A PILOT TRIAL OF A COACHING INTERVENTION
DESIGNED TO INCREASE WOMEN’S ATTENDANCE AT
CARDIAC REHABILITATION INTAKE

by

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A thesis submitted in conformity with the requirements
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ABSTRACT

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Cardiovascular disease (CVD) continues to be the leading cause of death of Canadian women and while treatment for CVD has improved dramatically, women typically fare worse than men with regards to morbidity following cardiac event. Cardiac rehabilitation (CR) is well established as a key intervention in the treatment of coronary artery disease and has been shown to be effective in both men and women. CR remains largely underutilized, especially in women who comprise only 12 – 24% of contemporary CR programs, even though the prevalence of CVD in men and women is similar.

The objectives of this pilot trial were to test the feasibility of all procedures, specifically to determine: 1) an estimate of patient recruitment rates, 2) acceptability and feasibility of the intervention and 3) barriers to CR attendance and resources required. Additionally, exploratory research questions were used to determine the effects of telephone coaching on
women’s attendance at CR intake appointment, self-efficacy for cardiac exercise and self-efficacy to attend CR.

A RCT design enrolled women with CVD referred for CR at a single site in Ontario. Patients were randomized, stratified for age, to either a usual care group or an intervention group. Participants allocated to usual care received a referral to CR. In addition to usual care, women assigned to the intervention group received individualized telephone coaching, designed to support self-management prior to CR intake.

Eighty-three patients were approached and 70 consented to participate (usual care $n = 36$, intervention $n = 34$). Participants in the intervention group were significantly more likely to attend CR intake ($p = 0.048$). Participants were highly satisfied with their coaching experience; they found the information provided to be helpful with goal setting, action planning and assisted them in their interactions with their health care providers. Barriers to attendance identified included transportation, health concerns, timing and lack of physician endorsement. Most common resources identified included problem solving support, assistance with communication with physicians and information concerning CR.

The evidence obtained from this pilot trial suggests that a telephone coaching intervention designed to enhance self-management is feasible and
may improve attendance at CR intake for women following hospital discharge with a cardiac event.
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CHAPTER 1

Introduction and Problem Statement

Cardiovascular disease (CVD) is the leading cause of death in both Canada and the United States (USA), accounting for more than half a million lives each year (American Heart Association, 2004; "The Growing Burden of Heart Disease and Stroke," 2003). In 2001 CVD accounted for 75,000 deaths in Canada, approximately one out of every three deaths ("The Growing Burden of Heart Disease and Stroke," 2003). The term CVD refers to those diseases of the heart and circulatory system including: coronary artery disease, stroke, hypertension, valvular heart disease, congenital heart disease and others. Of the cardiovascular diseases, coronary artery disease (CAD) accounts for 50% of the CVD deaths in women and 62% in men (Canadian Association of Cardiac Rehabilitation, 2004; Katzmarzyk, 2004).

While CVD remains the leading cause of death in Canada, mortality rates have declined over the last thirty years among men and women. This decline is explained in part by pharmaceutical advances in thrombolytic care, advances in preventive bypass surgery and angioplasty and improvements in pre-hospital emergency care. Risk factor reduction, such as smoking cessation and lipid control, also has contributed to the decline in CVD mortality (Lonn, 2001). Despite the decline in mortality rates, the actual number of deaths due to CVD has increased. This is primarily due to Canada’s aging population and, as
women tend to live longer than men, it is expected that the number of deaths from CVD will soon be higher in women than in men (Lonn, 2001).

Although mortality figures get much of the attention, the morbidity of CVD is also of interest. In Canada 1 in 4 adults over 70 years of age report having heart problems which cause them to feel less healthy, require assistance with normal activities of daily living, and restrict activity ("The Growing Burden of Heart Disease and Stroke," 2003). The treatment costs of CVD in Canada are enormous, estimated at $18.5 billion annually. This includes $6.8 billion in direct costs such as hospital care, drug expenses and physician expenses and $11.7 billion in indirect costs such as lost productivity and premature mortality (Canadian Association of Cardiac Rehabilitation, 2004; Heritier, Gebski, & Keech, 2003; Katzmarzyk, 2004).

Despite significant advances in the detection and treatment of CVD, heart disease and stroke continue to be the number one cause of death for Canadian women ("The Growing Burden of Heart Disease and Stroke," 2003). Once women develop CVD they typically fare worse than their male counterparts (Brister & Turek, 2001; Wenger, 2004). Following a diagnosis of myocardial infarction (MI), women are more likely to have a second MI or stroke within 6 years (Wenger, 2004). They are also twice as likely as men to be disabled by heart failure (Wenger, 2004). When women undergo interventions for CVD they continue to be at increased risk. Women have a mortality rate almost double that of men following coronary artery bypass surgery (CABG) (Blankstein et al., 2005; Humphries, Gao, Pu, Lichtenstein, & Thompson, 2007). While women
have similar mortality rates compared to men following percutaneous transluminal coronary angioplasty (PTCA), they continue to have more anginal symptoms than men, which can negatively impact on quality of life and physical functioning (Wenger, 2004).

Cardiac rehabilitation (CR) has been shown to be an effective intervention for both men and women and is considered an essential component of care for all patients with CVD (American Heart Association, 1994; Stone, 2004). Both the Canadian Cardiovascular Society and the American Heart Association guidelines for the prevention and treatment of CVD in women include referral to CR programs (Arthur, 2001; Mosca et al., 2004). Several studies have demonstrated that participation in CR reduces cardiac mortality in both men and women (Hamalainen, Luurila, Kallio, & Knuts, 1995; Hedback, Perk, & Wodlin, 1993). Overall mortality is also significantly reduced in CR participants. A recent Cochrane review confirmed a 27% reduction in all-cause mortality with exercise-based CR (Jolliffe et al., 2001). CR program participants have demonstrated improvements in physical functioning and risk factor profile as well as decreased activity-related symptoms and disability. The cornerstone of CR programs is structured physical activity occurring 2-3 times weekly over 12 to 26 weeks. Activity prescriptions need to follow the American College of Sports Medicine (ACSM) guidelines and include recommendations for daily exercise. This physical activity program is designed to enhance exercise capacity which has long been shown to be an independent predictor of death in men. More recently a study has demonstrated similar results in asymptomatic
women (Gulati et al., 2003). Even in patients with proven CAD, those with an excellent exercise tolerance have an excellent prognosis (Chaitman, 1997).

Although the benefits are well substantiated, CR is still largely underutilized (Stone & Taylor, 2004), with women comprising only 12–24% of contemporary CR programs (Caulin-Glaser et al., 2001; Schuster & Waldron, 1991; Thomas et al., 1996) even though prevalence of CAD in men and women is similar (American Heart Association, 2009). Current evidence suggests that once enrolled in a CR program, women have high drop-out rates and often do not continue with healthy exercise regimes following completion of a formal CR program (Fleury, Lee, Matteson, & Belyea, 2004; Halm, Penque, Doll, & Beahrs, 1999; King & Teo, 1998; Moore, Ruland, Pashkow, & Blackburn, 1998; Oldridge, 1991). Several studies have examined barriers to women participating in CR programs. Ades, Waldmann, McCann & Weaver (1992) and Halm et al. (1999) report that physicians are less likely to refer women to CR than men. Other studies have identified commute time, denial of disease, depression and financial issues as barriers for women participating in CR (Ades, Waldmann, McCann, & Weaver, 1992; Ades, Waldmann, Polk, & Coflesky, 1992; McSweeney & Crane, 2001). As early as 1986, Wenger (1986) called for specific CR intervention strategies for women to be developed and evaluated.

However, recent studies report that female gender, in and of itself, is one of the strongest predictors of poor CR attendance (Daly et al., 2002). Despite higher eligibility rates for CR among women, fewer women than men attend CR, and of the women who do attend, adherence and dropout rates are much higher
among women compared to men (Gallagher, McKinley, & Dracup, 2003; Halm et al., 1999; Jackson, Leclerc, Erskine, & Linden, 2005). Automatic referral has been suggested as an intervention to increase attendance. Recent studies have suggested that even with an automatic referral system in place, only 50 – 70% of patients will attend the intake assessment, with fewer numbers continuing on to participate in CR (Grace, Evindar, Kung, Scholey, & Stewart, 2004a; Harkness et al., 2005).

Traditionally, strategies to address a treatment gap have been aimed at physicians and have been seldom effective. More recently, interventions are being developed which are aimed at the patient and called “self-management strategies”. McAllister et al. (2001), in a systematic review, found these self-management strategies to be effective in reducing coronary risk factors. Strategies to support and assist patients in developing the knowledge, skills and self-confidence to self-manage their chronic condition are varied. In particular, a coaching strategy has been shown effective in assisting patients attain target levels for their total cholesterol (Vale et al., 2003; Vale, Jelinek, Best, & Santamaria, 2002). Vale et al. (2003; 2002) utilized nurses and dieticians to provide coaching to empower patients by giving them the knowledge and skills to work in partnership with their physician to achieve health goals. Coaching was directed at the patient and included assessment, education, assertiveness training, goal setting and re-assessment. Allen et al. (2008) utilized a nurse e-coach intervention to provide self-management support via the internet (Allen et al., 2008). The intervention targeted self-efficacy, patient education and
motivation to improve health and was aimed at engaging and empowering patients.

Little is known about interventions that may enhance attendance at CR intake assessment. Self-management strategies, such as coaching, may empower patients, enhance self-confidence and give them the knowledge and skills to work with their health care team. Coaching by a trained health care professional (HCP) can be directly targeted at the factors influencing intake and the barriers to program intake. The coach can assess individual patients to determine which factors and/or barriers may exist and use problem solving techniques to address each specific factor or barrier. These could include general education on the benefits of CR, information on programs which may be closer to home or offer more appropriate timing of classes, and problem solving concerning the management of family commitments and personal health care. Coaching that would provide information, promote empowerment, enhance confidence and address individual barriers to CR programs, could enhance attendance at CR intake appointment. Women may derive a benefit from formal linkages to coaches following a cardiac event.

The Canadian Association of Cardiac Rehabilitation (CACR) recently released a number of key research recommendations. One of these recommendations states that research evaluating strategies to increase utilization in marginalized groups based on age and gender are required (Canadian Association of Cardiac Rehabilitation, 2004; Lowensteyn, Grace, Stone, & Arthur, 2004). Clearly, designing and evaluating interventions for
women, which promote attendance at CR intake assessments and programs, is a gap requiring investigation. However, before an adequately powered randomized controlled trial can be designed with this population, important questions must be answered in a pilot trial.

Therefore, the objectives of this pilot trial were to test the feasibility of all procedures for a definitive trial and to inform the content of the intervention, specifically to determine: (a) an estimate of patient recruitment rate, (b) the acceptability of the coaching intervention, (c) common barriers to attendance at CR intake, and (d) common resources/solutions. Exploratory research questions will help to determine the effects of the coaching intervention on attendance at CR intake appointment and self-efficacy for cardiac exercise.

Problem Statement

Cardiovascular disease continues to be the leading cause of death of Canadian women. While treatment for CVD has improved dramatically, women typically fare worse than men. A key intervention in the treatment of CVD, CR, has been shown to be effective in both men and women but remains largely underutilized, especially in women who comprise only 12 – 24% of contemporary CR programs, even though the prevalence of CAD in men and women is similar(American Heart Association, 2009). Several factors have been identified which increase CR program intake in women. These include strong physician referral, higher education and income, living in an urban community and strong social support. Barriers identified include transportation issues, co-morbidities, family commitments, timing of the program and anxiety
Existing processes, including automatic referral, do not adequately address the issue of CR utilization by female cardiac patients (Grace et al., 2004a; Harkness et al., 2005). Despite positive health outcomes in other populations, studies examining the impact of coaching to influence attendance at CR were not found. The objectives of this pilot trial are to test the feasibility of all procedures for a definitive trial and to inform the content of the coaching intervention, specifically to determine: a) an estimate of patient recruitment rate, (b) the acceptability of the coaching intervention, (c) describe common barriers to attendance at CR intake, and (d) describe common resources/solutions. Exploratory research questions will help to determine the effects of the coaching intervention on attendance at CR intake appointment and self-efficacy for cardiac exercise. It is anticipated that regular health coaching designed to support self-management, delivered by telephone, will increase the likelihood that women will attend their CR intake appointment.
CHAPTER 2

Review of the Literature

Cardiovascular disease (CVD) is a major chronic illness in Canada and is the leading cause of mortality in both men and women (Heart and Stroke Foundation of Canada, 2003). Cardiac rehabilitation (CR) programs have been shown to be effective in improving physical functioning and risk factor profile but remain largely underutilized. This chapter reviews the most common factors influencing women's utilization of CR programs. The evidence is reviewed and summarized with respect to: a) benefits of CR programs and b) access and barriers to CR utilization. Current interventions designed to improve the utilization of CR will be discussed and self-management approaches to secondary prevention will be reviewed as a basis for developing a program to enhance CR utilization. Conclusions are summarized following the review of the literature.

