Toutefois, aucune corrélation significative n'a été prouvée entre la motivation à agir dans le sens exprimé par chacune des personnes influentes et la mesure directe de la norme subjective. La question utilisée afin d'évaluer la mesure directe de la norme subjective a trait surtout à la perception des sujets quant au degré d'accord ou de

désaccord des personnes importantes pour eux. Donc, cette façon de mesurer directement la norme subjective ne tient pas compte de la motivation des sujets à agir dans le sens exprimé par les personnes influentes tel que le propose le cadre théorique. Il faudrait donc revoir la formulation de la question relative à la mesure directe de la norme subjective afin qu'elle tienne compte de ce point.

De plus, les sujets perçoivent un bon degré d'encouragement de la part des personnes significatives mais ils se disent plus ou moins influencés par leurs opinions. Godin et al. (1991), ont également fait ressortir que la décision des personnes atteintes d'une maladie cardiaque de pratiquer l'exercice physique régulièrement est personnelle et qu'elle n'est pas influencée par les attentes des personnes significatives. Dans la présente étude, les sujets accordent toutefois de l'importance à l'opinion des personnes (ou groupes de personnes) qui encouragent le comportement de santé. Par exemple, les sujets perçoivent que les cardiologues constituent le groupe de personnes qui les encourageraient le plus à pratiquer l'activité physique tel que défini, et ils se disent le plus influencés par ces derniers. À l'inverse, les sujets croient que les collègues de travail encouragerait le moins l'exécution du comportement et il s'agit du groupe de personnes qui semble exercer le moins d'influence sur eux à propos de l'exécution du comportement étudié. Il est intéressant de constater que les sujets se sentent davantage encouragés par les groupes de personnes qui ont un lien avec le domaine de la santé. Cette observation peut s'expliquer en partie par le fait que les médecins et les autres professionnels de la santé possèdent une certaine crédibilité auprès des sujets. De plus, la volonté de vouloir plaire à ces personnes, étant donné leur rôle, peut contribuer à expliquer l'importance accordée à l'opinion de ces groupes de personnes.

À propos de la perception du *contrôle comportemental*, la majorité des sujets se sentent capables d'effectuer le comportement à l'étude. Selon la Théorie du comportement planifié, cette perception de contrôle comportemental est influencée par les croyances quant à la présence ou l'absence de facteurs qui facilitent ou qui nuisent à l'adoption du comportement.

Parmi les facteurs *nuisibles*, rappelons que la température extérieure et le manque de motivation sont considérés comme étant les facteurs les plus probables pouvant nuire à la pratique de l'activité physique tel que défini. À l'inverse, le manque de temps est considéré comme étant le facteur le moins probable pouvant nuire à l'adoption de ce comportement. Cette observation diffère des conclusions des certains auteurs (Shephard, 1985) qui estiment que ce facteur influence de façon importante la pratique de l'activité physique régulière dans la

population en général. Il faut toutefois considérer que la présente étude est constituée d'une population âgée en moyenne de 65 ans, donc plusieurs personnes sont retraitées, ce qui implique une plus grande disponibilité pour les loisirs. La peur d'avoir des malaises cardiaques est également un facteur dont les sujets accordent peu d'importance parmi les facteurs pouvant nuire à l'adoption du comportement. Cette observation peut être expliquée en se référant aux croyances de la plupart des sujets qui estiment que la pratique de l'activité physique tel que défini n'augmente pas nécessairement les risques d'avoir des malaises tels qu'une crise d'angine.

Parmi les facteurs *facilitants*, les sujets estiment que le plaisir procuré par l'activité physique et la motivation personnelle influencent le comportement en question. Cette dernière observation est cohérente avec la littérature où l'on constate que la motivation semble être le facteur qui explique le mieux le degré d'engagement des personnes dans l'adoption et le maintien de comportement (Cox & Wachs, 1985; Fleury, 1992; Kelly et al., 1991; McEwen, 1993).

Toutefois, nous observons un faible score de régression ($r = 0.2$; $p < 0,05$) entre l'ensemble des facteurs facilitants et l'évaluation directe de la perception du contrôle comportemental. Le score de régression ($r = -0.318$; $p < 0,005$) est légèrement supérieure entre les croyances quant à la présence ou l'absence de facteurs *nuisibles* et la mesure directe de la perception de contrôle sur le comportement. Malgré que les relations cause à effet sont significatives ($p < 0,05$), la perception de contrôle comportemental est donc peu expliqué par les croyances quant à la présence ou l'absence de facteurs qui facilitent ou nuisent à l'adoption du comportement. Il y a alors probablement d'autres facteurs qui contribuent à la perception du contrôle comportemental qui n'ont pas été mesuré dans la présente étude.

Enfin l'*intention de pratiquer une activité physique soutenue d'une durée totale de 20 minutes (consécutives ou par tranches de 10 minutes) à une fréquence d'au moins trois fois par semaine durant les loisirs* est assez importante. Dans l'étude de Godin et al. (1991), portant sur les déterminants psychosociaux de la pratique de l'activité physique chez des personnes atteintes d'une maladie cardiaque, un bon niveau d'intention à pratiquer l'activité physique a également été obtenu. En effet, dans cette étude, 65 % des sujets sont considérés comme ayant un niveau élevé d'intention de pratiquer l'activité physique. De plus, d'autres études ont également prouvé que les personnes atteintes de troubles cardiaques ont un niveau élevé d'intention à pratiquer une activité physique (Miller et al., 1984; Miller et al., 1989). Selon ces résultats, la majorité des personnes atteintes d'une maladie cardiaque ont un

niveau important d'intention à pratiquer une activité physique; quoique le comportement ne soit pas pratiqué dans une aussi grande proportion.

Concernant l'*habitude* de pratiquer l'activité physique tel que défini, un résultat assez élevé a été obtenu. La majorité des sujets (78,6 %) prétendent avoir l'habitude de pratiquer une telle activité depuis plus de 1 an. De plus, parmi ceux qui déclarent ne pas pratiquer l'activité physique au moment où le questionnaire a été rempli, 64,3 % reconnaissent avoir déjà eu l'habitude antérieurement. Ces chiffres sont surprenants étant donné que la littérature estime que moins de 20 % des adultes pratique l'activité physique et que dans la présente étude 38 % des sujets répondent aux critères de la pratique de l'activité physique régulière. Il n'est donc pas surprenant de ne constater aucune relation significative entre l'habitude et le comportement. Il faut toutefois considérer que la variable habitude a été mesurée de façon assez simple dans le questionnaire. L'habitude a été mesurée en fonction de la pratique d'activité physique sans tenir compte des autres éléments du comportement étudiés tel que l'intensité de l'activité, la durée et la fréquence. Les résultats obtenus à l'aide de cette variable sont donc à analyser avec une certaine retenue.

Limites de l'étude

Quelques limites méthodologiques sont à considérer dans cette étude. La première limite de l'étude s'avère être au niveau de sa validité externe. L'échantillon a été obtenu à partir d'un groupe restreint, c'est-à-dire à partir des membres de l'Association des cardiaques de la Mauricie. Les données sont donc représentatives de ce groupe d'individus, ce qui ne représente pas nécessairement l'ensemble de la population des personnes atteintes d'une maladie cardiaque. De plus, il faut noter que les participants à l'étude ne sont pas tous à la même phase de réadaptation après l'événement cardiaque. Le choix de cet échantillon est justifié par sa facilité d'accès et par le fait que des études comparatives entre des personnes impliquées dans une association et le reste de la population des personnes atteintes de maladies coronariennes seraient intéressantes à effectuer ultérieurement.

Le phénomène de désirabilité sociale doit également être considéré lors de l'analyse des données. En effet, les réponses à des questionnaires explorant des variables psychosociales peuvent être biaisées par le désir des sujets de répondre de manière à refléter les comportements considérés acceptables par la société. Une échelle de désirabilité sociale aurait pu être inclus dans le questionnaire. Toutefois, cette solution aurait allongé ce dernier, ce qui aurait pu occasionner de la fatigue, une diminution de l'intérêt à répondre et une diminution de l'attention des participants.

Recommandations et conclusion

Implications pour la recherche

Quelques pistes de recherche peuvent être tirées de cette étude. D'abord, peu de recherches ont été effectuées en sciences infirmières sur les facteurs psychosociaux influençant de façon spécifique la pratique de l'activité physique régulière. Il serait donc intéressant de reproduire des recherches auprès d'autres groupes de personnes atteintes d'une maladie coronarienne. Par exemple, nous pourrions viser des personnes qui ne sont pas impliquées dans une association afin de pouvoir comparer les résultats. L'étude du phénomène auprès de personnes qui sont à une phase spécifique de la réadaptation cardiaque pourrait également être intéressante. Ceci permettrait alors de constater s'il y a une évolution au niveau des facteurs psychosociaux qui influencent la pratique de l'activité physique.