Literature Review

Benefits of Cardiac Rehabilitation

Programs of CR have been recognized as an essential component of the management of patients with diagnosed CVD with international clinical guidelines including referral to exercise–based CR for the prevention and treatment of (Jolliffe et al., 2001) CVD for over ten years.
(Stone, 2001; Stone & Arthur, 2005; Wenger et al., 1995). The Canadian Association of Cardiac Rehabilitation has adopted the following definition of Cardiac Rehabilitation:

the enhancement and maintenance of cardiovascular health through individualized programs designed to optimize physical, psychological, social, vocational and emotional status. This process includes the facilitation and delivery of secondary prevention through risk factor identification and modification in an effort to prevent disease progression and recurrence of cardiac events (Stone & Arthur, 2005)(p.2).

The effects of exercise-based CR have been investigated in numerous trials. In this section four meta-analyses of randomized controlled trials (RCTs) reviewing the effectiveness of CR programs with some form of exercise component are discussed. All of the meta-analyses looked at the end-points of all-cause mortality and cardiac mortality. The first two are early meta-analyses reflecting the accepted practice of the 1970’s and 1980’s and include post MI patients only (O’Connor et al., 1989; Oldridge, Guyatt, Fischer, & Rimm, 1988a). The next reviews are more recent and include both MI and revascularization patients (Jolliffe et al., 2001; Taylor et al., 2004).

Oldridge et al. (1988b) combined the results of ten randomized clinical trials which included 4347 patients. This overview included patients who had experienced an MI and were randomized to a rehabilitation program which included at least 6 weeks of exercise or to usual care. Pooled odds ratios (OR) for all-cause mortality (OR 0.76 [95% Confidence Interval (CI) 0.63, 0.92]) and
cardiovascular mortality (OR 0.75 [95% CI 0.62, 0.93]) were significantly lower in the rehabilitation group than the control group but did not demonstrate any difference for nonfatal recurrent MI. O'Connor et al. (1989) performed an overview of 22 randomized trials involving 4554 patients. Fourteen of the trials were coordinated by the World Health Organization as part of a large trial but as randomization methods differed among sites each was considered and evaluated separately. Trials all included post-MI subjects who were randomized to usual care or a cardiac rehabilitation program which incorporated a structured exercise component. Pooled odds ratios showed a significant reduction in total mortality (OR 0.8 [95% CI 0.66, 0.96]), cardiovascular mortality (OR 0.78 [95% CI 0.63, 0.96] and fatal reinfarction (OR = 0.75 [95% CI 0.59, 0.95]) in the rehabilitation group at 3 years. The limited description of the methods makes evaluation of this trial difficult. The authors did test for heterogeneity of endpoints which showed no statistically significant heterogeneity. More concerning is the difference in the interventions, with some interventions being multifactorial, and thus results of individual trials cannot be compared.

While the results of these meta-analyses were promising, with 20 – 25% reductions in cardiac mortality, they do antedate contemporary revascularization and pharmacological therapies – which may offset the benefit of CR. Both authors acknowledge the effect that time to randomization, type of intervention (exercise alone or exercise plus education), and length of follow-up may have had on their findings. In addition, these early trials almost exclusively enrolled subjects who were low-risk, white, middle-aged men who had survived an MI.
Women, the elderly, and those undergoing reperfusion procedures were almost completely excluded. Thus the study populations do not include those who may benefit the most from CR and do not reflect current practice.

Given these limitations a Cochrane Review was designed to determine the effectiveness of exercise-based interventions (Jolliffe et al., 2001). Following a systematic search the review identified and included 32 trials (n= 8440) which were then further divided based on different interventions and comparison groups. This resulted in 51 separate comparisons. Pooled data showed that exercise-only interventions (12 trials, n= 2582) reduced all cause mortality by 27% (OR 0.73 [95% CI 0.54, 0.98]), while comprehensive CR programs (29 trials, n= 5101) had a non-significant effect of 13% (OR 0.87 [95% CI 0.71, 1.05]). The effect on total cardiac mortality was larger at 31% (OR 0.69 [95% CI 0.51, 0.94]) and 26% (OR 0.74 [95% CI 0.57, 0.96]) for the exercise only and comprehensive CR group respectively when compared to usual care. Neither intervention had any significant effect on sudden death or nonfatal MI recurrence. The authors concluded that there was no clear evidence to determine whether exercise only or comprehensive CR was more beneficial.

Several limitations of this review exist. The sample was largely white, low-risk males following MI. Information concerning use of pharmacologic or revascularization interventions was not generally available and raises the issue of whether improvements in therapy account for improvement in mortality.

A more recent systematic review and meta-analysis of RCTs of exercise based CR identified 48 eligible studies, which involved a total of 8940 patients
with coronary heart disease (Taylor et al., 2004). In contrast to previous meta-analyses, women were one-fifth of the cohort; 8 of the trials recruited patients post revascularization and 8 trials recruited post MI and post revascularization patients. Trials had to include a structured exercise program which could be delivered as an inpatient, outpatient, in the community or in the home. The results of this systematic review confirmed previous reviews with exercise based CR being associated with a significant reduction in all cause mortality (OR 0.80 [95% CI 0.68, 0.93]) and total cardiac mortality (OR 0.74 [95% CI 0.61, 0.96]) when compared to usual medical care. This review shows that the mortality effects are consistent between both MI and revascularization patients as well as in a larger group of women and older patients than previously reported. The results were also consistent across a range of exercise-based delivery strategies and in more recent trials occurring in the era of improved pharmacological and revascularization therapies.

While this review is limited by the methodological quality of the trials included, the search for studies appeared exhaustive. Four hundred and twenty-five papers were identified and 397 rejected for a variety of reasons including: nonrandomized design, inappropriate patient group or intervention, inadequate follow-up, or the control group received an exercise intervention. The trials included had methodological flaws including: not providing information on methods of randomization or blinding of outcome measurements and pooling of data across studies despite the lack of homogeneity in duration of follow-up.
Despite the limitations of these 4 meta-analyses of RCTs, the results are consistent in showing that participation in CR improves mortality and morbidity outcomes. Survival benefits in recent trials continue to be of a similar magnitude despite the added benefits of increasing intensive pharmacological and revascularization therapies. Participation in CR programs works, improving functional status and decreasing mortality and morbidity.

Utilization of Cardiac Rehabilitation

While the benefits of CR are well substantiated and international clinical guidelines include referral to exercise-based CR for treatment of patients with CVD (Mosca et al., 2004; Stone & Arthur, 2005; Wenger et al., 1995), referral and attendance rates are low, and only a small proportion of eligible candidates complete a CR program. A recent study from the United States utilized Medicare claims to determine CR usage in 267,427 patients aged 65 or older following either acute myocardial infarction (AMI) or coronary artery bypass graft surgery (CABG) and found only 18.7% received at least 1 session of outpatient CR (Suaya et al., 2007). Women were less likely to receive CR than men (14.3% vs 22.1%) and patients following CABG surgery were more likely to use CR than patients with AMI (31.0% vs 13.9%). This study reflects previous literature which has documented the under use of CR programs over the last 15 years (Ades, 2001; Evenson & Fleury, 2000; Evenson, Rosamond, & Luepker, 1998; Halm et al., 1999; Lieberman, Meana, & Stewart, 1998; Wenger et al., 1995). In particular, women, the elderly, and ethnic minorities are least likely to attend a CR program. In 1999, King et al. found that only 28.4% of 1245 eligible
patients attended CR programs in a study in Western Canada. A more recent Canadian systematic clinical and economic review estimated only 10% of eligible patients participate in CR programs and called for interventions to improve utilization especially among women, the elderly, ethnic minorities and patients at high risk of a second cardiac event (Brown, Noorani, Taylor, Stone, & Skidmore, 2003).

Predictors and Barriers of Cardiac Rehabilitation Utilization

With the identification of low utilization rates of CR programs, researchers have attempted to identify factors affecting decisions to attend CR. While several themes emerged from international guidelines, systematic reviews and research articles, there is evidence that provider referral to CR is low in both men and women. Once patients receive referrals, factors influencing attendance at intake appointment for a CR program include physician recommendation, sociodemographic factors, and medical/psychological factors.

Referral

Recent reviews and guidelines have identified lack of provider referral as one of the largest predictors of non-enrollment (Cooper, Jackson, Weinman, & Horne, 2002; Jackson et al., 2005; Stone & Arthur, 2005). Studies have shown referral rates to be as low as 9% to a high of 74% with the exception of several studies reporting 100% referral as a result of an automatic referral system (Grace et al., 2004a; Grace et al., 2007; Harkness et al., 2005; Smith, Harkness, & Arthur, 2006). Jackson et al. (2005) reviewed the literature from 1990 to 2004 to identify quantitative studies testing predictors of initial referral,
participation and long term behaviour change. Ninety-eight studies were identified, with 32 meeting the inclusion criteria, of which 10 focused on referral. The articles described data from 16 804 patients (5882 women). The findings identified as having an impact on referral, participation and behaviour change were categorized as health systems, disease, psychological functioning and demographics. Positive predictors of referral to CR included physician attitude toward the effectiveness of CR, having a diagnosis of PTCA, angina, CABG or hypercholesterolemia and having co-morbid conditions. Patients without medical insurance and women were less likely to receive referrals to CR.

Cortés and Arthur (2006) more recently systematically reviewed available literature to determine factors predicting referral of patients to CR. Forty-five studies were retrieved with 10 observational studies meeting inclusion criteria resulting in a sample of 30 333 patients with CAD. Referral rates ranged from 9% to a high of 93% in the setting of automatic referral; the mean referral rate was 34%. This review was able to group the factors affecting referral into 3 domains: sociodemographic determinants, health-related determinants and health care system determinants. The authors reviewed the relative risks associated with individual factors and suggested a hierarchy with patients who spoke English or were admitted to a hospital with a CR program being the most likely to be referred to CR (RR >4). The next groups most likely to be referred were those with insurance coverage, previous participation in CR, prior MI, cardiac catheterization or aged 45 – 59 (RR 2.0 – 3.98). The lowest association with referral was for those patients with hypercholesterolemia, bypass surgery,
smoking behaviour or high blood pressure (RR 1.3 – 1.98). Recommendations from the systematic review include the use of automatic referral to reduce referral bias.

**Physician Recommendation**

This section reviews five studies which identify predictors of attendance at CR programs. The studies are grouped together here as findings from all studies indicate that patients identify physician recommendation as the most important reason for attending CR. Four of the studies were designed to elicit gender differences in referral and enrollment in CR with one focusing on the elderly. A fifth study was conducted to identify factors influencing women’s decisions concerning attendance at CR. Each of the studies looked at clinical, social and demographic information and interviewed patients to elicit predictors of attendance and barriers to attendance.

Ades et al. (1992) used interviews to collect medical and sociodemographic data from 226 (97 women) consecutive patients with MI or CABG who were candidates for the local CR program. Patients were interviewed in hospital and following initial outpatient visit with their physician. Strength of physician recommendation was the most powerful predictor of participation for the group (p < 0.001), but physicians recommended participation more strongly to older men than to older women (p < 0.05). While other factors included in the analysis differed between men and women (owning and driving a car, transportation problems, marital status, arthritis and
dependent spouse) only age was a predictor of physician recommendation score.

Lieberman et al. (1998) surveyed CABG and MI patients referred to CR to investigate sex differences in barriers and incentives to CR participation. The authors developed a questionnaire based on literature and key informants, followed by pilot testing and revision. One hundred and twenty nine patients attending CR completed the questionnaire (100% of those approached) and 61 non-attenders (82% of those called) also completed the questionnaire. No significant differences were found between men and women in the group attending CR, but in the non-attending group women were significantly more likely to be retired than men ($\chi^2 = 5.97$ (1, n = 61), p<0.01). Both men and women rated physician recommendation as the most important influence to attending CR while financial concerns were the least important. There was a gender difference in the rating of attention to health promotion and influence from adult children; women rated these factors as more influential than men. Transportation, timing of programs and concomitant illness were cited as the most important barriers to attendance by both men and women. This study was limited by the small sample size, uniform population from a highly specialized quaternary hospital, and use of a questionnaire with no established reliability and validity.

Gallagher et al. (2003) conducted a descriptive study with a convenience sample of 196 women eligible for CR programs; data were collected prior to hospital discharge and 12 weeks following discharge. The primary aim of the
study was to determine attendance at CR and to assess patient-related factors on attendance. Only 112 women reported being referred to CR; while 57 attended CR intake, 21 dropped out of CR prior to completing the program. Logistic regression analysis using 10 variables (age, education, hospital type, work, living arrangements, diagnosis, perceived control, readmission, complication and personal stressful event during follow-up) was used to determine the best predictors of attendance at CR. Five variables (age, diagnosis, employment, perceived control and stressful event) explained 27% of the variation in attendance ($Wald \chi^2 = 33.98; P = 0.0002$) with the odds of attending CR increasing almost 7 times if the woman had a CABG diagnosis. Women who had experienced a stressful event (OR 0.21, 95% CI 0.06, 0.73) or were unemployed or retired (OR 0.20, 95% CI 0.07, 0.58), were the least likely to attend CR. The effect of age was nonlinear such that women aged 55 to 70 years had the highest odds of attending CR (OR 1.72, 95% CI 1.10, 2.70).

Further data were collected by telephone interview 12 weeks following discharge and revealed that most patients identified physician recommendation, followed by other health professional recommendation, as the reason for CR attendance. The most common reasons for non-attendance were transportation issues, feeling too sick or tired, felt unnecessary as doing well, multiple roles, and lack of motivation. This study is limited by self-report of attendance at and referral to CR programs which may be impacted by issues of recall or desire to give the socially acceptable answer.
A descriptive study by Dolansky et al. (2006) used focus groups of CR participants (n=28) and individual interviews of non-participants (n=12) to elicit expectations of and experiences with CR programs. Patients had experienced a first coronary event within the prior 6 months and were 65 years of age or older with men and women being equally represented. Participants and non-participants were comparable in age and level of education. While the data revealed that participants were apprehensive and unclear about what CR entailed, the most frequently stated reason for attending was the strength of physician referral. One individual indicated an interest but was told he did not need to attend. These results may be limited in generalizability as the sample was not a random sample, was selected from a single site and only included individuals over age 65. In addition, selection bias may have occurred as the patients willing to participate may not have been representative of the cardiac population, especially those who did not participate in CR.

Heid and Schmelzer (2004) used a comparative descriptive design to investigate factors which influence women’s participation in CR. Data were collected through chart review and patient interviews. Patient charts were randomly selected from a computer generated list of all patients admitted with a cardiovascular diagnosis. Patient records were reviewed with respect to sex, diagnosis, whether they had been referred to CR, and if they had enrolled in CR. The sample included 84 women and 118 men and there was no significant difference in referral rates between the sexes (women = 41.7%, men = 44.1% $\chi^2 = 0.115, df = 1, p = 0.734$). Once patients were referred to CR men were
significantly more likely to attend than women (62.9% vs 37.1% \( \chi^2 = 8.756, \) df = 1, \( p = 0.003 \)). Interviews were conducted with 30 women (n = 20 who attended CR and n = 10 non-attenders) to elicit factors which influenced participation in CR. Content analysis revealed four major themes: 1) desire to improve their health, 2) social factors, 3) misconceptions concerning CR, and 4) timing issues. Within the theme social factors, 9 women chose to attend CR because either their physician or nurse had recommended CR. Findings of this study include recommendations for telephoning women following discharge to clarify misconceptions about CR and reinforce the benefits of rehabilitation. There is no information concerning how women were chosen to be interviewed and this may be a limitation of the study. The study occurred at a single site in Texas and this may limit the generalizability of the findings.

In summary, physician recommendation has consistently been found to be the most powerful predictor of CR participation. Two studies found recommendations from nurses and other HCP to be important for encouraging attendance at CR and one study found that women also valued the opinion of their adult children. While these studies are limited by study design, including sample selection and retrospective data collection, the consistency of the results raises confidence in the findings.

*Sociodemographic Factors*

Older age has consistently been reported as an important predictor of CR participation (Ades, Waldmann, McCann, et al., 1992; Evenson et al., 1998; King, Humen, & Teo, 1999; Thomas et al., 1996). While most studies report
that patients aged 70 years and older have a lower probability of electing to attend CR (Ades, Waldmann, McCann, et al., 1992; Ades, Waldmann, Polk, et al., 1992; Bittner, Sanderson, Breland, & Green, 1999; King et al., 1999; Thomas et al., 1996) Gallagher et al. (2003) did find that women less than 55 years of age were less likely to attend CR than those between 55 and 70 years.

Transportation and location of CR present practical problems which impact intake to and uptake of CR. Several studies have found that patients living in the city or in close proximity to a CR program are more likely to enroll compared with rural dwellers. King et al. (1999) conducted a retrospective review of consecutive health records to examine the influence of cardiac patients' demographic characteristics on attendance at CR. The investigators reviewed 1245 patient charts finding that 354 patients attended CR. Forward stepwise logistic regression using eight variables was used to estimate the probability of attending CR. The overall model was statistically significant ($\chi^2 = 1.58.28$, df = 8, $p < 0.001$). The ability to speak English (OR 9.56, CI 2.18, 41.93), city living (OR 3.97, CI 2.97, 5.31) and current smoking (OR 1.51, CI 1.09, 2.08) were associated with increased likelihood of attendance at CR. Variables associated with a decreased likelihood of attending CR included history of neurological or cognitive impairment (OR 0.26, CI 0.12, 0.57), current admission for PTCA (OR 0.32, CI 0.20, 0.49), being 70 years of age or older (OR .42, CI 0.30, 0.59), and having a history of chronic pulmonary disease or asthma (OR 0.53, CI 0.31, 0.92).
Brady et al. (2005) used a prospective cohort design to examine the effects of preoperative exercise tolerance, functional status, and exercise behaviour on CR enrollment following CABG surgery. Seventy-eight patients and were recruited 1 – 2 weeks prior to surgery and participated in initial interviews at recruitment and again 10 – 12 weeks following surgery. Sixty-seven patients were referred to CR and 36 chose to participate. There were no significant between group differences noted for the primary variables. There was however, a significant difference between urban and rural living participants ($\chi^2 = 4.59, p = 0.032$) and education levels ($\chi^2 = 3.8, p = 0.05$) with those with a post-secondary education being more likely to enroll in CR. Patients who did not attend CR were also asked for reasons for non-enrollment with common reasons including unmotivated, accessibility and healthcare team recommendation.

Johnson, Weinert and Richardson (1998) identified predisposing, enabling and need factors which explained attendance at CR programs. Their research was set in a rural context and participants were adults hospitalized for acute MI, CABG or PCI. A total of 254 participants completed all 3 sets of questionnaires (immediately after discharge, two weeks following discharge and at the expected end of 12 week CR program) for a 54% return rate. Well documented scales and single questions were used to collect data. Of the 254 participants only 72 participated in at least 1 CR session with only 43 attending all 36 sessions. The most common reasons for non-attendance were distance, lack of insurance, lack of importance of the program and feeling too ill. Using
the data from the 72 patients who attended CR, the significant predisposing variables emerged as locus of control, social support, employment status, and health beliefs. There was only one enabling factor, economic adequacy, and two need factors, functional ability and emotional health which emerged as statistically significant. These seven factors accounted for 28% of the variance in number of CR sessions attended. A logistic regression was used as a second analysis strategy; the dependant variable was attendance at any CR session. Age, social support, intention to attend and degree of rurality emerged as significant and correctly categorized 77% of the participants as attenders or non-attenders. Study recommendations included providing creative alternative CR programs for rural residents to ensure CR is accessible and acceptable to rural residents.

While women are underrepresented in CR programs it is not clear if sex is a predictor of CR attendance. A recent review of the literature examined the evidence to determine patient, provider and programmatic factors which may influence a woman’s enrollment in CR (Benz Scott, Ben-Or, & Allen, 2002). Twenty-one studies were reviewed and results suggest that age, personal resources such as transportation and weak recommendations to participate in CR explain why fewer women attend CR. There are several limitations of this review including: 1) the search strategy was not outlined, 2) outcomes were not measured consistently among studies, 3) studies were primarily conducted in urban centres with MI patients, 4) most of the studies consisted of primarily
male patients and 5) there was little information about women who did not enroll in CR.

In summary, several predictors of CR enrollment have been identified including: urban location, social support, good education/socioeconomic status and age less than 70, although one study did find women younger than 55 also less likely to attend CR. While sex has not consistently been identified as an independent predictor of CR enrollment, women are more likely to be older, have lower socioeconomic status and have more co-morbidities, which are also predictors of CR enrollment.

*Interventions to Enhance Utilization*

*Automatic Referral*

Automatic referral has been suggested as a means to increase utilization of CR (Cardiac Care Network, 2002; Daly et al., 2002; Grace, Evindar, Kung, Scholey, & Stewart, 2004b; King & Teo, 1998; Stone & Arthur, 2005; Thomas, 2007) and several studies have examined uptake rates in the setting of automatic referral (Grace et al., 2004a; Grace et al., 2007; Smith et al., 2006). Grace et al. (2004a) used a retrospective chart review plus survey to examine factors associated with CR enrollment in the context of automatic referral. They identified 1501 eligible patients and randomly extracted 501 to participate. Only 384 were able to be contacted and 272 consented to participate. Of the 272 participants, 191 (73.2%) had attended a CR assessment and 69.7% reported participating in CR. A hierarchical logistic regression analysis was used to examine the proposed factors predicting CR enrollment and demonstrated that
logistic barriers (distance, cost) and denial or minimization of illness accounted for over 43\% of the variance in CR enrollment. Several limitations of this study exist including the retrospective design, sample bias and measurement issues. The sample which did not respond to the survey were less likely to enroll in CR (23.1\%) compared to participants (60.7\%) ($\chi^2 = 64.83; df = 1; p < 0.001$) and participants were more likely to be male than non-participants ($\chi^2 = 4.75; df = 1; p < 0.05$). The measurement of perceived need for CR did not include well known risk factors such as smoking, diabetes mellitus, high blood pressure or high blood cholesterol levels all of which may affect the decision to attend CR.

Using the same data Grace et al. (2004a) compared automatic referral with usual referral patterns. In their paper 215 cases of the 501 charts randomly sampled participated in CR as verified by contact with the CR program. This reflects a 42.9\% participation rate, which the authors believe is conservative as cases which could not be verified were considered as not participating in CR. When compared to the participation results in a recent government funded provincial pilot project (21.6\% participation) the authors concluded that automatic referral results in a significant improvement in participation rates.

Smith, Harkness and Arthur (2006) conducted a historic prospective study of CABG surgery patients to determine predictors of intake and uptake of CR in an automatic referral system. Consecutive health records of 3536 patients who met eligibility criteria were reviewed for evidence of CR intake and uptake as well as medical history and risk factor profile. The sample was predominantly male (79.1\%) and mean age was 64.4 ± 9.87 years. Sixty
percent (n = 2121) of the patients attended CR intake appointment with 69.1% (n = 1463) of those actually enrolling in at least one CR service. This means that 41.5% of the 3536 CABG surgery patients enrolled in some aspect of a CR program. Independent variables previously identified in the literature were included in a stepwise logistic regression. Attendance at CR intake appointment was significantly predicted by 11 of the 18 variables used ($\chi^2 = 399.513; \text{df} = 14; p < 0.0001$) explaining 65.8% of the variance. These variables include: male sex, age under 70, living with a partner, English speaking, dyslipidemia, diabetes, obesity, previous attendance at CR, living in the greater Hamilton area and explain 65.8% of the variance. Enrollment in a CR service was explained by three variables which accounted for 69.6% of the variance ($\chi^2 = 149.081; \text{df} = 3; P < 0.0001$) and included age under 70 years, living with a partner and living in the greater Hamilton area which explained almost 80% of the explained variance. Limitations of this study include the use of CABG patients only. Patients with other cardiac diagnoses may view CR differently which may affect intake and uptake rates. The study occurred at a single site which may limit generalizability to other sites or regions and the retrospective design did not account for practice changes that may have occurred during the time period sampled.