D'autres recommandations concernant la recherche se situent au niveau de la façon de mesurer les variables. En effet, si l'on veut comparer de façon appropriée des résultats de recherche, il serait tout à fait approprié d'utiliser un instrument de mesure commun. Godin & Kok (1996) ont également soulevé ce point. Ces derniers ont observé que plusieurs méthodes différentes sont utilisées dans les recherches afin d'évaluer les variables de la Théorie du comportement planifié. Ceci amène donc une certaine confusion dans l'interprétation des résultats de recherche. Il serait donc pertinent de s'assurer du développement d'un instrument de mesure valide afin d'évaluer l'ensemble des variables du modèle théorique. De plus, nous pourrions envisager une mesure du phénomène de désirabilité sociale afin de constater son impact sur les réponses.

Concernant certaines variables, il serait intéressant d'explorer de façon plus spécifique et détaillée les facteurs qui les expliquent. Par exemple, on reconnaît que la perception du contrôle comportemental influence l'intention de comportement mais nous n'avons pas très bien identifié ce qui explique cette perception de contrôle. Il faudrait également pousser nos recherches sur d'autres phénomènes qui expliquent le comportement de pratiquer l'activité physique, étant donné que nous ne sommes pas arrivés à des résultats concluants sur ce sujet.

Malgré que nous ayons réussi à bien décrire les variables à l'étude, nous pouvons constater que nous connaissons encore peu les facteurs qui influencent le comportement de pratiquer l'activité physique régulière chez les personnes atteintes d'une maladie coronarienne. Il s'agit d'un phénomène complexe qui nécessite une exploration de plusieurs variables. Nous devons donc poursuivre nos recherches en ce sens afin de mieux comprendre le phénomène pour mieux intervenir.

Implications pour la pratique

La pratique infirmière peut bénéficier de résultats tirés de cette étude. Nous avons pu constater que les croyances des personnes jouent un rôle considérable sur l'attitude envers le comportement, la norme subjective et sur la perception de contrôle sur le comportement. Nous pouvons donc influencer ces différentes variables par certaines de nos interventions. Par exemple, lors de rencontres avec la personne/famille nous pourrions explorer leurs croyances en regard de la pratique de l'activité physique. Ceci permettrait de renforcer les croyances à connotation positive et d'ébranler les croyances à connotation négative. De plus, étant donné l'importance accordée à l'opinion des professionnels de la santé, nous aurions avantage à encourager le comportement, tout en expliquant convenablement la façon de pratiquer l'activité physique. Enfin, lors des conseils donnés aux personnes, il apparaît important

de transmettre de l'information concernant les facteurs qui facilitent l'adoption du comportement (ex : suggérer à la personne de trouver une activité qui procure du plaisir, joindre à l'activité un facteur de motivation personnel, suggérer des endroits ou des moments de la journée où la température est confortable). Dans le même ordre d'idée, il serait approprié de démontrer que l'activité physique, tel que suggéré, peut se pratiquer sans être obligé de faire face à certains facteurs nuisibles sur lesquels la personne a un certain contrôle. ♥

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Biventricular Pacing and Cardiac Resynchronization Therapy: A Fresh Approach to Heart Failure and Intraventricular Conduction Delay

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Approximately 25% of patients diagnosed with symptomatic heart failure have evidence of significant intraventricular conduction delay defined by a QRS width greater than 120 ms. Heart failure leads to dysynchronous ventricular contraction, mechanical inefficiency and further impairment of left ventricular function. Patients with severe heart failure are also more likely to be burdened by mitral regurgitation. Biventricular pacing is a new therapy for heart failure refractory to standard pharmacological therapy. Biventricular pacing has been shown to improve the hemodynamics of

patients with intraventricular conduction delay and low ejection fraction. This is done by simultaneous electrical stimulation of both ventricles. This is a review of recent evidence on the efficacy of biventricular pacemakers, cardiac resynchronization therapy, and the pathophysiology underlying the use of these therapies.

Key words: biventricular pacing; cardiac resynchronization therapy; heart failure, intraventricular conduction delay

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Introduction

Heart failure is a common problem, affecting over 350,000 Canadians (Liu, et al., 2001). Heart failure is also the most common hospitalized condition in Canada with an economic burden that exceeds one billion dollars annually (Liu, et al., 2001). It is estimated that 30% to 50% of patients with heart failure have intraventricular conduction delay reflected by a prolonged QRS interval (Bramlet, Morris, Coleman, Albert, & Cobb, 1983; Bristow, Feldman & Saxson, 2000; Cazeau, et al., 2001; Kass et al., 1999; Linde et al., 2002).

Cardiac resynchronization therapy (CRT) uses pacemaker leads implanted in the right atrium, right ventricle and epicardial vein over the left ventricle (inserted transvenously through the coronary sinus) using a biventricular pacemaker or ICD to pace and sense both right and left ventricles as well as the right atrium. Electrophysiological parameters may then be manipulated via echocardiography to synchronize the ventricular and atrial contractions.

Asynchronous ventricular contraction, due to conduction delay, may worsen left ventricular dysfunction. Patients with heart failure are also at risk for sudden death due to life-threatening ventricular tachyarrhythmias or bradyarrhythmias (Exner, Klein, & Prystowsky, 2001). For this reason, biventricular pacing technology and cardiac resynchronization

therapy are being studied in combination with an implantable cardioverter defibrillator (ICD) platform (see Table 1) (Bristow et al., 2000; Pavia & Wilkoff, 2001; Saxon et al., 1999). In fact, the COMPANION trial, which compared the efficacy of optimal medical therapy versus a resynchronization pacemaker versus a resynchronization defibrillator, was recently terminated early when a significant reduction in the risk of death or hospitalization for heart failure was observed with resynchronization therapy versus best medical therapy (Huston, 2002).

Nurses should be aware of this promising therapy for symptomatic improvement in certain patients with moderate to severe heart failure, and the perioperative care and complications associated with this therapy. A review of current literature was completed using online search criteria from 1985 to present. Medline and CINAHL search engines were used as well as reference citations from published articles based on the original literature searches. Only English articles or translated articles were accessed.

Case Study

DJ is a 64-year-old woman with congestive heart failure secondary to dilated cardiomyopathy, severe left ventricular systolic dysfunction (LVEF 18%), and a left bundle branch
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Table 1				
Completed and ongoing trials in heart failure and resynchronization therapy				
Trial	Sponsor	Number of Participants/Summary of Inclusion Criteria	Design	Results
Resynchronization Only				
InSync <i>Multisite pacing as a supplemental treatment of congestive heart failure: the Medtronic Inc. InSync Study</i>	Medtronic, Inc.	n = 103 NYHA II/IV QRS \geq 150 ms LVEF \leq 35%	Canadian & European Prospective, non-randomized observational	Clinical benefit from pacing group matched or exceeded those in drug groups encouraging further randomized trials
MUSTIC <i>Multisite Stimulation in Cardiomyopathies Trial</i>	Medtronic, Inc. & ELA Medical, Inc.	n = 58 MUSTIC SR n = 43 MUSTIC AF NYHA III SR group QRS \geq 150 ms and in normal SR AF group QRS \geq 180 ms AF with slow ventricular response LVEF \leq 35%	European randomized (single-blinded) crossover. Three month BiV or no pacing crossover at six months to preferred pacing mode. First randomized, controlled trial of CRT using transvenous approach	<i>MUSTIC SR group:</i> improved six-minute walk test by 22%, NYHA class by (mean) 1, QOL, peak VO ₂ and decreased hospital admissions in pacing group. <i>MUSTIC AF group:</i> Improved exercise tolerance but less significant than the SR group
MIRACLE <i>Multicenter InSync Randomized Clinical Evaluation Trial</i>	Medtronic, Inc.	n = 524 NYHA III/IV QRS \geq 130 ms LVEF \leq 35%	North American randomized (double-blind) to BiV pacing or no pacing for six months. First prospective, randomized, double-blind, parallel-controlled trial	Clinical improvement in BiV pacing group with NYHA class by (mean) 1, QOL, QRS, peak VO ₂ , and reduced plasma norepinephrine
CARE-HF <i>Cardiac Resynchronization in Heart Failure</i>	Medtronic, Inc.	n = 800 NYHA III-IV LVEF \leq 35% QRS \geq 150 or if 120 ms to 150 ms then two out of three echocardiographic criteria must be met	European randomized to either pharmacological therapy or BiV & pharmacological therapy. To study the effect of CRT on survival and hospitalization	Ongoing (enrollment complete)
PATH-CHF <i>Pacing Therapy for Congestive Heart Failure Trial</i>	Guidant, Inc.	n = 42 NYHA III-IV QRS \geq 120ms PR \geq 150ms	European randomized crossover	LV pacing superior to biventricular, both superior to RV pacing. Non-significant trend toward benefit
VIGOR-CHF <i>Guidant, Inc. Model 1240 pulse generator</i>	Guidant, Inc.	NYHA II-IV QRS \geq 120ms PR \geq 160ms Sinus Rhythm \geq 55 bpm LVEF \leq 30%	Randomized to receive BiV pacing or no pacing then both receive BiV six months following	Improvement in Myocardial Performance Index (reduction in ratio of isovolumetric contraction and relaxation time relative to ejection time) with BiV pacing