Grace et al. (2007) report the results of a more recent trial where a prospective cohort design was utilized to compare attendance at CR intake and subsequent uptake of a CR program following automatic referral versus usual care where referral to CR is at the discretion of the physician. Patients (n =
were consecutively identified in two hospitals following cardiac diagnosis, one centre utilizing automatic referral and one centre where referral was at the discretion of the attending physician. Of these patients 661 consented to participate and 483 were considered ineligible to participate. Subsequently 61 of the 661 were deemed ineligible and 506 of the 600 were retained at the 9-month follow up. Individuals were given a self-administered questionnaire in hospital and a second survey nine months later. Clinical data including disease severity and co-morbidities were collected and CR intake and uptake information was collected from CR centres for verification of attendance.

Patients did not differ between collection sites with the exception of cardiac condition as more patients from the usual care site were post PCI. Significantly more of the automatically referred participants (n = 241) as compared to the usual referral group (n = 265) reported that: 1) they were referred to CR (n=162, 67.2% vs n = 91, 34.3%) (\(\chi^2 = 111.46, p<0.001\)); 2) they attended CR intake (n= 118, 59.9% vs n = 96, 35.8%) (\(\chi^2 = 26.5\), p<0.001); and 3) they participated in a CR program (n= 109, 55.3% vs n = 90, 34%) (\(\chi^2 = 21.04\), p<0.001). Self-reports were verified by contacting CR centres and results were highly concordant: patients in the automatic referral group were significantly more likely to attend intake appointment and enroll in a CR program.

Limitations of this study include the aspect of self-report which is mitigated by the verification of results, the sample between sites differed with respect to cardiac diagnosis, the sample was younger and predominantly male and results
from the usual care site are much higher than typically reported, especially in
the PCI population which was predominant.

While the findings of these four studies indicate that automatic referral
results in both significantly higher intake and uptake of CR programs than
previously reported, automatic referral alone does not ensure 100% attendance
at CR intake. Several limitations of the studies exist including the retrospective
design used by three of the studies. In an attempt to further improve attendance
at CR intake appointment researchers have begun to explore other interventions
designed to enhance attendance at CR.

Other Interventions

Six trials have examined interventions designed to improve attendance at
CR. Jolly et al. (1999) conducted a RCT designed to assess the effectiveness
of a nurse led intervention intended to improve coordination of care and patient
follow up with respect to cardiac risk factors. The trial randomized 67 general
practices to intervention (n = 33 practices) or control (n = 34 practices) and
identified 723 patients with either a newly diagnosed MI or recent (less than 3
months) diagnosis of angina. The intervention was led by cardiac nurse
specialists who provided information and support for the practice nurses,
encouraged the patients to see their practice nurse and provided patients with
two documents: 1) a patient held record designed to prompt follow-up at
standard intervals and 2) clinical guidelines to deliver to their physician. While
not a primary outcome of this trial, attendance at CR was collected and more
patients in the intervention group did attend at least 1 CR session compared to
the control group (difference 18%, 95% CI 10, 26, p<0.001).

In a RCT (n = 249), Arthur et al. (2000) proposed an intervention of
exercise, education and reinforcement and monthly calls from a nurse during
the waiting period for CABG surgery as a means to improve pre and post
operative outcomes. While the primary outcome was post-operative length of
stay, attendance at CR following surgery was a secondary outcome. Patients
who received the multidimensional intervention spent 1 day less (95% CI, 0.0 to
1.0 day, p = 0.002) in the hospital than controls and were more likely to
participate in postoperative CR (70% vs 57%) than controls.

Wyer et al. (2001) conducted an RCT to test an intervention based on the
Theory of Planned Behaviour (Fishbein & Ajzen, 1975), randomizing 100
patients who had been admitted for AMI and referred for CR. All patients
received a sealed letter thanking them for participation in the study and a visit
from the CR nurse for routine assessment and invitation to CR. In the sealed
envelope the experimental group also received an intervention letter designed to
influence acceptance of and attendance at CR. A second intervention letter was
sent to those patients in the experimental group who had agreed to participate
in CR 3 weeks post MI. Patients in the experimental group who declined CR
were sent a letter wishing them well and letting them know the invitation to CR
was still open. Patients in the experimental group were significantly more likely
to accept the invitation to attend CR than those in the control group ($\chi^2 =
3.097, df = 1, p<0.039$) and significantly more likely to attend CR than those in
the control group ($\chi^2 = 7.91$, df = 1, $p<0.0025$), with 37 of the 43 patients in the experimental group attending compared to 26 of the 44 control patients. This study is limited by the small sample size, and generalizability is limited by the single site of data collection. The intervention is also open to alternative interpretations as letters may be seen as “fear” messages. However, results are promising and suggest that the enhancement of motivation may increase participation in CR.

A small non-randomized trial examined whether a simple post-discharge message would improve CR participation following CABG (Pasquali, Alexander, Lytle, Coombs, & Peterson, 2001). One hundred consecutive patients from a single site were identified and contacted by telephone 6 to 12 weeks following bypass. A medical student provided information concerning the health benefits of CR. Follow up phone calls were made 4 to 7 weeks after initial contact and patients were asked if they had enrolled in a CR program. Response rate was 100%. The enrollment rate in CR prior to intervention was 31% and following the intervention CR enrollment increased to 56% ($p<0.0001$); the effect appeared to be stronger in the group > 70 years of age, where enrollment increased from 25% to 56% ($p<0.001$) compared to those <70 years who improved from 34% to 56% ($p<0.001$). The authors concluded that many patients do not know the health benefits of CR or how to access programs and their intervention of a simple phone call may help to improve CR uptake. This trial is limited by its small sample size and the single site of data collection.
Methodologically the design lacks the rigour of a RCT, as there was no control group. These patients may have attended CR without the intervention.

Grace et al. (2005) utilized a prospective design with a convenience sample of 80 female patients admitted for PCI. The intervention consisted of a brochure designed to educate patients about CR and the benefits of CR as well as to motivate patients to discuss CR with their HCP. Forty patients were recruited to a control group and given a Heart and Stroke Foundation (HSF) brochure concerning women and CVD. The next 40 patients (intervention group) recruited received the interventional brochure and a brief motivational interview encouraging participants to think about goals for recovery. Follow up consisted of a telephone survey 8 weeks after PCI collecting sociodemographic information and data concerning patient-provider communication about CR and CR referral. The authors reported significantly more patients in the intervention group discussed CR with their HCP compared to the control group (43.8% vs 16.7% \( \chi^2 = 5.99 \text{ df} = 1 \) \( p = 0.01 \)); the intervention group was more likely to initiate the discussion (80% vs 20%, \( \chi^2 = 5.23 \text{ df} = 1 \) \( p = 0.02 \)). While the authors indicated that the intervention group trended to be more likely referred to CR there was no information concerning attendance at CR intake appointment or uptake of a CR program. This study is limited by the design which did not randomize patients and did not collect data concerning CR intake and uptake making it difficult to determine how successful the intervention was.

A retrospective cohort design was utilized by Harkness et al. (2005) to determine the effectiveness of a nurse initiated telephone call on attendance at
CR intake appointment. The design called for a review of consecutive health records of patients who had been discharged following CABG surgery over a period of four years, where a change in practice resulting in the intervention occurred after the second year. The intervention, a telephone call from a nurse clinician was designed to optimize nursing support in the post-operative period and specifically involved assessment of health status, review of cardiac risk factors, and encouragement to attend CR by provision of knowledge and problem solving concerning perceived barriers. The sample included 3536 patients with 1251 (35.4%) in the group which received a nurse initiated telephone call. The two groups were fairly similar being predominantly male, living with a partner and English speaking with small but significant differences between the groups with the intervention group being more likely to be non-English speaking, have hypertension, hyperlipidemia, smoking history, obesity and preoperative CR. The nursing phone call significantly impacted patients’ attendance at CR intake appointment; 78.1% of patients in the intervention group attended intake compared to 50.1% in the control group (p<0.001). Independent variables were forced into a regression equation with the nurse intervention as the final variable. The intervention was the strongest independent predictor explaining 56.9% of the unique variance (OR 3.429; 95%CI = 2.919, 4.028; p<0.0001). These results are promising but limited in generalizability due to the sample being CABG surgery patients only. Methodologically, retrospective studies have potential limitations as practice may change over time thus impacting on study results.
A systematic review by Beswick et al. (2005) posed the following question “How can recruitment to cardiac rehabilitation be improved (uptake)?”. Data collection included a computer search of 12 databases, hand searching conference abstracts and newsletters, reviewing reference lists and consulting with experts. The titles and abstracts were examined against the following criteria: trials had to evaluate an intervention to increase uptake, patients required a diagnosis of MI, CABG, PTCA, heart failure, angina or coronary heart disease and outcomes measured needed to include numbers of patients attending CR programs. Only eight studies met the inclusion criteria and two were excluded for methodological reasons. Analysis was a qualitative overview and several themes emerged with the authors concluding that there was some benefit to motivational and self-management strategies as well as the use of lay volunteers in the uptake of CR.

In summary, six studies show an improvement in both intake and uptake of CR with a variety of interventions. The majority of interventions were patient focused with only one study intervening at the level of the HCP. Two studies (Harkness et al., 2005; Pasquali, Alexander, Lytle, et al., 2001) using HCP to initiate a telephone call providing information and problem solving techniques realized good results as attendance at intake appointments increased. Limitations of the studies include use of retrospective designs and limited generalizability of the sample. In none of these studies did CR enrollment exceed 86% suggesting that other interventions should be researched. The most successful interventions were those where a nurse or other HCP initiated a
Telephone call to the patient and the next section will review the use of telephone interventions in general.

**Telephone Interventions**

Telephone interventions are flexible, private and have the potential for wide population use. These interventions can decrease the time and cost of clinic visits and may be less threatening for the patient (Neubeck et al., 2009). The telephone remains one of the most widely used communication tools in all age groups and this is unlikely to change in the foreseeable future.

Interventions delivered by telephone have the potential to increase access to those with physical, psychosocial, social or geographic limitations. Telephone delivered interventions for health behaviours such as smoking cessation, cancer screening and lifestyle behaviours have been used and evaluated for the last decade with varied results (McBride & Rimer, 1999).

McBride and Rimer (1999) provided a descriptive overview of 74 trials of telephone interventions published between 1987 and 1999 to identify gaps in knowledge and propose future recommendations. Findings of the review were grouped into three themes: 1) Broadening the reach, 2) Behaviour change and 3) Health Service Delivery. The majority of the participants in the trials were identified as higher educated white women except when major efforts are made to reach other groups. Proactive interventions were found to be effective in overcoming barriers to cancer screening and in short term smoking cessation, other interventions had inconclusive results. Telephone interventions were found to be as effective as face to face interventions in encouraging patient
adherence however content, timing and amount of intervention is unknown.

This review is descriptive rather than evaluative as formal meta-analysis was not possible due to the wide range of behaviours and health service outcomes investigated by the studies and the heterogeneity of the interventions.

Eakin et al. (2007) systematically reviewed the literature on interventions for physical activity and dietary behaviour change in which a telephone was the primary method of intervention delivery. Following a structured search of computer data bases and reference lists 26 studies were identified. Sixteen studies evaluated interventions to promote physical activity, six studies had dietary interventions and the remaining four targeted both diet and activity. The study populations were almost equally split with 14 studies targeting healthy adults and 12 participants with chronic conditions. Overall, 20 studies reported positive changes in dietary behaviours and physical activity with a moderate average effect size across the studies (0.60; range 0.24 – 1.19). Positive outcomes were reported in 11 of the 16 (69%) of the physical activity studies, 83% of dietary behaviour studies and 75% of studies addressing both behaviours. All interventions were delivered by HCP or research staff and those interventions lasting 6 to 12 months with 12 or more calls had the most favourable outcomes. While overall results are promising limitations of this review include: differences among recruitment procedures between studies, with some studies using random selection and others recruiting a highly selected clinical sample, wide differences in number of calls and duration of intervention and differences in additional interventions, with some studies using
printed materials or face to face counseling in addition to the telephone intervention.

Neubeck et al. (2009) designed a systematic review with meta-analysis to determine the effectiveness of telehealth interventions in CAD management. Telehealth intervention was defined as having more than 50% of provider contact being delivered via telephone, internet or videoconferencing. Multiple databases, reference lists and bibliographies were searched and 11 unique RCT’s (3145 patients) were identified. The majority of participants were men (74%), with a mean age of 61 years and were enrolled following myocardial infarction. Nine trials delivered the intervention primarily by telephone. Two trials used the Internet and included only 135 participants. All interventions were delivered by HCP and varied considerably in length of contact with each participant, ranging from 40 minutes to nine hours. Meta-analysis showed a non-significant reduction in all-cause mortality in the telehealth intervention group (RR=0.70, 95% CI=0.45-1.1, p= 0.12). Significantly favourable changes were seen in total cholesterol values and smoking habits with the telehealth participants compared to usual care. Levels of physical activity, quality of life and cost were difficult to quantify due to disparate methodologies but favourable effects were noted. While these results are promising limitations of this synthesis include: lack of blinding of group allocation during outcome measurements, patients who elect to participate in an RCT may not be representative, participants were generally middle-aged men, exclusion of
patients with severe comorbidities and wide differences in number and length of the interventions.

Redfern, Briffa, Ellis and Freedman (2008) designed a single blind RCT to determine whether a patient-centered modular approach (Redfern, Ellis, Briffa, & Freedman, 2006), compared with usual care, would improve the coronary risk profile of those patients who chose not to attend CR. The main outcome measures were total cholesterol, systolic blood pressure, smoking status and physical activity. Patients were recruited following diagnosis of acute coronary syndrome and randomly allocated to usual care (n=72) or a patient-centered intervention (n=72). In addition, 64 patients who were about to start a CR program were also recruited. The intervention consisted of a one-hour initial consultation and approximately four 10-minute calls over three months. The intervention was designed to engage participants in decisions and give choice concerning behaviour change. All patients in the intervention group participated in a module for lowering cholesterol level. Other modules offered were blood pressure lowering, smoking cessation, and physical activity. Participants chose an additional module and then selected a strategy for lowering a give risk factor. Strategies included: physician directed, structured existing programs, home programs or self-help. Participants were asked to set goals and develop formal action plans. Written information was also provided to the participants in the intervention group and they were encouraged to communicate goals and plans with their physicians. Overall, most participants in the study were men in their 60’s who were not working. At baseline there were no significant differences in
risk factors between the control and intervention group, however the group who chose to attend CR had lower total cholesterol and LDL cholesterol compared to the control and intervention group. At three months the intervention group had significant improvements in total cholesterol, LDL cholesterol, body mass index and physical activity compared to baseline. The control group showed an improvement in physical activity compared to baseline, however their systolic blood pressure had increased significantly over the three months. At three months the intervention group had similar values in almost all risk factors when compared to the CR group. Limitations of this study include the reporting of short-term outcomes only and the heterogeneity of the sample.

The authors went on to examine this study cohort at one year (Redfern, Briffa, Ellis, & Freedman, 2009) and four years (Neubeck, Freedman, Briffa, Bauman, & Redfern, 2011) following the patient-centered modular intervention. The levels achieved by the intervention group at three months were maintained at one year and at four years following intervention. At one year the intervention group had significantly lower LDL cholesterol and systolic blood pressure as compared to controls. The intervention group also had significantly higher score for physical activity when compared to controls. At four years, the intervention group continued to have significantly lower blood pressure and higher physical activity scores as compared to the control group. Thus the intervention group had sustained risk factor benefit following a three-month intervention delivered primarily by telephone. The control group did have improvements in risk factor status from one year to four years. Possible explanations from the authors
include increasing awareness by physicians of risk factor targets and the letters sent to physicians at one year may have prompted treatment in the control group.

These reviews and recent research suggest that telephone interventions have promising results and advocate for further research concerning telephone interventions and behavior change in chronic disease.

Summary of the Literature Review

Cardiac rehabilitation is an important intervention in the management of women with CVD and the Canadian guidelines for prevention and treatment of CVD in women include referral to CR programs (Stone, 2004). Exercise-based CR programs have proven effective in improving functional capacity and reducing mortality and morbidity (Jolliffe et al., 2000; O'Connor et al., 1989; Oldridge et al., 1988a; Taylor et al., 2004). Despite these findings, CR programs are underutilized with a recent Canadian review estimating only 20 - 30% of eligible patients participate in CR programs (Dafoe, Arthur, Stokes, Morrin, & Beaton, 2006; Swabey, Suskin, Arthur, & Ross, 2004; Witt et al., 2004).

Research has identified several factors associated with low attendance at CR programs. Provider referral rates range from 9% to a high of 74% with women consistently referred in lower numbers than their male counterparts (Grace et al., 2004a; Grace et al., 2007; Harkness et al., 2005; Smith et al., 2006). Predictors of referral include physician attitudes, diagnosis and clinical characteristics, patient age, functional status, language, rural location and co-
morbidity. While fewer women are referred to CR, using sex alone as a predictor of referral would be incomplete (Gallagher et al., 2003). Women are more likely to be older, have more co-morbidities and lower functional status thus reducing referral.

Physician recommendation is the most powerful predictor of patient participation for both male and female patients (Ades, Huang, & Weaver, 1992; Gallagher et al., 2003; Heid & Schmelzer, 2004; Lieberman et al., 1998). Three studies found that women rated the opinion of other HCP, including nurses, and adult children right after physician recommendation as important influences in the decision to attend CR (Gallagher et al., 2003; Heid & Schmelzer, 2004; Lieberman et al., 1998).

While age younger than 70 years has generally been found to be a predictor of CR attendance, one study did find that women younger than 55 years were less likely to attend than those 55 to 69 (Gallagher et al., 2003). Living in a rural setting is associated with lower attendance and relates to transportation difficulties and even availability of a CR program (Johnson et al., 1998; King et al., 1999). Women are also more likely than men to report concomitant illness as a barrier to CR (Ades, Waldmann, McCann, et al., 1992; Gallagher et al., 2003; Heid & Schmelzer, 2004; Lieberman et al., 1998).

Automatic referral has been proposed as a means to increase CR utilization and does indeed increase attendance at intake appointment when compared to usual care (Grace et al., 2004a, 2004b; Grace et al., 2007; Smith et al., 2006). As rates remain below 70% there is room for improvement and
other interventions have been suggested to increase attendance. Telephone interventions in general have shown promising results in the area of behaviour change (Eakin et al., 2007; McBride & Rimer, 1999) and in particular the use of telephone contact by a HCP has proven promising in two studies improving attendance by 25 to 28% (absolute difference) (Harkness et al., 2005; Pasquali, Alexander, Lytle, et al., 2001). The calls served to educate patients on the benefits of CR and remind patients of intake appointments. Two other studies used motivational interventions in the form of letters or brochures and interviews. Both were successful, however Grace et al. (2005) failed to verify if patients actually attended CR and Wyeth’s intervention based on the Theory of Reasoned Action had less effect on female patients compared to male patients perhaps related to the wording of the letters which may have been perceived as a fear message (Wyer et al., 2001). Beswick et al. (2005) also proposed motivational and self-management strategies to promote attendance at CR.

CR programs have been recognized as an important intervention for female cardiac patients but unfortunately in Canada remain under-utilized (Canadian Association of Cardiac Rehabilitation, 2004; Stone & Taylor, 2004). Interventions designed to improve attendance at CR have not ensured 100% attendance at intake appointment and no interventions specifically designed to increase attendance by women were found. Telephone interventions from HCP have increased CR utilization and self-management support and motivational interventions have shown promise in changing other health behaviours. Therefore, given the current gap in interventions designed to enhance women’s
attendance at CR there is a clear need to design and evaluate theoretically based interventions targeted at women. Previous interventions based on self-management support and delivered by telephone have shown promise in changing health behaviours. For that reason theoretically based self-management support interventions delivered by telephone were investigated. The next chapter explores the theory underpinning self-management support.
CHAPTER 3

Theoretical Underpinnings of a Structured Coaching Intervention

The exploratory research questions of this trial were: attendance at CR intake, self-efficacy for cardiac exercise and self-efficacy to attend CR. Self-management approaches have been successful in improving patients' health status, health behaviours, self-efficacy and health service utilization (DeBusk et al., 1994; Lorig, 1993; Lorig et al., 1999; Raczynski et al., 1999).

Many of the self-management approaches described in the literature have drawn upon Social Cognitive Theory (SCT) and in particular utilize the key constructs of self-efficacy and self-regulation to develop and implement interventions designed to promote behaviour change (Bandura, 2005b; Barlow, Wright, Sheasby, Turner, & Hainsworth, 2002). SCT was developed by Albert Bandura as a framework for understanding human social behaviours and is rooted in Social Learning Theory (SLT), a psychological theory which views human behavior as shaped and controlled by the environment (Bandura, 2001). Bandura began to move away from SLT in 1977, having decided traditional principles of learning theory were not adequate for understanding learning and behaviour. He noted that people were not merely onlookers being molded by environmental events, rather they had agency, that is, they are proactive, self-reflective, self-regulatory and self-organizing (Bandura, 1989). In this agentic
perspective individuals are able to intentionally make events happen by their own actions. Bandura further broadened his theory to include observational learning, recognizing that people turn to expert models to gain knowledge and skill. He also recognized vicarious reinforcement as important to behaviour change (Bandura, 1977).

In 1986, Bandura renamed SLT as SCT (Glanz, Rimer, & Lewis, 2002). SCT builds on the agentic perspective explaining human behavior in terms of a dynamic reciprocal interaction of three determinants: behavior, personal factors (including cognitive, affective and biological events) and environment (society). This view has personal factors, environmental events and behaviour all interacting and influencing each other bidirectionally. The three interacting determinants are not necessarily of equal strength, with relative influence being variable in different circumstances (Bandura, 1986) (See Figure 1).

Figure 1 Triadic Reciprocal Causation
The most important personal factors include an individual’s ability to anticipate the outcomes of behavior, learn through observation, believe that they can perform a behavior and/or overcome the barriers to performing the behavior (self-efficacy) and the ability to self-regulate behavior, reflecting on and analyzing experiences (Bandura, 2001). To be successful in making appropriate behavioral changes individuals have to make good judgments about their abilities, anticipate the outcomes of their actions and anticipate barriers and opportunities. Bandura (1997) notes that two of these cognitive factors, self-efficacy and self-regulation, are particularly important in predicting human behavior and developing effective interventions.

**Self-Efficacy**

A key concept in SCT is the belief in personal efficacy (Bandura, 1997). In 1977, Bandura proposed efficacy as the construct central to many aspects of health and social behaviour change. Efficacy pertains to self-control and is the confidence a person feels about performing a particular activity, including the confidence in overcoming barriers to performing that activity. Efficacy beliefs are judgments about personal capabilities and partially account for the challenges individuals undertake, how long they will persevere in the face of adversity and whether or not failures are motivating or demoralizing (Bandura, 1997). Bandura thought that unless individuals believe they can actually make changes to produce results or prevent illnesses they would have little motivation to make and maintain said changes, especially in adverse conditions. Having the knowledge concerning the benefit of healthy behaviours would not be
enough to elicit behavior change; the individual must also have the belief in their personal self-efficacy to perform these healthy behaviours.

Approaches such as modeling effective strategies, positive communication, personalized messages and tailored guides concerning how to make a change in behaviour have been used to increase personal self-efficacy (Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001). Bandura (2005b) suggests that health communication should emphasize the requirement for perseverance in making a health behaviour change and acknowledge temporary set-backs to minimize undermining a person’s sense of efficacy.

**Self-Regulation**

Within SCT is the understanding that individuals have certain capabilities that define what it is to be human, including the ability to self-regulate their behavior. Individuals self-regulate their health behaviours and actions based on: self-observation, they look at themselves and their behavior; judgment, they compare themselves to a standard or they compete with themselves; and self-evaluation of their actions and behaviours, in which they reward or punish themselves depending on how they compared to the standard (Bandura, 2005b).

Effective self-regulation of health behaviours requires certain skills. Individuals must first self-monitor health behaviour and examine conditions under which it occurs. This provides information for the second skill, which is setting realistic goals for behaviour change and evaluating progress in behaviour change. Realistic goals should include small sub-goals which when
met will bolster self-efficacy. The third component of self-regulation is incentives; people must decide what a realistic reward is for successful behaviour change (Bandura, 1991; Bandura, 2005b).

The SCT is particularly relevant to health educators as it provides context for understanding individual and organizational approaches to health care change as the constructs of self-efficacy and self-regulation provide a framework for designing tailored interventions to enhance health behaviour changes (Bandura, 1997; Glanz et al., 2002; Von Korff, Gruman, Schaefer, Curry, & Wagner, 1997). Health behaviours are not readily or easily changed. The SCT has been used and tested by health educators to develop specific interventions influencing key constructs with the aim of increasing the likelihood of behaviour change. Self-efficacy and self-regulatory skills are two constructs of SCT which have guided interventions in self-management models.