Table 1, continued...		Number of Participants/Summary of Inclusion Criteria		
Trial	Sponsor	Design	Results	
PACMAN <i>Pacing For Cardiomyopathy, A European Study</i>	Guidant, Inc.	n = 328 NYHA class III QRS \geq 150ms LVEF \leq 35% Dilated Cardiomyopathy	European randomized to six months on & off BiV pacing. Designed to study functional capacity and hospitalization	Ongoing
Re-Le-Vent <i>Remodelling of Cardiac Cavities by Long-Term Ventricular-Based Stimulation</i>	St Jude Medical, Inc	n = 500 QRS \geq 140ms & LBBB LVEF \leq 35%	European randomized to pharmacological therapy, BiV or LV pace	Ongoing
InSync III <i>InSync III Cardiac Resynchronization System Trial</i>	Medtronic, Inc.	n = 250 NYHA class III-IV LVEF \leq 35% Stable HF regimen No indication for pacing or defibrillation	Prospective, multicentre, nonrandomized trial. Sequential BiV pacing will be effective if at least 50% patients demonstrate acute improvement in hemodynamics.	Ongoing (enrollment complete)
VecToR <i>Ventricular Resynchronization Therapy Randomized Trial</i>	St Jude Medical, Inc.	n = 420 NYHA class II-IV QRS \geq 140 ms LVEF \leq 35%	World-wide randomized to pharmacological therapy or BiV pacing	Ongoing (enrolling)
PATH-CHF II <i>Pacing Therapies in Chronic Heart Failure II Trial</i>	Guidant, Inc.	n = 89 NYHA class \geq II Two Groups: QRS \geq 150 ms & QRS \leq 150 ms LVEF \leq 30%	Randomized crossover of BiV or LV pacing	CRT by LV pacing significantly improved maximal and submaximal exercise capacity, QOL, and NYHA for heart failure patients
PAVE <i>Multicenter Cardiac Resynchronization Therapy Post AV Node Ablation Evaluation</i>	St. Jude Medical, Inc.	n = 328 Chronic AF treated with AV Node Ablation NYHA class II-III	Designed to evaluate if an increase in exercise capacity can be realized using a BiV stimulation device versus a conventional RV single-chamber pacemaker in patients following an AV nodal ablation procedure for rate control of chronic AF.	Ongoing (enrollment complete)
Resynchronization and ICD Therapy				
MIRACLE-ICD <i>Multicenter InSync Randomized Clinical Evaluation Implantable Cardioverter Defibrillator</i>	Medtronic, Inc.	n = 369 NYHA III-IV QRS \geq 130 ms LVEF \leq 35% Indication for ICD	North American prospective, randomized, double-blind, parallel-controlled (similar to MIRACLE except for ICD indication)	Completed 2002 HF patients with ICD indication benefit as much from CRT as those without ICD indication.

Table 1, continued...		Number of Participants/Summary of Inclusion Criteria	Design	Results
Trial	Sponsor			
COMPANION <i>Comparison of Medical Therapy, Pacing and Defibrillation in Heart Failure Trial</i>	Guidant, Inc.	n = 1520 (target 2200 randomized) NYHA III-IV (and at least one of the following) a. Hospitalization for HF b. O/P visit where inotropes were used c. ER visit of at least 12 hours duration QRS \geq 120ms PR \geq 150ms LVEF \leq 35% Optimal medical therapy	North American randomized, blinded, controlled trial of pharmacological therapy versus BiV pacing alone versus BiV pacing and ICD therapy. The two pacing arms will continue to receive optimal pharmacological therapy.	The study was terminated prematurely due to reports that suggest a significant reduction (20%) in primary endpoints in the combined CRT groups compared with medical therapy alone.
InSync-ICD <i>InSync ICD Cardiac Resynchronization System</i>	Medtronic, Inc.	n = 84 NYHA III-IV QRS \geq 120ms PR \geq 150ms LVEF \leq 35% Indication for ICD	Multicentre randomized (blinded). This system allows sequential BiV pacing.	Improvements in QOL, NYHA class, six-minute walk distance, and QRS duration at one, three, and six months when compared to baseline status.
BELIEVE <i>Bi versus Left Ventricular Pacing: An Italian Evaluation on HF Patients with Ventricular Arrhythmias</i>	Medtronic, Inc.	N = 74 LVEF \leq 35% QRS \geq 130 ms Stable medical regimen Indication for ICD	Italian randomized to BiV versus LV pacing	Ongoing (started May 2000)
RHYTHM <i>Resynchronization Hemodynamic Treatment for Heart Failure Management ICD trial</i>	St. Jude Medical, Inc.	n = unknown LVEF \leq 35 % NYHA III/IV QRS $>$ 150ms Optimal medical therapy Indication for ICD	Double-blinded, Evaluating the efficacy of St. Jude Medical Epic™ HF Implantable ICD	Ongoing (Enrollment started June 2003)
VENTAK-CHF <i>Guidant, Inc. Model 1822 pulse generator</i>	Guidant, Inc.	n = 54 NYHA II-IV on contemporary therapy QRS \geq 120ms LVEF \leq 35% Normal sinus node An indication for ICD (including criteria used in MADIT trial)	Randomized crossover of ICD alone or ICD and BiV pacing. Implantation required thoracotomy.	Improved QOL, NYHA, VO ₂ , six-minute walk (in BiV group) and reduction in need for defibrillation with BiV pacing
CONTAK-CD <i>Guidant, Inc. Model 1241 Contak CD</i>	Guidant, Inc.	n = 581 NYHA II-IV on contemporary therapy QRS \geq 120 ms LVEF \leq 35% Normal sinus node An indication for ICD (including criteria used in MADIT trial)	Randomized, double-blind. North America crossover of ICD or ICD and BiV pacing. This study evolved from Ventak CHF, however implantation was transvenous.	In Press Improved QOL, NYHA, VO ₂ , six-minute walk, LVEF
<p>Note: BiV = Biventricular; ICD = Implantable Cardioverter Defibrillator; NYHA = New York Heart Association Functional class; LVEF = Left Ventricular Eject Fraction; LVEDD = Left Ventricular End Diastolic Diameter; CRT = Cardiac Resynchronization Therapy; QOL = Quality of Life; RV = Right Ventricle; LV = Left Ventricle; AF = Atrial Fibrillation; SR = Sinus Rhythm; VO₂ = Peak oxygen uptake; O/P = Outpatient. "Cardiac Resynchronization Therapy: A Review of Clinical Trials and Criteria for Identifying the Appropriate Patient," by W.T. Abraham, 2003, <i>Reviews in Cardiovascular Medicine</i>, 4(Suppl. 2), p. S31.</p>				

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block (QRS width 180 ms). She had persistent marked functional impairment (NYHA functional class IV symptoms) despite therapy with an ACE inhibitor, beta-blocker, digoxin, spironolactone, nitrates, a loop diuretic and weekly intravenous milrinone. She underwent implantation of an AV sequential biventricular device for cardiac resynchronization therapy six months ago. Since insertion of her device, she has noted a significant improvement in her functional status (NYHA functional class II), has not required any additional intravenous milrinone treatments and has had a decrease in her hospital admissions for congestive heart failure. Her ECG tracings before and after insertion of the biventricular device are shown in Figure 1.

Discussion

Optimal medical therapy with angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARB), beta blockers, diuretics, digoxin, and spironolactone leads to improvements in functional status in many, but not all patients with heart failure (Canadian Hypertension Society, 2002; Thackray et al.,

2001; Wong, Kocovic, & Loh, 2001). Despite the use of optimal medical therapy, many patients have continued problems with shortness of breath, fatigue and poor self-perceived quality of life (Peters & Gold, 2000).

Dysynchronous ventricular contraction

Normally, the right and left ventricles simultaneously depolarize. Due to mechanical or other factors related to remodelling, dysynchrony may occur. The dysynchrony between electrical activation of the ventricles is represented on the electrocardiogram (ECG) as a prolonged QRS interval ≥ 120 ms, generally in the form of a left bundle branch block (LBBB). During dysynchronous ventricular contraction, the septum is displaced to the right, causing impaired left ventricular contraction (McAtee & Gawlinski, 2002). Patients with heart failure and LBBB have significantly higher mortality rates and higher rates of atrial fibrillation compared to other patients without bundle branch block (Werling et al., 2002). The presence of LBBB is also associated with decreased diastolic filling times, which is often explained more simply as AV asynchrony (Grines et al., 1989). As diastolic filling time

becomes reduced, so does preload volume and LV ejection fraction (LVEF). According to Wong et al., a direct linear correlation between the width of the QRS and duration of mitral regurgitation has also been observed. In other words, the longer the QRS width is, the shorter the LV filling time, and the longer the mitral regurgitation and the greater the impairment in LV contractility. With more simultaneous ventricular contraction or a reduction in QRS width, abnormal ventricular wall motion and mitral regurgitation are reduced, thus cardiac function may improve.