Lorig et al. (1999) evaluated the effectiveness of their Chronic Disease Self-Management Program (CDSMP) in a six-month RCT of 1140 patients with a diagnosis of heart disease, stroke, lung disease or arthritis. The CDSMP was a 7 week program (now 6 week) based on Self-Efficacy Theory and incorporates strategies to enhance self-efficacy including action planning, goal setting and modeling of behaviour. The primary classifications of outcome variables were health behaviours (measured exercise in minutes and communication with physician), health status (self-rated health) and health care utilization (hospitalizations). Control (n = 476) and treatment (n = 664) groups showed no statistically significant differences at study entry on any study
variable. As compared with controls, the treatment group demonstrated significant improvements in health behaviours, specifically changes in physical activity measured in minutes per week (mean change = ↑ 16 minutes/week vs mean change = ↓ 2 minutes/week, p = 0.0003) and improved communication with their physician (mean change 0.26 vs 0.11, p = 0.006 [scale 0 – 5, higher is better]). The treatment group had significantly fewer hospitalizations (0.8 fewer nights in the hospital, p = 0.01), and better self-rated health status (mean change -0.09 vs + 0.02, p = 0.02 [scale 0-5, lower is better]). There is no information on the clinical significance of these findings but the decrease in disability, limitations, and increase in exercise time suggest that participants were positively affected. Findings of this trial may be limited as participants self-select and may be more motivated than the average patient with a chronic condition. They were generally well educated; 29% had 16 or more years of education.

DeBusk et al. (1994) utilized an efficacy model incorporating self-regulatory principles to devise a computer-assisted case management intervention to promote healthy habits and reduce unhealthy habits. A RCT was designed to test the intervention compared to usual care. Patients (n = 585) from 5 hospitals were enlisted following MI. The intervention strategies included proximal goal-setting, strategy development and self-motivation incentives. For each risk factor participants were given detailed guidance on how to alter their habits and then set short term goals regarding the behaviour. At set intervals the computer generated individual guidelines for changes and participants
mailed in a report indicating changes in behaviour as well as their level of efficacy for the next cycle of self-directed change. The outcomes of interest in this trial included smoking prevalence, plasma low-density lipoprotein cholesterol (LDL-c) concentrations 2 months post MI and functional capacity 6 months post MI. Compared to the group receiving usual care the patients receiving the computer-assisted case management intervention demonstrated higher smoking cessation rates (70% vs 53%, p = 0.03), lower LDL-c levels (2.77 ±0.69 mmol/l vs 3.41 ± 0.90 mmol/l, p = 0.001) and higher functional capacity (9.3 ± 2.4 METS vs 8.4 ± 2.5 METS, p = 0.001) (DeBusk et al., 1994).

Luepker et al. (2000) designed a RCT to test an intervention designed to reduce patient delay in seeking hospital care for AMI symptoms. The Rapid Early Action for Coronary Treatment (REACT) trial was a 4 year study of 20 communities (10 matched pairs) in the United States. The investigators determined that SCT and Self-Regulatory Theory were the most appropriate to guide intervention development, implementation and evaluation (Raczynski et al., 1999). Self-efficacy was addressed through use of specific guidelines and scripts designed to “make it easy” as the provider approached behaviour change in small steps. The intervention was multi-component, involving public, professional, and patient education and addressed symptom recognition and the importance of acting quickly by calling 911. The primary outcomes measured were time from symptom onset to arrival at the emergency department (ED) and use of the emergency medical system (EMS). While the delay time in arriving at the ED decreased in the intervention communities there was not a significant
difference between the two groups (-4.7%/year [95% CI -8.6%, -0.6%] vs -6.8%/year [95% CI -14.5%, 1.6%] p = 0.54). The intervention group showed increased appropriate use of the EMS with a net effect of 20% (OR 1.2, 95% CI 1.07, 1.34, p < 0.005). A secondary outcome, knowledge of symptoms of MI, was collected in a series of telephone surveys. The knowledge of symptoms increased in the intervention communities while no change in knowledge was seen in the comparison communities. The intervention was deemed more effective in ethnic minorities, low income households and those with a family history of MI (Goff et al., 2004). The improvement in knowledge of symptoms did not translate into a reduction of the delay to seeking treatment. This may be attributed to the relatively short delay time to start, increased use of EMS may have slowed down the entire system or the intervention may not have been intense or long enough.

**Self-Management**

Self-management is a term used widely in the health care literature and to date no “gold standard” definition has been agreed upon (Barlow et al., 2002). The definitions of self-management are varied and range from simply participating in treatment to participating in inter-disciplinary group education. At one end of the spectrum authors believe that self-management occurs when individuals practice specific behaviours or engage in day-to-day tasks designed to control or reduce the impact of a chronic condition regardless of the degree of education or training and with no mention of collaboration with health care providers. Gruman (1998) wrote “the individual engages in activities that protect
and promote health, monitors and manages symptoms” (p.1), while Glasgow, Wilson and McCall (1985) used the term “self-management” to describe the daily behaviours that individuals use to manage their chronic conditions. Barlow et al. (2002) add the dimension of self-monitoring thus establishing a dynamic process of self-regulation.

In contrast, other authors focus on training with little regard to how training translates into behaviour. Alderson et al. (1999) refer to self-management as interdisciplinary group education based on the principles of adult education, focusing on training without linking the training to the behaviours or outcomes of managing chronic conditions. Redman (2004) describes self-management preparation as the training people with chronic conditions require to maintain everyday life, medical routines and deal with the future.

Lorig (1993) combined training and behaviours, stating that self-management is “learning and practicing skills necessary to carry on an active and emotionally satisfying life in the face of a chronic condition” (p.13) and involves working actively with health care providers to develop at home strategies which will control or reduce the impact of the disease on health status. A review by Clark et al. (1991) explicated this, describing self-management as “the day-to-day tasks an individual must undertake to control or reduce the impact of disease on physical health status” (p.5). At-home management tasks and strategies are undertaken with the collaboration and guidance of the individual’s physician and other health care providers.
The United Kingdom National Health Service (2001) has built on Lorig’s CDSMP, calling their program “The Expert Patient Approach”; using the term self management to describe formal patient education programs designed to provide individuals with the knowledge and skills necessary to manage their chronic conditions within the medical regime. The educational programs are based on developing the confidence and motivation to enable the individual to use their own skills, interacting with health services to take effective control of their chronic condition.

Self-Management Intervention

The following section will address the theoretical underpinning of the intervention that will be used in this study. As shown above, self-management has various definitions including: participating in patient education, helping patients manage their health on a day-to-day basis, helping patients practice specific skills or behaviours and having the skill to cope with illnesses without their healthcare provider. For the purposes of clarity in this trial the definition provided for The 1st Annual Crossing the Quality Chasm Summit (Adams, Greiner, Corrigan, & Institute of Medicine (U.S.). Committee on the Crossing the Quality Chasm: Next Steps Toward a New Health Care System., 2004) will be adopted:

Self-management is defined as the tasks that individuals must undertake to live well with one or more chronic conditions. These tasks include having the confidence to deal with medical management, role management, and emotional management of their conditions. (p.57)
The definition proposed by the Crossing the Quality Chasm Summit has been chosen to guide this research for the following reasons. This definition emphasizes the empowerment of the patient and the role a patient has in decision-making related to their health care. First, it envisions self-management as more than attending patient education classes and being trained in specific technical skills. Instead self-management gives patients the knowledge, skill and self-confidence to manage their disease. Ideally self-management includes the ability to interact effectively with health care providers. For this reason it provides a focus for the interactions between patients and their health care providers. Second, the focus is on the individual with chronic conditions managing their illness in collaboration with medical management, making necessary behavior changes and having the confidence to do so. Third, this definition of self-management incorporates problem-solving skills and collaborative goal-setting to manage disease and symptoms both are compatible with the theoretical tenets of Bandura’s self-efficacy theory.

Adams, Greiner and Corrigan (2004) go on to define the element of self-management support which consists of the means by which healthcare practitioners and communities support patients with chronic illnesses to develop the knowledge, skill and confidence of self-management. The 1st Annual Crossing the Quality Chasm Summit provides the following definition of self-management support:

the systematic provision of education and supportive interventions by health care staff to increase the patients’ skill and confidence in
managing their health problems, including regular assessment of progress and problems, goal setting, and problem-solving support. (p. 57)

Self-management support can occur in a variety of settings, individually or in groups. Support can be provided by health care practitioners or lay persons.

Self-management support is critical to the development of self-management and emphasizes patients' central role in managing and being responsible for their health because the locus of responsibility rests with them. In addition, self-management support involves collaborative relationships with patients and their families and goes beyond the provision of education and support. Patients and providers work together to define problems/barriers, develop priorities and set goals while the provider offers problem solving support and strategies to build confidence.

Self-management approaches have been shown to have positive impacts on the well-being of individuals with chronic illness (Barlow et al., 2002; Barlow, Turner, & Wright, 2000; Warsi, Wang, LaValley, Avorn, & Solomon, 2004). In addition, Lorig's work suggests improved health behaviour, health status and decreased health care utilization in patients participating in a CDSMP (Lorig, Lubeck, Kraines, Seleznick, & Holman, 1985; Lorig, Mazonson, & Holman, 1993; Lorig et al., 2001; Lorig et al., 1999).

Coaching as Self-Management Support

Health coaching has been proposed as one approach of partnering with patients to enhance self-management strategies and support behaviour change
Coaching empowers patients by giving knowledge and supporting patients with goal setting as they work toward the achievement of health-related goals. Vale et al. (Vale et al., 2003) used coaching to assist patients achieve target cholesterol levels. In a multicentre RCT 792 CVD patients from six academic hospitals in Australia were randomized to usual care plus intervention or usual care alone. Randomization occurred in hospital and was stratified by diagnosis. Patients in the COACH intervention (n = 398) received regular personal coaching via telephone and mailings, which were initiated 2 weeks after randomization. The personal coaching was designed to establish patient’s knowledge, attitudes, and beliefs concerning cardiac risk factors and provide education as necessary and to assist with goal setting and training in relation to communication with physicians. Ongoing coaching sessions were built on previous sessions as goals were reviewed and evaluated, new goals set, and ongoing progress supported. The primary outcome of the trial was total cholesterol (TC) with a mean reduction of 0.54 mmol/l (95% CI, 0.42 – 0.65 mmol/l) realized from baseline to 6 months after randomization in the intervention group and 0.18 mmol/l (95% CI, 0.07 – 0.29 mmol/l) in the usual care group (p < 0.0001). In addition, the intervention group had improvements in blood pressure, body weight, and self-reported walking for exercise. The authors attribute the success of the program to three key characteristics: knowledge – giving patients the information, empowerment – enhancing communication skills, and supporting decision making and monitoring – following up to assess progress toward goals. Limitations of this
study include generalizability as patients living remotely from the centre were not included and women comprised only 25% of the sample. Internal validity may be an issue in this study, physicians could possibly care for patients in both the treatment and control group and their interactions with study patients may influence their pattern of care. A guide to secondary prevention was also given physicians of both groups and this may have influenced care. Despite these threats to internal validity, coaching was more effective than usual care.

A second group from Australia (Francis, Feyer, & Smith, 2007) had the opportunity to evaluate and report on seven projects where four different models of self-management were being used. The purpose of the evaluation was to look at demonstrated change in the management of chronic conditions as demonstrated by self-management behaviours and health status using The Client Health Questionnaire and a Client Service Use Questionnaire. The four self-management interventions were: 1) Stanford Chronic Disease Self-Management Program, 2) generic planning, training and support, 3) planning, training and support tailored to individual disease status and circumstances and 4) self-management planning and ongoing telephone coaching. While the authors report Model 3, tailored support, and Model 4, telephone coaching, had the greatest benefits, they do not show the data or results of statistical testing nor do they indicate how the groups were compared. In addition, there was a wide variation in sample size between the interventions.

Allen et al. (2008) designed an internet-based health coaching intervention, based on the principles of self-management, which aimed to
empower patients by promoting patient self-efficacy in the domain of communication with HCP. Patients who already used a secure internet-based portal received an on-line invitation to participate in the study. Those who replied were screened and 121 were randomized to usual care or e-coaching with those in the intervention group receiving a welcome email tailored to their specific chronic conditions. Two experienced registered nurses (RN) were the e-coaches, monitoring the inbox and providing standardized responses which included an invitation to contact the e-coach for further assistance. Most of the patients sending a message to the e-coach did so in preparation for a physician visit and the most commonly sent response encouraged patients to set a goal for the physician visit with the next most frequent encouraging patients to work collaboratively with their physician and to continually assess effectiveness of interventions and monitor goals. While results from the RCT are not yet published patient feedback has been positive. However, 70% of the participants had a college education or higher, nearly all were white (91%) and more than half were female (59%).