Cardiac resynchronization therapy

A biventricular pacemaker or ICD may be implanted to treat heart failure patients with low LVEF ($\leq 35\%$) and prolonged intraventricular conduction (QRS > 130 ms). Cardiac resynchronization therapy may prove to be important at three levels of cardiac physiology: Atrioventricular, interventricular and intraventricular synchrony.

Atrioventricular (AV) synchrony occurs when LV filling coincides with complete mitral valve closure. An attempt is made with resynchronization therapy to adjust AV delay using echocardiographic optimization. Diastolic filling time is prolonged in order to increase LV end diastolic volume (LVEDV) and subsequently LV end diastolic pressure (LVEDP). According to Pavia and Wilkoff (2001), along with increased LVEDV and

Figure 1

Twelve lead ECG before and after biventricular pacemaker insertion



stroke volume, diastolic mitral regurgitation is reduced, if not eliminated. Conventional dual chamber pacing (right atrium & right ventricle) has proven to be useful in patients with prolonged AV conduction represented by PR interval > 200 ms (Legge & Leeper, 2002).

According to Gaita et al. (2000), the sequelae of electromechanical interventricular conduction delay include LV isovolumetric contraction and relaxation time prolongation, mitral regurgitation worsening, and shortening of LV filling time with consequently diminished stroke volume and cardiac output. The onset of the QRS complex to the onset of aortic ejection flow is termed the LV pre-ejection interval (Pavia and Wilkoff, 2001), thus this interval will concomitantly be prolonged with QRS lengthening. Biventricular pacing addresses this delay by reduction in QRS interval with subsequent decrease in the LV pre-ejection interval (Legge & Leeper, 2002; Pavia & Wilkoff, 2001; Wong et al., 2001).

Intraventricular asynchrony is when both systole and diastole overlap. This causes ventricular contraction to occur during part of the ventricular filling phase – isovolumetric relaxation is eliminated. A large part of ventricular filling occurs soon after the AV valves open (Tortora & Grabowski, 1993). Contraction would extend beyond completion of aortic ejection, which would be deleterious to cardiac output (Pavia & Wilkoff, 2001). The mitral and tricuspid insufficiency produced by intraventricular asynchrony causes regurgitation of blood from the ventricles to the atria, as well as atria contracting against closed AV valves. Biventricular pacing may minimize asynchrony by early capture of the LV (see Table 2) (Abraham et al., 2002; Cazeau et al., 2001; Cohen & Klein, 2002; Legge & Leeper, 2002; McAtee & Gawlinski, 2002; Pavia & Wilkoff, 2001; Wong et al., 2001).

Inconsistent observations have been noted from various studies regarding dual chamber pacing as a therapeutic modality for patients with cardiomyopathy. This may be due to the fact that DDD pacing from a single site in the right ventricle apex further delays LV activation and further enhances ventricular dysynchrony; therefore resembling a LBBB (Legge & Leeper, 2002; Saxon et al., 1999; Wong et al., 2001). As opposed to pacing only the right ventricle, biventricular pacing produces longer LV filling times. Clinical trials are still ongoing, but early data is encouraging (see Table 1). The Multisite Stimulation in Cardiomyopathy (MUSTIC) trial, which is the first randomized trial to be published on cardiac resynchronization therapy, observed that although the procedure was technically complex, “atrioventricular pacing significantly improves exercise tolerance and quality of life in patients with chronic heart failure and intraventricular conduction delay” (Cazeau et al., 2001, p 873). The patients in the MUSTIC trial had severe heart failure (New York Heart Association [NYHA]

functional class III) due to chronic left ventricular systolic dysfunction, with normal sinus rhythm and a QRS interval > 150 ms (see Table 3).

Most of the research consistently reveals that there is about a 20% to 25% no response rate, meaning that this therapy is not suited for all patients. Patient selection is thus very important. Current selection criteria use a QRS duration of ≥ 150 ms to detect mechanical dysynchrony. Leon (2003) suggests that over-riding comorbidities may attenuate the response to CRT especially because exclusion criteria for CRT trials omitted patients with significant comorbidities. Most patients studied were considered to have NYHA class III heart failure, with approximately 10% having NYHA class IV symptoms. Therefore, patients with NYHA class III or stable class IV symptoms should be considered. A patient with refractory unstable severe heart failure is at increased risk of implant-related complications and may not have the same benefit from CRT (Leon, 2003). Optimal pharmacological therapy and LVEF $\leq 35\%$ are also implantation criteria. In soon-to-be-published guidelines by the American College of Cardiology, American Heart Association and the North American Society of Pacing and Electrophysiology (Gregoratos et al., in press), biventricular pacing is listed as class IIa for medically refractory idiopathic dilated or ischemic cardiomyopathy.

Multicenter InSync Randomized Clinical Evaluation (MIRACLE) trial, which was the first prospective, randomized, double-blind, parallel-controlled trial designed to validate the results of previous studies and to further evaluate CRT, found that patients randomized to CRT, compared to the control group, demonstrated significant improvement in quality-of-life score ($P = .001$), six-minute walk distance (+39 versus +10 metres; $P = .005$), NYHA functional class (-1 versus 0 class; $P < .001$),

Table 2

Mechanisms of cardiac resynchronization therapy

Improved Contraction Pattern

- Improved interventricular synchrony
- Reduced paradoxical septal wall motion
- Improved LV regional wall motion
- Lowered end-systolic volumes
- Improved LV dP/dt

Improved AV Timing

- Reduced mitral regurgitation
- Increased diastolic filling time
- Improved LV dP/dt

Note: LV dP/dt = measurement of LV contractility. Prolonged QRS is associated with reduced dP/dt.

treadmill exercise time (+81 versus +19 seconds; $P = .001$), peak oxygen consumption (VO_2) (+1.1 versus +0.2 mL/kg/min; $P < .01$); and LVEF (+4.6% versus -0.2%; $P < .001$). Patients randomized to CRT were more likely to improve and much less likely to have worsened, or to have remained unchanged. Also notable was that patients receiving CRT required fewer hospitalizations (8% versus 15%) or intravenous therapy (7% versus 15%) for the treatment of heart failure (both $P < .05$). The MIRACLE study was not designed to evaluate the effect of CRT on all-cause mortality alone; thus mortality data was collected primarily as a safety endpoint (Abraham, 2003; Abraham et al., 2002).

The Pacing Therapy for Congestive Heart Failure (Path CHF) trial found that LV pacing was superior to biventricular pacing and that both were superior to RV pacing alone (Stellbrink et al., 2001).

The recently completed Pacing Therapy for Congestive Heart Failure II (Path CHF II) trial had several objectives. These were to evaluate and compare the action of pacing therapy in CHF patients with univentricular and multisite pacing, to evaluate the chronic benefit of acutely optimized univentricular pacing in CHF patients with and without indication for ICD, and to separately evaluate the benefit for patients with short QRS (120-150 ms) and long QRS (≥ 150 ms). The trial found that pacing therapy had a significant effect on all endpoints for patients in the long QRS group, as opposed to patients in the short QRS group, which did not reach significance. The primary limitation to this study was the small sample size and the relatively short crossover period between pacing treatments (Auricchio, 2002; Butter et al., 2001).

The VIGOR trial was designed to assess functional and symptomatic improvement in heart failure patients with biventricular pacing and without a concomitant indication for conventional bradycardia pacemaker therapy. Patients were randomized to receive either biventricular pacing or no pacing for the first six weeks to assess for potential placebo effects. Following six weeks, both groups received pacing therapy. With this system, the left ventricular epicardial lead was

implanted using a left anterior thoracotomy (Saxon et al., 1999). VIGOR found an improvement in Myocardial Performance Index (reduction in ratio of isovolumetric contraction and relaxation time relative to ejection time) with biventricular pacing compared to no pacing.

Cardiac Resynchronization in Heart Failure (CARE-HF) trial has currently completed enrollment. This is a European trial where patients are randomized to receive either pharmacological therapy alone or biventricular pacing and pharmacological therapy. The intention is to study the effect of CRT on survival and hospitalization. According to Cleland et al. (2001), the CARE-HF trial is using imaging modalities to detect cardiac dyssynchrony in an effort to increase the specificity of response to CRT.

Another interesting study is the Multicenter Cardiac Resynchronization Therapy Post AV Node Ablation Evaluation (PAVE) trial. This trial is designed to determine if an increased exercise capacity, quality of life, and heart function can be realized using biventricular pacing versus a conventional RV single-chamber pacemaker in patients following total AV nodal ablation procedure for rate control of chronic atrial fibrillation. Enrollment of 328 patients has been completed (St. Jude Medical, 2003).

Small non-randomized trials have found similar results in terms of improved quality of life, exercise tolerance, NYHA class and peak VO_2 (Garrigue et al., 2002; Lunati et al., 2002).