In order to address problems related to access to CR programs for women with CVD, theoretically or conceptually justified interventions need to be investigated. The proposal utilizes a structured coaching intervention (self-management support), grounded in SCT, to enhance health behaviours, health status and appropriate health care utilization. Patients randomized to the intervention group will receive individualized, personal coaching delivered via telephone by a RN. The coaching program is based on the SCT constructs of
self-efficacy: the confidence an individual feels about performing an activity and self-regulation: the capacity an individual has to self-regulate their behaviour.

Coaching emphasizes problem solving, decision making and confidence building as an RN will work with the patient to define problems/barriers, set priorities and identify realistic attainable goals. The nurse acts as a resource for problem solving and assisting with motivation and confidence building.

According to Bandura, individuals’ beliefs in their abilities to motivate themselves and perform behaviours play a crucial role in individuals even attempting to change behaviour.

In summary, self-management has been shown to be beneficial for health outcomes in individuals with chronic diseases. Many of the successful self-management interventions have been grounded in SCT. The coaching intervention proposed for this trial targeted personal factors of knowledge, self-efficacy and self-regulation to enhance behavior change (See Figure 2).

![Figure 2 Relationship among Structured Coaching, Personal Factors and Behaviour](image-url)
Research Objectives

The objectives of this pilot trial are to test the feasibility of all procedures for a definitive trial, specifically to:

1. Provide an estimate of patient recruitment rate.
2. Determine the acceptability of the coaching intervention.
3. Describe common barriers to attendance at CR intake.
4. Describe common resources/solutions.

In addition, the following exploratory research questions are addressed to determine the effects of the coaching intervention.

Primary Question

What is the effect of a coaching intervention designed to support self-management, delivered by telephone, on attendance at CR intake appointment?

Secondary Question

What is the effect of a coaching intervention designed to support self-management, delivered by telephone, on (a) self-efficacy for exercise and (b) self-efficacy to attend CR intake?
CHAPTER 4

Design and Methods

Sample and Setting

Participants were recruited from a tertiary care hospital located in the Greater Toronto Area (GTA), which utilized an automatic referral system for all patients eligible for CR. All participants received an information letter about the study prior to hospital discharge. Participants were recruited from the cardiovascular surgery, cardiac intervention and cardiac medicine in-patient units. Participants included female CVD patients who: 1) had a cardiac diagnosis (MI, angina, congestive heart failure, CABG, CABG/valve or valve surgery or PCI); 2) were eligible for referral to CR; 3) were judged ready for discharge; 4) had access to and were able to communicate over a telephone; and 5) were able to read, write and understand English.

Definitions

**Cardiovascular Diseases** include diseases of the heart and circulatory system including coronary artery disease, stroke, congestive heart failure, hypertension, valvular heart disease, congenital heart disease and others. This study focused on coronary artery disease and valvular disease and included the diagnosis of angina, myocardial infarction, congestive heart failure, PCI, CABG +/- valve surgery and valve surgery.
CR Intake was defined as attendance at the initial CR assessment following discharge from the hospital.

Self-Efficacy is concerned with the judgments of personal capability. Self-efficacy is not a measure of the skills an individual has but rather the belief one has in his/her ability to organize and perform certain actions required to produce certain behaviours. Self-efficacy includes the belief one has in his/her ability to overcome barriers to performing behaviours (Bandura, 1986; Bandura, 1989; Bandura, 1991, 1997).

Study Design

A randomized controlled trial design with stratification for age, enrolled women with CVD referred for CR at a single site in the GTA.

Methods

Manoeuvre

RCT manoeuvre prior to randomization

Prior to participant recruitment, ethics approval was obtained from the Southlake Regional Health Centre Research Ethics Board and the Health Sciences I Research Ethics Board at the University of Toronto. All potential participants received contact names and numbers and an information letter about the study during their hospital admission. An NP or physiotherapist from the appropriate in-patient unit followed-up to introduce the trial and to seek permission from each patient to release her name to the trial investigator. The trial investigator then approached eligible participants approximately 1-2 days prior to hospital discharge to confirm eligibility criteria, give verbal and written
explanations of the trial (including rights, safeguards to preserve anonymity, and risks and benefits of participation), to obtain consent (Appendix A) and to gather demographic data (Participant Contact Form [Appendix D] and Participant Entry Form [Appendix E]). Participants were randomized to either the control group (usual care) or the intervention group (usual care plus telephone coaching). Randomization was centrally controlled using a web-based randomization service (www.randomize.net) with stratification based on age, using variable block sizes of 4 and 8. Age has been reported as an important predictor of CR participation. Several studies found patients aged 70 and older are less likely to participate in CR and Gallagher et al. (2003) reported that women less than 55 years of age were less likely to attend CR. Based on these findings the following strata were identified: a) age < 55 years, b) age 55 – 70 years, and c) age > 70 years.

*RCT manoeuvre following randomization for both groups.*

A schematic diagram of the manoeuvre for participants is depicted in Figure 3. A letter was sent to all participants eight weeks after discharge, thanking them for participating, alerting them to the data collection phone call they would receive, and reminding them of the importance of their participation in the study. A research assistant (RA), blinded to group allocation, collected all outcome data via telephone interview with each participant. The trial investigator completed a Coaching Activity Log for each participant randomized to the intervention group (Appendix G) at the completion of each telephone coaching intervention. The Coaching Activity Log provided information related to
compliance with intervention (percentage of calls made to patients with 2 weeks of hospital discharge), dose of the intervention (number of calls made to patients prior to CR Intake) as well as the specific self-management support provided to patients during each telephone call.

Usual Care

Participants allocated to usual care received a referral to CR. This was followed by a letter from the CR program informing them of their intake appointment. Individual nurses or physiotherapists gave other information concerning CR prior to discharge.

Intervention

Coaching Program In addition to usual care, women randomly assigned to the intervention group received individualized coaching, designed to support self-management, delivered by telephone. The coaching program consisted of scheduled coach-generated telephone calls made between hospital discharge and CR intake appointment to explain the benefits of CR, clarify concerns, motivate women to assume management of their healthcare and daily decision making and assist participants in overcoming any individual barriers to entering a CR program.

The trial investigator provided the intervention to all women in the intervention group. The investigator is a registered nurse with advanced practice credentials, has extensive experience caring for women with CVD and women in CR and has completed the Master Trainer training from the Stanford University CDSMP.
Figure 3. Schema for Trial Participants

- **Hospital In-Patient**
  - Trial introduced by RN/NP/PT and permission obtained to give name to Trial Investigator
  - Eligibility and consent re-confirmed by Trial Investigator
  - Randomization by RA

- **Two Days Prior to Hospital Discharge**
  - Eligibility and consent re-confirmed by Trial Investigator
  - Randomization by RA
  - Control: Usual Care Group
  - Intervention: Usual Care Plus Coaching

- **8 weeks post-discharge**
  - Thank-you/Reminder note re post-discharge interview

- **10 weeks post-discharge**
  - (Prior to scheduled CR Intake Appt)
  - Outcome measures by RA (blinded)
This intervention was standardized in that: a) all interventions were delivered by the same investigator, b) interventions were initiated within one to two weeks of hospital discharge, c) calls were scheduled every two weeks, d) the intervention was at least three phone calls and lasted until scheduled CR intake appointment or to a maximum of five phone calls, and e) the final call occurred within one to two weeks of scheduled CR intake appointment. The number of telephone calls was based on a wait time for CR intake appointment of 12 weeks and time required to deliver the intervention. Calling the patient every two weeks allowed participants to practice skills and permit follow up of patient goal setting and problem solving. Calling over this time frame also allowed participants to identify potential barriers and find solutions and resources. All telephone calls were scheduled and initiated by the investigator. The initial telephone call was scheduled with patients following randomization.

During the telephone calls the investigator covered the topics of priority and goal setting, defining problems and barriers, problem solving and decision-making. The intervention was based on Stanford University’s CDSMP, a six week program designed to help patients with chronic illnesses develop self-management strategies (Lorig, 1993; Lorig & Holman, 2003). The investigator offered problem solving support and strategies to build confidence (See Appendix F for intervention and timing).

1) Problem solving - Basic problem solving skills were taught and included: identification of the problem/barrier, generation of possible solutions (includes asking for assistance with ideas from friends or HCP), select and
implement a solution, assess results, substitute another solution if necessary, and utilize other resources. Together the investigator and participant worked through potential barriers and generated solutions which could work for the participant. The investigator provided support and resources to promote problem solving.

2) **Decision-making** - To make decisions individuals require timely and appropriate information. Information concerning the health benefits of CR was presented. The investigator also questioned the patient concerning any physiological symptoms they experience with exercise, recognizing that the patient may interpret symptoms experienced when walking at home as a reason for not attending an exercise-based CR program. Bandura noted that individuals who expect “too much, too soon” often did not continue with an exercise program (Bandura, 1997). The investigator encouraged participants to resume activity following discharge reminding them to reduce or stop activity if symptoms occurred.

3) **Resources** - Finding and utilizing resources is an important self-management skill. The investigator assisted participants looking for resources such as transportation, hospital phone numbers, and information on how to find a physician.

4) **Partnerships with HCP** - When living with a chronic disease, the patient becomes an active partner in her health care. This may necessitate learning a new language to communicate with her provider. The “Take PART” method of communication was shared with participants as a resource for
communicating with her HCP (Ajzen & Fishbein, 2004; Lorig et al., 2006; Lorig & Holman, 2003). This method involves preparing for a visit with the HCP by developing a list of questions and concerns and prioritizing them. The second part is to ask about diagnosis, test results, treatment options and follow-up plans. Repeating these results helps to clarify findings and can enhance understanding. Finally, take action, there is a clear understanding of next steps, perhaps this concerns medications, lifestyle changes or preparation for a test. This is when barriers to action should also be discussed with the HCP.

5) Setting goals and making action plans - Taking action is one of the skills associated with behaviour change. Action plans involve the steps toward attaining a goal of the participant. Action plans should be achievable and action specific. They answer the questions what, how much, when and how often. Finally, they should be something the participant is fairly sure she can accomplish. The investigator provided support and positive re-enforcement as the patient worked toward their goals, but also assisted the patient in identifying other supports - such as peers or family members who have attended CR - or made positive behaviour changes, such as implementing an exercise program.

Instrumentation

Outcome variables and measures are presented in Table 1.
Baseline demographic information

A variety of factors interact to influence attendance at CR programs: strong physician recommendation, age younger than 70 years, social support networks, good preprogram functional status, gender, living in an urban environment, education and income and social status (Arthur, 2000; Stone & Arthur, 2005). Some of these relate to the individual, while others relate to the environment in which the individual lives. Baseline demographic data (age, marital status, education, current employment status, address) and clinical information (body mass index, left ventricular function, Canadian Cardiovascular Society (CCS) functional classification, New York Heart Association (NYHA) functional classification and co-morbidities) were obtained from the participant and the patient record. Demographic data were used to describe the sample and were collected using the ‘Participant Entry Form’ (Appendix E).
Table 1. Study instruments and timing of administration

<table>
<thead>
<tr>
<th>Time</th>
<th>Outcome Measure</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>Demographics</td>
<td>Participant Entry Form</td>
</tr>
<tr>
<td>Prior to CR Intake</td>
<td>Feasibility</td>
<td>Coaching Activity Log</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Exploratory Outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac Exercise Self-Efficacy</td>
<td>CESEI(^1)</td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy to Attend CR</td>
<td>SEACRI(^2)</td>
<td></td>
</tr>
<tr>
<td>Following CR Intake</td>
<td>Feasibility</td>
<td>Patient Experience of Coaching</td>
</tr>
<tr>
<td>(scheduled intake appointment)</td>
<td>Acceptability of Coaching</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exploratory Outcome</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attendance at CR Intake</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)Cardiac Exercise Self-Efficacy Instrument  
\(^2\)Self-Efficacy to Attend CR Intake Instrument
Feasibility Measures

1) Coaching activities. All coaching activities (e.g. telephone discussions, left messages) were documented by the investigator using the Coaching Activity Log (Appendix G). This included any identified barriers to cardiac rehabilitation as well as resources utilized by participants to solve problems or overcome barriers (Appendix G).

2) Incomplete calls. Any calls that were interrupted or are unable to be completed for any reason were documented on the Coaching Activity Log (Appendix G) including reasons as to why the call and intervention could not be delivered as scheduled.