Implantable cardioverter defibrillator

According to Teresa et al. (2000), 30% to 50% of all patients with heart failure will die of a sudden cardiac event, and at least 30% of these will be ventricular tachyarrhythmia. In response to sudden cardiac death, biventricular ICDs have emerged as a viable treatment option (see Table 1). Pavia & Wilkoff (2001) suggest that biventricular pacing in itself be considered a mechanism to decrease mortality, with the added benefit to be able to treat bradyarrhythmia. Biventricular pacing has been proven to decrease the use of ICD therapies, leading to the hypothesis that biventricular pacing may not only improve symptoms of heart failure, but also have an

Table 3

Example of QRS duration and morphology

	Intrinsic	RV paced	LV paced	Biventricular paced
QRS Duration	180 ms (0.18 sec)	200 ms (0.20 sec)	160 ms (0.16 sec)	157 ms (0.157 sec)
QRS Morphology	Usually LBBB pattern	LBBB pattern	RBBB pattern	RBBB pattern or no BBB pattern ^a

Note: LBBB = Left bundle branch block; RBBB = Right bundle branch block. ^awhen QRS < 120 ms.

effect on sudden cardiac death (Higgins et al., 2000). A recent study (Werling et al., 2002) found that out of 360 patients provided with an ICD, 10% had indications for biventricular pacemaker at time of implant. Most patients requiring ICD have structural heart disease, which usually leads to chronic heart failure. In patients with an indication for both ICD and biventricular pacing, implantation of a biventricular ICD may not only prevent sudden cardiac death, but may also reduce the symptoms associated with heart failure.

As previously cited, the Comparison of Medical Therapy, Pacing and Defibrillation in Heart Failure (COMPANION) trial was a multicentre, prospective, randomized, controlled clinical trial designed to compare pharmacological therapy alone with pharmacological therapy in combination with CRT with or without an ICD in patients with dilated cardiomyopathy, NYHA functional class III or IV, intraventricular conduction delay and no indication for device. The COMPANION trial was terminated prematurely following randomization of 1,500 patients (Abraham, 2003; Huston, 2002). Preliminary data suggest a significant reduction in the primary endpoint in the combined CRT groups. A reduction in overall mortality and hospitalization with the CRT and ICD group was 19.3 %, and 18.6% (both $P < .05$) for the CRT group alone. There was a 39.5% and 35.8% (both $P < .05$) reduction in mortality and heart failure hospitalization for the CRT and ICD and CRT alone groups respectively. In terms of mortality compared to the control group, there was a 43.4% and 23.9% risk reduction (both $P < .05$) for both CRT and ICD and CRT alone groups respectively (see Figure 2) (Bristow et al., 2003).

The Multicenter InSync Randomized Clinical Evaluation Implantable Cardioverter Defibrillator (MIRACLE - ICD) trial was designed similarly to the MIRACLE trial, with the primary additional prerequisite that eligible patients require an ICD. At six months, patients assigned to active resynchronization had a greater improvement in quality-of-life score ($P = .02$) and NYHA class (-1 versus 0 class, $P = .007$) than control groups. Peak oxygen consumption increased ($P = .04$) and treadmill exercise duration increased by 56 seconds in the CRT group and decreased in the control group by 11 seconds ($P = .0006$). No differences were noted in mortality or rates of hospitalization, although the trend supported CRT.

The results were similar to the MIRACLE trial, suggesting that patients with indication for ICD benefit from CRT just as much as patients without ICD indications (Abraham, 2003; Abraham et al., 2002).

An early randomized trial, the VENTAK CHF trial, used an ICD designed to provide chronic biventricular pacing therapy in addition to treating ventricular tachyarrhythmias. All patients received conventional ICD and CHF therapy throughout the study and were randomized in a two-period crossover design to receive either no pacing or biventricular pacing for three months. Implantation was similar to the VIGOR CHF trial requiring a left anterior thoracotomy. The trial found improvements in all endpoints in the biventricular pacing group. An unexpected finding was the reduction in need for defibrillation therapy with biventricular pacing (Higgins et al., 2000; Lozano et al, 2000).

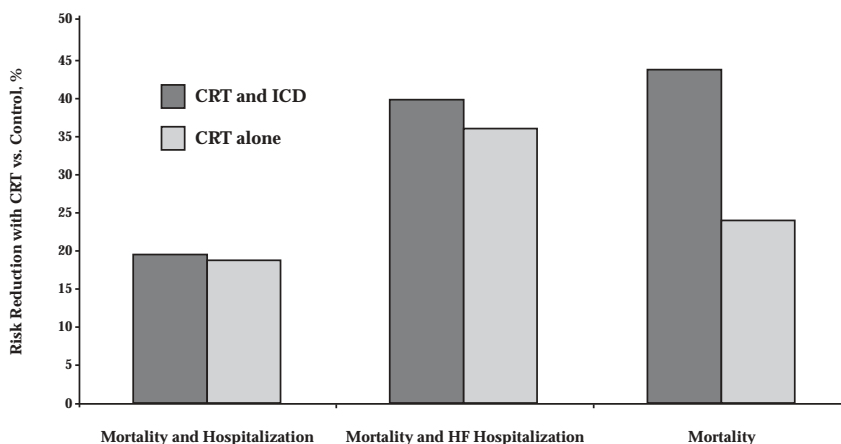
The Bi-versus Left Ventricular Pacing: An Italian Evaluation on HF Patients with Ventricular Arrhythmias (BELIEVE) trial is currently ongoing. Patients are randomized to receive either biventricular pacing or LV pacing alone. Seventy-four patients with indications for ICD are to be enrolled (Medtronic, Inc, 2003).

Another ongoing trial is the Resynchronization Hemodynamic Treatment for Heart Failure Management ICD (RHYTHM) clinical study. This study is designed to test the safety and efficacy of the St. Jude Inc. Epic™ HF implantable ICD in patients who have indications for ICD and severe heart failure (St Jude Medical, Inc, 2003).

Figure 2

Effect of CRT on Mortality and Morbidity

Comparison of CRT alone and CRT with ICD risk reduction on all-cause mortality, hospitalization, and hospitalization due to heart failure based on preliminary COMPANION Trial results (Bristow, et al., 2003). HF=heart failure; CRT=cardiac resynchronization therapy; ICD=implantable cardioverter defibrillator



Nursing implications

After biventricular pacemaker implantation, nurses participate with the patient in their recovery by monitoring the surgical site for signs of infection, hematoma formation, and wound dehiscence; monitoring the ECG to assess rhythm and biventricular capture; and providing family and patient teaching.

In order to prevent hematoma formation post-operatively, the patient's arm on the operative side should be restricted from movement. This will also assist in preventing lead displacement. Pulling, pushing, and lifting anything heavier than five pounds after the first two weeks should be discouraged (McAtee & Gawlinski, 2002). The head of the bed may be raised 20 to 30 degrees to prevent swelling at the site (Legge & Leeper, 2002). The patient should wash daily with soap and water to prevent pacer site and pocket infection. The patient should be instructed to contact a physician should bleeding, sudden swelling, or severe pain occur at the pacemaker site. Analgesia should be given to provide comfort post-operatively.

Continuous ECG monitoring must be utilized to observe pacemaker capture. Trauma to the conduction pathways during lead placement can result in third-degree heart block or right bundle branch block. Only one ventricular pacemaker spike will be seen, as energy is delivered concurrently to both ventricles (Legge & Leeper, 2002; McAtee & Gawlinski, 2002). The best lead to monitor is V1, as this lead provides more data regarding bundle branch block than lead II, which is a more commonly-used lead. Loss of capture of either right or left ventricular lead will be evident by a change in QRS morphology and interval (see Table 3). According to McAtee & Gawlinski (2002), the left lead is more likely to lose capture. Typically, right ventricular capture resembles LBBB and left ventricular capture resembles RBBB. For example, if a patient were to lose left ventricular capture, the QRS morphology would resemble LBBB, as only the right ventricle would be paced. With biventricular capture, usually the QRS is much shorter when the therapy is on (see Figure 1). It is important to watch for other complications, such as signs of cardiac tamponade from perforation of the coronary

sinus and asphyxia or dyspnea due to phrenic nerve damage or pneumothorax. All patients should receive a chest x-ray prior to discharge (Corona, 2002; Leon, 2003).

Patient and family teaching and education are important in preventing post-operative complications and assisting the patient in transition to living with a pacemaker. Many of the same teaching objectives used for permanent pacemakers may be applied for biventricular pacemakers, including the need to keep away from strong magnetic fields which may interfere with pacemaker function. Magnetic resonance imaging cannot be performed on a patient with a biventricular pacemaker. Normal household appliances will not interfere with the pacemaker. Patients will need to have follow-up assessments of their pacemakers, usually at six-month intervals, or more frequently as required.

Conclusion

Biventricular pacemakers, biventricular ICDs, and cardiac resynchronization therapy present patients who have increased risk of morbidity and mortality from heart failure with an opportunity to have a higher quality of life and potentially decreased mortality from pump failure or sudden cardiac death. This therapy is used as an adjunct to pharmacological and non-pharmacological therapy for heart failure. Ongoing trials are studying unanswered questions including the long-term morbidity and mortality in relation to biventricular devices, the role of this therapy in atrial fibrillation, and they are attempting to clearly identify clinical indications for the use of CRT. Given the recent termination of the COMPANION trial, due to a significant reduction in death or hospitalization for heart failure with resynchronization devices, these devices are likely to play an increasingly important role in the management of patients with heart failure. Nurses will need to be aware of the new changes in heart failure therapy in order to apply current knowledge to their clinical environment as these changes unfold. ♥

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Evaluating Treatment-Seeking for Acute Myocardial Infarction in Women

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A telephone survey of 349 randomly-selected women living in Greater Vancouver was conducted to assess their understanding of acute myocardial infarction (AMI). The results revealed that women have not yet personalized AMI risk information. Participants indicated a need for more information pertaining to symptom recognition for AMI; they were largely unaware that females may experience AMI differently than do males. Participants were less aware of the risks that diabetes, obesity and menopause pose for AMI. Approximately 36% of these women intended to delay treatment-seeking in the

presence of suspicious AMI symptoms. One-third or fewer participants would call for an ambulance for the most serious AMI symptoms. Alongside a recent poll result indicating that a large majority of Canadians believe immediate emergency care for chest discomfort and chest pain is unnecessary, these findings are an alert to health care professionals that much work lies ahead in educating the public regarding treatment-seeking for AMI.

Key words: help-seeking behaviour, myocardial infarction, women's health, surveys

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Background

The Heart and Stroke Foundation of Canada has been clear that research for the purpose of better understanding women and heart disease is not only a worthy undertaking, but also deserving of targeted financial support. "Further studies on medical issues concerning Canadian women's heart health need to be conducted in order to have reliable data for clinical decision-making and public health recommendations" (Heart and Stroke Foundation of Canada, 1997, p. 16). Treatment delay is a critical aspect of acute myocardial infarction (AMI) mortality and morbidity. A lifetime of chronic, low-level functioning in survivors could potentially be avoided, or at least reduced in severity, if treatment is delivered promptly when AMI occurs. It is important for health professionals, health educators and others to consider how to best reduce treatment delay time. Education and public awareness aimed at improving symptom recognition are vital aspects of meeting the challenge of optimizing time to treatment and reducing treatment delay for AMI.

There is published evidence to suggest that women are more likely to experience AMI symptoms characterized as "atypical" or different from men's (Canto et al., 2000; Chiamvimonvat & Sternberg, 1998; Douglas & Ginsburg, 1996; Hochman et al., 1999; Mosca et al., 1997; Penque et al., 1998). Because of this, it is considered important to educate women about AMI symptoms and their similarity with symptoms of other chronic illnesses (Meischke et al., 1999). It will be difficult, if not

impossible, to dispel the myths surrounding women and heart disease without a better understanding of the information needs and knowledge deficits of women. This study was designed to help health care professionals and policy-makers concerned with health promotion make better decisions about what and how to best deliver health information to women in an effort to reduce the potentially devastating effects of AMI.

Methods

The theoretical framework guiding this study is based on the Health Belief Model (HBM) (Strecher & Rosenstock, 1997). Generally, the theory asserts that persons are more likely to engage in behaviour intended to maintain or improve their health if they believe the following: (a) they are susceptible to the relevant health concern or condition, (b) the condition has serious consequences, (c) taking an action would be beneficial in reducing either the susceptibility or the severity of the condition, and (d) the anticipated barriers to (or costs of) taking the action are outweighed by the benefits. Without examining or testing all of the HBM components, these assertions served as central assumptions in guiding this work.

The study was undertaken for the purpose of preliminary investigation toward the long-term goal of helping reduce treatment delay for women with AMI. This telephone survey, using random digit dialling, was designed with the intent of gaining a better understanding of Greater Vancouver women's

knowledge, knowledge deficits, and their ability to recognize, as well as their likelihood of responding appropriately to, AMI symptoms.

A random sampling approach was used to conduct this telephone survey of women in the Greater Vancouver area. Being a female at least 18 years old, giving consent, along with ability to communicate in English were the only criteria for participation. A total of 1,699 randomly-selected, active, residential telephone numbers from the Greater Vancouver area were provided by ASDE Survey Sampler in Quebec. A range of response rates for the study is presented in Table 1. In total, 349 interviews were completed. The conservative completion rate was calculated to be 59.7% and the most reasonable completion rate or liberal estimate was calculated to be 62.0% depending on who is included in the denominator.

Among the research questions posed were:

1. What do women understand about their susceptibility to AMI and the general risk factors for AMI?
2. How well can women identify symptoms of AMI?
3. How likely are women to take appropriate action in the event AMI symptoms occur?
4. To what extent must women be certain of their condition before taking action to seek assistance for symptoms of AMI (i.e., what is their intention to delay)?

Ethical approval to conduct this study was obtained from the Behavioural Research Ethics Board of the University of British Columbia. Verbal telephone consent was used. The participants were informed that their participation was voluntary and that they had the right to withdraw their participation at any time. Participants were assured that their identity would be protected and that at no time would specific names or telephone numbers be noted or associated with any particular survey response.

Measurement

The likelihood of responding appropriately to AMI symptoms index (LRS), developed expressly for this survey, provides estimates of how likely women are to respond appropriately to AMI symptoms. The LRS is a summed score of 10 survey items. Participants were asked what their most likely response would be to hypothetical scenarios pertaining to AMI symptoms. For example, one survey item

read, “If you started feeling extremely weak and tired and could not do your usual activities, would you: wait to see what happened, phone to make an appointment with your family doctor, visit your family doctor immediately, go to the hospital emergency room, or would you call an ambulance?” Each subsequent item contained an AMI symptom such as nausea, heartburn, jaw pain, back pain, and upper abdominal pain. With each item, the symptom became progressively more ‘typical’, serious and potentially life-threatening. The ninth item of this 10-item index asked participants how they would most likely respond if they had unexplained chest pain lasting longer than 10 minutes. The last item asked participants how they would respond if two or more of the previously-mentioned symptoms happened at once. Participants were scored four for the “call an ambulance” response, three for “go to the hospital emergency room”, two for “visit your family doctor”, one for “phone to make an appointment with your family doctor”, and 0 for “wait to see what happened”. Responses other than the four that were offered were noted but received a score of 0. Summated scores ranged from a possible 0 to 40 for the LRS index.

We wanted to better understand the extent to which women must be *certain* of their condition before taking action to seek assistance for possible AMI symptoms. The variable used to measure this was a single item asking participants the extent to which they agreed or disagreed with the statement: “Before going to an emergency room to be examined for a heart attack, you would want to be sure you were really having a heart attack”. The variable, intention to delay (ITD), was adapted from the work of Meischke et al. (2000).

Two nursing research experts and a clinical nurse specialist in cardiac care carefully examined the

Table 1

Final disposition of telephone numbers (N = 1,699)

Final Disposition	Number	Percentage of all Sample Numbers
a. Number not in service	228	13.4
b. Fax or data line	88	5.2
c. Business phone	64	3.8
d. No eligible woman in the home	233	13.7
e. Unable to contact after 6 or more attempts	177	10.4
f. Unable to contact after 5 or fewer attempts	216	12.7
g. Language barrier	108	6.4
h. Unable to speak to an adult	3	0.2
i. Refusal by male household respondent ¹	19	1.1
j. Refusal by eligible respondent	214	12.6
k. Completed interview	349	20.5

¹Could not determine if eligible woman was in household.

questionnaire. The questionnaire was judged to provide adequate means to explore the research questions.

Results

The average age of the study participants was 47.0 years (95% CI: 45.1 - 48.9) ($SD = 18.2$, range 18 to 91 years). Most of the participants (61.3%; 95% CI: 56.2% - 66.4%) were partnered, either married or in commonlaw relationships. Over one-half (59.9%; 95% CI: 53.8% - 64.2%) were employed and earning an income either inside or outside the home. As expected, the sample was ethnically diverse. Of the sample, 100 (28.7%; 95% CI: 24.0% - 33.4%) reported being "Canadians". Although approximately one-third (30.9%; 95% CI: 26.0% - 35.7%) or 108 of the participants were classified as immigrants because they had originated from a country other than Canada, nearly three-quarters (71.2%; 95% CI: 66.4% - 76.0%) of the participants reported their main ethnic background as being other than Canadian. The majority of the sample was high school educated with only 34 (9.7%; 95% CI: 6.6% - 12.8%) indicating that they had less than a high school education.

Knowledge of women's risk of AMI

Among the key variables were items used to assess what women understand regarding women's risk for heart attack, along with a question pertaining to their personal heart attack risk. Most of the participants (85.7%; 95% CI: 82.0% - 89.4%) either strongly disagreed or disagreed with the statement that women are less likely to have heart attacks than men. When participants were asked what they thought their likelihood was of having a heart attack during their lifetime, 83 (23.8%; 95% CI: 19.3% - 28.3%) reported it to be "not at all likely", 192 (55.0%; 95% CI: 49.8% - 60.2%) considered the likelihood as "possible", 42 (12.0%; 95% CI: 8.6% - 15.4%) indicated that they thought it was "likely", and 29 (8.3%; 95% CI: 5.4% - 11.2%) indicated that they thought the possibility was "very likely".

Questions related to the major heart attack risk factors were included. When presented with the statement that "smoking has nothing to do with heart attack", only 14 (4.0%; 95% CI: 2.0% - 6.0%) of the participants indicated agreement. In response to the statement that "high levels of cholesterol in the blood have no relationship to heart attack", six participants (1.7%; 95% CI: 0.4% - 3.0%) either agreed or strongly agreed. Only one participant (0.3%; 95% CI: 0.0% - 0.9%) agreed with the statement "even if a person has high blood pressure, high blood pressure causes no real harm". The majority of participants (80.8%; 95% CI: 76.7% - 84.9%) indicated disagreement or strong disagreement with the statement "even very overweight people are healthy as long as they have no diseases". In response to the statement that "people with diabetes have the same chance of having a heart attack as everyone else", the responses were more

varied with 164 (47.0%; 95% CI: 41.8% - 52.2%) either strongly agreeing or agreeing and 157 (45.0%; 95% CI: 39.8% - 50.2%) either disagreeing or strongly disagreeing. Perhaps indicating uncertainty, 28 (8.0%; 95% CI: 5.2% - 10.8%) participants did not provide responses. In response to the statement, "just because someone in your family had a heart attack doesn't mean that you're at greater risk than anyone else", the majority of participants, 286 (81.9%; 95% CI: 77.9% - 85.9%) either disagreed or strongly disagreed. Responses were more varied for the statement that "once a woman goes through menopause she has the same chance of a heart attack as a man" with 205 (58.7%; 95% CI: 53.5% - 63.9%) either strongly agreeing or agreeing and 116 (33.2%; 95% CI: 28.3% - 38.1%) either disagreeing or strongly disagreeing. Perhaps due to uncertainty of the participants, 28 (8.0%; 95% CI: 5.2% - 10.8%) of the participants did not provide a response to this item.

AMI symptom recognition

Questions intended to help gain a better understanding of what women in general understand about heart attack symptom recognition were included. Participants were asked their level of agreement with the statement, "you feel you know all you need to know in order to recognize the symptoms of a heart attack". With this item, most women (75.6%; 95% CI: 71.1% - 80.1%) indicated a need to better recognize the symptoms of AMI. In response to the statement that, "if a woman has a heart attack, her symptoms would be just like that of a man", 198 (56.7%; 95% CI: 51.5% - 61.9%) participants either strongly agreed or agreed and 144 (41.2%; 95% CI: 36.0% - 46.4%) participants either disagreed or strongly disagreed. The participants also were asked, "What would you say are the signs and symptoms of a heart attack?" The interviewer probed, "Are there any others?" All responses were recorded. Of particular interest was the ability of participants to identify nausea and shortness of breath, which are thought to be more common AMI symptoms in women (Goldberg et al. 1998; Meischke, Larsen, & Eisenberg, 1998). The majority of participants, 208 (59.6%; 95% CI: 54.5% - 64.7%) mentioned neither nausea nor shortness of breath. More participants mentioned shortness of breath than nausea, with 108 (30.9%; 95% CI: 26.1% - 35.7%) mentioning shortness of breath and 17 (4.9%; 95% CI: 2.6% - 7.2%) mentioning nausea. Very few participants (3.2%; 95% CI: 1.4% - 5.0%) mentioned both nausea and shortness of breath.

To better understand the putative myth among the public that all heart attacks result in severe pain, participants were asked, "On a scale of one to 10 with one being very little and 10 being the worst pain you can imagine, how much pain would you expect there to be if you had a heart attack?" Responses were categorized as mild (1-3), moderate (4-6), or severe (7-

10) pain. As expected, the majority of the participants expected their AMI pain to be severe; 219 (62.8%; 95% CI: 57.7% - 67.9%) expected the pain to be seven or greater ($M = 6.7$, $Mode = 8$, $SD = 2.6$).

Action to be taken

Within the theoretical framework that was used for this work, one of the underlying beliefs is that when women are of the opinion that taking action for a heart attack may bring benefits, they are more likely to seek help when a heart attack occurs. In response to the statement, "If a person is having a heart attack, it does not really matter how quickly he or she seeks medical help", the majority of participants, 340 (97.4%; 95% CI: 95.7% - 99.1%), either disagreed or strongly disagreed. In response to the statement, "There is nothing that can be done to stop a heart attack" only 48 (13.8%; 95% CI: 10.2% - 17.4%) participants agreed.

Because four cases were excluded due to excessive missing data, descriptive statistics of the summated LRS index are reported for 345 cases. The average score was 17.2 ($SD = 7.4$; 95% CI: 16.4 - 18.0); the scores ranged from 0 to 35. Because of the potential seriousness of the symptoms presented in the last four scenarios, they have been singled out for analysis (see Table 2). Of note is that for each of the four scenarios - difficulty breathing, chest pressure, unexplained chest pain and two or more of the previously mentioned symptoms at once - participants consistently chose the option of going to the emergency room by their own means more frequently than activating emergency services and calling for an ambulance.

Intention to delay

Most participants, 220 (63.1%; 95% CI: 58.0% - 68.2%), either strongly disagreed or disagreed with the statement, "Before going to an emergency room to be examined for a heart attack you would want to be sure you were really having a heart attack" and 125 (35.8%; 95% CI: 30.8% - 40.8%) either agreed or strongly agreed. The frequency distribution for the intention to delay (ITD) variable is presented in Table 3.

Discussion

The promising news is that the myth that heart attacks affect only men appears to be eroding. These survey participants seem to have received the message that heart attacks affect both men and women. There is room for concern, however. The women in this sample have not yet personalized the risk of heart attack for

themselves. Considering that heart disease is the number one killer of both men and women in Canada, only 12% of this sample considered their risk of heart attack as "likely" and an even smaller 8.3% considered their own risk for heart attack as "very likely". Based on these results, nurses have much work ahead in getting the message out to women that heart attack is a real threat.

Table 2

Selected likelihood of responding appropriately to AMI symptoms (LRS) items

Survey Item **Frequency (%) N=349**

If you had unexplained difficulty breathing for more than 10 minutes would you:

Wait to see what happened?	26 (7.4)
Phone to make an appointment with your family doctor?	34 (9.7)
Visit your family doctor immediately?	63 (18.1)
Go to the hospital emergency room?	128 (36.7)
Call an ambulance?	93 (26.6)
Missing or unanswered	5 (1.4)

If you had a feeling of pressure in your chest for 10 minutes or more would you:

Wait to see what happened?	39 (11.2)
Phone to make an appointment with your family doctor?	35 (10.0)
Visit your family doctor immediately?	57 (16.3)
Go to the hospital emergency room?	131 (37.5)
Call an ambulance?	82 (23.5)
Missing or unanswered	5 (1.4)

If you had unexplained chest pain lasting longer than 10 minutes would you:

Wait to see what happened?	27 (7.7)
Phone to make an appointment with your family doctor?	29 (8.3)
Visit your family doctor immediately?	55 (15.8)
Go to the hospital emergency room?	139 (39.8)
Call an ambulance?	95 (27.2)
Missing or unanswered	4 (1.1)

If you had two or more of these things happen to you at the same time, such as pain in the abdomen and nausea or pressure in your chest and feeling of being extremely tired, would you:

Wait to see what happened?	17 (4.9)
Phone to make an appointment with your family doctor?	22 (6.3)
Visit your family doctor immediately?	40 (11.5)
Go to the hospital emergency room?	144 (41.3)
Call an ambulance?	121 (34.7)
Missing or unanswered	5 (1.4)

used to gauge how well a population might be able to recognize and respond appropriately to heart attack symptoms. With this study, the LRS appears to be providing important information.

Doing anything other than dialling 9-1-1 for an ambulance when a heart attack is occurring results in delayed treatment time. The four selected items of the LRS represent symptoms that health professionals will recognize as being in need of urgent attention. In every case (unexplained difficulty breathing, chest pressure, chest pain and two or more of these three symptoms occurring together for longer than 10 minutes), participants were unlikely to be inclined to call for an ambulance. For every symptom, over one-third of the participants seemed to recognize the need for urgent attention. The problem is that in every case, except when presented with two or more symptoms, about one-quarter of participants would be inclined to call for an ambulance. In the case of two or more symptoms occurring concurrently, only 34.7% indicated that they would call for an ambulance. These findings give us reason to believe that treatment-seeking delay is problematic. This finding deserves attention, particularly in light of a recent poll reported by the Heart and Stroke Foundation of Canada (2003). This newest report reveals that 82% of Canadians believe that it is not necessary to seek immediate emergency care for chest discomfort or pain.

Recommendations

The women in this population are in need of information related to cardiac risk factors and AMI symptom recognition. As is often the case, nurses are well-positioned within the health care system to provide timely information to persons at risk. Nurses can provide lifesaving information as we care for those persons who have survived AMI, but also as we come into contact with persons considered to be at risk for AMI. Nurses can help to reduce mortality due to lengthy treatment-seeking delay by at least arming the public and those with whom we have contact with information necessary to identify heart attack symptoms.

Everyone, particularly those persons at risk, needs and deserves to hear from nurses and other health care providers that doing anything other than dialling 9-1-1 for a heart attack is likely to lengthen the time involved to get the treatment needed to salvage precious heart muscle. There appears to be a myth concerning appropriate transport to hospitals for AMI symptoms. Based on this work and that of Meischke, Ho, Eisenberg, Schaeffer, and Larsen (1995), the public needs to understand that the best way to be transported to receive AMI treatment is to activate emergency medical systems by dialling 9-1-1. It is likely that valuable treatment time is lost because of public

ignorance that AMI treatment includes basic measures such as oxygen and nitroglycerin administration, as well as an expedited course through the emergency department facilitated by paramedical support. This information should be disseminated to the public, not only by public information services, but also by clinicians in contact with those persons at risk for AMI.

The findings of this study hold implications for those conducting health promotion campaigns for women in the Greater Vancouver area, but educational efforts must not be limited to large organizations. To increase the likelihood of important information reaching those who most need it, a multidimensional approach is required (Lee, 1997). While health policy must reflect the importance of encouraging prompt treatment for AMI, health care providers providing direct services for women are well-positioned to provide needed information. All women, but particularly those women with identified risk factors for AMI, need information regarding risk factor reduction, AMI symptom recognition, and the importance and value of seeking prompt treatment by activating emergency services when AMI symptoms occur. Additionally, women need to be provided with the messages that prompt treatment for AMI results in better outcomes, and that prompt treatment is best achieved by dialling 9-1-1 so that treatments such as oxygen and nitroglycerin can begin en route to the hospital.

This study is only a small step in the effort towards reducing treatment-seeking delay for persons with AMI. More research is needed to gain a better understanding of how women arrive at their decisions to seek help for heart attack symptoms. For a decision that can ultimately mean the difference between life and death or disability, very little is currently understood about the thought processes or factors that influence treatment-seeking for AMI. It is likely that the determinants of treatment-seeking are multi-factorial and complex. Cognitive knowledge, while important and, of course, one aspect that nurses can address, will be only one dimension of these personal decisions women make. It will be critical in the future to consider how it is that individual differences such as social obligations, emotional factors, personal preferences or other beliefs contribute to the treatment-seeking decisions of women as they face heart attack symptoms.

Limitations

The results of this study, although informative, should be interpreted with caution. Perhaps the most significant limitation of this study is that this was the first time the questionnaire was used. Even though two nursing research experts and a clinical nurse specialist in cardiac care carefully examined the questionnaire, every item, with the exception of the demographic

items and the ITD variable used by Meischke et al. (2000), was newly created and thus not validated. Further testing of the measures, particularly the two response variables, LRS and ITD, need further validity and reliability assessment.

Although the use of random-digit dialling strengthened the study, it must be borne in mind that only those women able and willing to communicate in English were able to participate. The findings pertaining to immigrant women, and perhaps the knowledge items, may have been different if women who spoke languages other than English had been included. Perhaps a mixed sampling approach might be appropriate in future studies to better sample those women of ethnic minority groups most common in the Greater Vancouver area.

Another consideration is that participants were asked prospectively how they would most likely respond to a number of hypothetical scenarios. We cannot be certain that the prospective 'guesses' provided by the

participants accurately predict the decisions that would be made should these scenarios actually occur.

Because this study was limited to a sample of women, concerns related to symptom identification and the likelihood of action are related to the behaviour of women. It is not to be inferred, however, that men do not have similar attitudes and knowledge gaps. The factors that influence men's likelihood of responding appropriately to AMI symptoms could not be discerned in this study. ♥

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Research

R O U N D S

Transitions in CCCN: A New National Research Chairperson

Dianne Tapp, RN, PhD, and Kathryn M. King, RN, PhD

Address for correspondence: If you have comments, questions, or suggestions about the activities of the National Research Committee, please contact Dianne Tapp at dtapp@ucalgary.ca or (403) 220-6332.

Five short years ago, after making a number of important contributions to the Canadian Council of Cardiovascular Nurses, Dr. Terry Davis (University of Alberta) entrusted the chairmanship of the national research committee to Dr. Kathryn King. The transition was planned for more than a year as Dr. Davis took the neophyte 'under her wing' and demonstrated the leadership skills as well as the processes for undertaking the work of the chair. Kathryn King undertook the leadership of CCCN's research committee in the fall of 1998. Now, in fall 2003, and as was modeled so well by Terry Davis, another transition is underway with a similar period of grooming and mentorship. Dr. Dianne Tapp will begin her term as CCCN's national research chairperson. She is poised for the challenge! Our purpose in writing this column (and doing so together) is to summarize the highlights of the work of the research committee over the last few years, and to introduce the readers to CCCN's new research chairperson.

Two of the major responsibilities of the research chair are the administration of the peer-review process for abstracts submitted for presentation at the annual scientific sessions, and the implementation of the adjudication of the small research grant for CCCN. These activities are done in collaboration with the national research committee which is comprised of provincial research chairs. The abstracts submitted for consideration for presentation either in oral or poster form have progressively increased in both number and quality over the past five years. Each abstract is blind reviewed and ranked by at least two people, including a member of the national research committee and a member of an organizing committee struck by the chair

of the province that will be hosting the upcoming annual meeting. In the event that rankings are inconsistent, the national research chair also reviews and scores the proposal to come to a final decision as to whether to accept the abstract. Similarly, the applications for the small research grant are reviewed and numerically scored by members of the national research committee based on clearly-defined guidelines to identify those projects most deserving financial support.

Under Dr. King's tenure as national research chair, the processes for both of these review functions have been systematically refined and documented. Over the past five years, the "Research Rounds" column of CJC/N has been an important forum to publicize these opportunities to members, and to ensure that these processes are transparent. This column has been a source of information, guidance and support for members who are interested in submitting abstracts, developing presentations, and publishing findings of projects and research studies. In these written contributions, Dr. King has supported and extended nursing scholarship by sharing her expertise and knowledge of these processes, and by offering countless practical tips and suggestions for the novice presenter and author. A number of these columns have been co-authored, an effort which has acknowledged and showcased others with contributions in this arena, and which is in itself a testament to Dr. King's thoughtful and willing mentorship of colleagues.

Finally, Dr. King will continue to be an advocate for cardiovascular nursing research. She has recently begun the associate directorship for the forthcoming FUTURE Program for the Training of Cardiovascular

Nurse Scientists (www.cvnursescientist.ca) and a three-year term as an institute advisory board member for the Institute of Circulatory and Respiratory Health of the Canadian Institutes of Health Research. In these roles, Dr. King will continue to have a role in shaping the future of cardiovascular nursing research in Canada.

Dr. Tapp is an accomplished researcher (currently holding grants with the Social Science and Humanities Research Council and the Alberta Heritage Foundation for Medical Research). These research projects are using hermeneutic qualitative methods to explore family nursing practices in hospital cardiac medical-surgical settings, and family and societal influences on weight management. She is committed to practice-based research, and currently holds an appointment as researcher-in-residence with the heart health portfolio of the Calgary Health Region, where she is promoting and supporting the development of nursing research

initiatives. Dr. Tapp will bring new and vibrant leadership to CCCN's Research Committee – a group of highly committed and hard working provincial research chairs that includes the following people:

Donna Best (Newfoundland)
Judy Cotton (Prince Edward Island)
Brendalynn Ens (Saskatchewan)
Debbie Oldford (Nova Scotia)
Jennifer Price (Ontario)
Nicole Parent (Quebec)
Cathy Roberts (British Columbia and Yukon)
Gayle Urquhart (Alberta, NWT and Nunavut)
Judy Wood (New Brunswick)

The legacy of support and mentorship afforded to Kathryn King will continue as Dianne Tapp takes on this role. Both Drs. King and Tapp are associate professors in the Faculty of Nursing at the University of Calgary. They are committed to making the transition a smooth one. ♥

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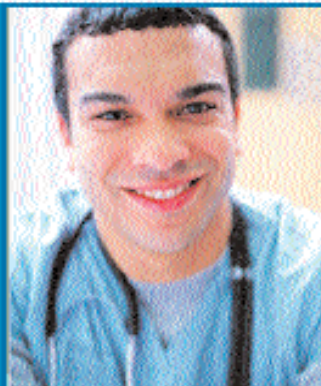


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