3) Participant Experience of Coaching Intervention. Participants who received the coaching intervention were asked for their views of the coaching experience using the Patient Experience of Coaching Intervention Questionnaire found in Appendix H. Participants were asked to respond to 12 Likert-type questions designed to elicit information pertaining to the acceptability of the coaching intervention. An open-ended question was asked to elicit any further data.

4) Complications. The RA also collected data concerning any complications or re-admissions to hospital in the period between discharge and CR intake appointment as these data may contribute to understanding reasons for not completing the study or may be identified as barriers.
Exploratory Measures: Primary

Attendance at CR Intake Appointment

The primary endpoint for a larger trial, attendance at CR intake appointment was ascertained from the participant by the research assistant and verified by a telephone call to the program coordinator (Appendix I).

Exploratory Measures: Secondary

Self-efficacy

Two separate measures of self-efficacy were used to evaluate impact of the intervention on the secondary outcomes of cardiac exercise self-efficacy and self-efficacy to attend cardiac rehabilitation. The Cardiac Exercise Self-Efficacy Instrument (CESEI) was developed as a self-efficacy measure of the cardiac risk factor inactivity (Hickey, Owen, & Froman, 1992) (See Appendix B). The CESEI has a high internal consistency of 0.87 to 0.93 (Burns, Camaione, Froman, & Clark, 1998; Hickey et al., 1992; Lau-Walker, 2004; Senuzun, Fadiloglu, Burke, & Payzin, 2006) and stability of 0.87 (Hickey et al., 1992). The CESEI has documented construct, known groups, predictive, and factorial validity (Hickey et al., 1992). Test-retest reliability was found to be 0.87 to 0.97 (Senuzun et al., 2006). This 16-item instrument assesses cardiac exercise self-efficacy by self-report using a 5-point response scale ranging from 1 (very little) to 5 (very much). Participants are asked to assess their level of confidence for exercise behaviours such as warming up, cooling down and fitting exercise into a busy day. The overall score is calculated as a mean rather than a sum, which
would yield an incorrect score if data were missing. The mean score is also in the original metric providing a simple frame of reference for interpretation (Redman, 1998).

The Self-efficacy to Attend Cardiac Rehabilitation Intake (SEACRI) was developed specifically for this study and was devised to assess an individual’s confidence in dealing with barriers to CR intake (See Appendix C). Bandura (1997) states that scales of perceived self-efficacy must be tailored to the object of interest. As no self-efficacy scales were found which were specific to attending CR, the SEACRI was constructed based on the identified challenges and impediments to attending CR programs (Bandura, 1997; Bandura, 2005a). Once constructed the scale was sent to 5 experts for review (2 experts in self-efficacy and 3 experts in CR). Based on their comments, revisions were made and the final scale consists of 14 items rated on an 11-point Likert type scale with the anchors *not at all confident I can attend* and *extremely confident I can attend*. Numeric responses are summed and then divided by the number of activities to which the individual provided a response. The resulting score gives an estimate of the individual’s self-efficacy to attend CR.

Data management

The trial investigator at the study centre was responsible for all participant recruitment activities and the collection of all baseline data prior to randomization. The RA was responsible for participant randomization using a web-based randomization service ([www.randomize.net](http://www.randomize.net)). Outcome data were collected by phone interview by the RA. Data were entered into a Microsoft
Access® database by the trial investigator. Logic and range checks verified the accuracy of the data. Computer files were backed up on a daily basis onto the cardiology server at Women’s College Hospital. Security software protects all hospital servers and the database was password protected with only the investigator and RA having permission to access the database. This is a reliable, secure and highly present form of data backup. All hard-copy of trial-related materials was stored in a locked file in the study area. The participant contact sheets and consent forms were kept separate from the data collection forms, to protect participant confidentiality. There were no identifying data on collection forms or in the database, which could link data to a specific patient.

Data Analyses

Data were collected at baseline and prior to scheduled CR intake appointment and were analyzed using SPSS software, Version 20. Since this was a pilot study, the focus was on descriptive statistics rather than formal tests of hypotheses. The primary measure, Attendance at Cardiac Rehabilitation Intake Appointment was assessed at ten to twelve weeks following discharge and frequencies and percentages were assessed. Chi-square was used to detect significant differences between the usual care and intervention groups. The effect size was described and level of significance examined.

Secondary measures (self-efficacy for cardiac exercise and self-efficacy to attend CR intake) and other data (coaching intervention logs) were assessed at ten to twelve weeks following discharge. Properties of their distribution were assessed by group; including means and variance for continuous data.
Differences between groups were assessed using Student’s t-tests, with trends reported to \( p \leq 0.2 \). Psychometric properties of the self-efficacy scale developed to measure self-efficacy to attend CR (SEACRI) were assessed using coefficient alpha to determine reliability based on internal consistency (Nunnally, 1978). The relationship between attendance at CR intake and SEACRI score was determined to assess predictive validity. Treatment effects were compared between the groups using independent t-tests. Missing data patterns were described in detail.

Response rate was tracked and reasons for refusal were described. Clinical and demographic data of the sample were described using means for continuous data and percents for categorical data. To inform the content and delivery of future coaching interventions the Coaching Activity Logs were reviewed and summarized with respect to: feasibility of calls, barriers to CR intake and resources/solutions utilized. Two researchers independently reviewed the qualitative data from the Coaching Activity Logs and the Participants Evaluation of Coaching Activity. Data were organized into meaningful groups, combining similar patterns into themes.

Sample Size

Sample size estimation is based on the exploratory question (Friedman, Furberg, & DeMets, 1998), attendance at CR intake. A review of the literature on interventions to increase attendance at CR intake appointment yielded the following. Pasquali et al. (2001) found that one 30 minute telephone call from a medical student nearly doubled enrollment in CR (31% vs 56%). Harkness et
al. (2005) found similar results with patients who received a single nurse initiated phone call being significantly more likely to attend their CR intake appointment than those who did not receive a phone call (78.1% vs 50%). Both interventions consisted of one telephone call reminding the patient of the CR intake appointment and reviewing benefits of CR. The intervention in this RCT not only reviews benefits of CR but also teaches self-management skills, enhances self-efficacy to attend CR intake, supports patient problem solving concerning barriers to CR and follows up on individualized patient goal setting. Therefore, it is justifiable to expect the structured coaching intervention to have a similar effect to the 56% relative difference reported by Harkness (2005) and Pasquali et al. (2001). For this reason the expected relative increase for this RCT is conservatively set at fifty six percent.

To achieve 80% power to detect a fifty six percent relative increase, from 35% to 55% in attendance at CR intake appointment and using a chi-square at alpha=0.05 (two sided) we would need a sample of 96 participants per group. However, because this is a pilot trial intending to assess feasibility and acceptability, not detect significant differences between groups, enrollment was restricted to 70 participants. This allows the 30 – 40 participants per group as suggested by Herzog (2008) and Feeley et al. (2009).
Feasibility

Participant Recruitment

In the past 16 months at Southlake Regional Health Centre (SRHC) 2866 patients were referred to CR of whom 829 were female (29%) (Clark, 2009). Given the current and projected CABG surgery rate and PCI rate at this hospital of approximately 2000 patients/year, ineligible participants and refusals, it was estimated that the study sample could be recruited within 5 months.

Potential Problems

Compliance

Participants could not be blinded to group assignment. With detailed informed consent procedures, it was expected that participants would accept their group allocation following randomization. Participants randomly assigned to the usual care group had access to all the standard follow-up at Southlake Regional Health Centre with their cardiologists, which included participant-initiated contact with a registered nurse on the in-patient unit, follow-up with the discharging physician and recommendations for lifestyle changes. It was anticipated that the major threat to compliance would be to the coaching intervention. Activities for monitoring compliance with the intervention included: (a) the trial investigator delivered all the coaching interventions, and (b) the trial investigator completed a Coaching Activity Log for each telephone contact. Participants in the Coaching Intervention who could not be reached by telephone after three attempts were sent a card to their place of residence to
inquire of they would like to continue in the study. Compliance was defined as participating in three telephone calls where all the planned content has been delivered.

Contamination

Since the intervention occurred after hospital discharge, other health professionals caring for the patients were blinded to group allocation. Outcome data were collected by the RA who was blinded to group allocation. A formal, telephone coaching program to support self-management does not exist; therefore, no participant in the usual care group will receive the intervention.

Co-Intervention

Patients in both groups could use other strategies to problem-solve around barriers to CR attendance while at home. Patients could also have a variety of existing self-management support structures in the community such as a family physician. Randomization helped to ensure that participants using other strategies and those with self-management supports in the community were distributed between the intervention and usual care groups.

Loss to Follow-Up

We anticipated minimal losses to follow-up. The importance of obtaining outcome data, regardless of what the participant decided to do about CR, was emphasized during the information and consent process.

The time from randomization to data collection for the primary outcome was ten to twelve weeks. Two to three percent may die during this period (Cardiac Care Network of Ontario, 2004). To address participants’
questions/concerns without delay, the trial investigator was available via email and telephone. A letter was sent to all participants eight weeks after discharge, thanking them for participating, alerting them to the data collection phone call they would receive, introducing them to the RA who would be calling, and reminding them of the importance of their participation in the study.

Ethical Considerations

Risks

There were no known risks to participation in the trial. Participants in both groups had access to all standard usual care available following discharge from hospital. The trial investigator is a registered nurse well versed in confidentiality guidelines and CVD including when and how to refer participants to other health services.

Benefits

There are no known benefits to participating in the trial for women with cardiac disease. However, individuals involved in a study of internet-based nurse coaching appreciated the information and support for self-management (Allen et al., 2008). In addition, participants in other trials have been satisfied with various forms of self-management support and it has been reported that self-management support enhanced behaviour change and decreased health care utilization.
CHAPTER 5

Results

Included in this chapter are study results related to the: (a) description of the participants; (b) feasibility of the intervention related to participant recruitment, coaching interventions and participants’ satisfaction with the coaching intervention; and (c) primary and secondary research questions.

Sample

Recruitment and Randomization

Of 89 participants screened between April 2010 and August 2010, 13 refused and 70 were assessed to be eligible to participate (Figure 4). An additional six patients were found to be ineligible; one did not have a telephone and five had CAD not amenable for PCI and at this institution were not eligible for automatic referral to CR. This represents an accrual percentage of approximately 79% over the 5 months.

Seventy participants were randomized prior to hospital discharge to either the control group (usual care) or the intervention group (usual care plus coaching intervention) (Figure 4).

Attrition

Four participants (3 in the usual care group and 1 in the coaching intervention group) did not complete outcome measurements. Two participants
in the usual care group chose not to complete the outcome measurements when contacted by the research assistant, yielding a 5.5% refusal rate. Two participants (1 per group) did not respond to telephone or mail contact to complete telephone interviews ten weeks after hospital discharge, yielding a 2.9% loss to follow-up in the coaching intervention group and a 2.7% loss to follow-up in the usual care group.

Two participants in the coaching intervention group did not complete the coaching intervention (3-5 telephone contacts) but did complete the outcome measurements (Figure 4). One of these participants was hospitalized during the intervention and the other did not respond to telephone or mail contact to complete the coaching intervention. These two participants are included in the final analysis as per intention to treat principles. Due to the small number of participants who did not complete the intervention their demographic and disease characteristics were not compared to the completers.
Figure 4 Participant Flowchart

Enrollment

Assessed for eligibility (n=89)

Excluded (n=19)
- Not meeting inclusion criteria (n=6)
- Declined to participate (n=13)

Randomized (n=70)

Allocated to intervention (n=34)
Received allocated intervention (n=34)

Allocated to usual care (n=36)

Allocation

Follow-Up

Lost to follow-up (n=1)
- Unable to locate (n=1)
Discontinued intervention (n=2)
- Hospitalized (n=1)
- Unable to locate (n=1)

Lost to follow-up (n=3)
- Refused to complete follow-up (n=2)

Analysis

Analysed (n=33)
- Excluded from analysis (n=1)

Analysed (n=33)
- Excluded from analysis (n=3)
Baseline Characteristics

Baseline characteristics of the participants were obtained from the participants and from chart review and are reported in Table 2. Decimals were rounded to the nearest whole number. Canadian Cardiovascular Society Function (CCS) and New York Heart Association Functional Classification data were missing from over 60% \((n = 45)\) of the patient records. Participants in both groups were mainly either married or living in a stable relationship (usual care \(n = 22, \ 61\%\); coaching intervention \(n = 18, \ 53\%\)) and were retired (usual care \(n = 21, \ 58\%\); coaching intervention \(n = 18, \ 53\%\)).

The highest level of education completed was high school for 14 (39%) in the usual care group and 13 (38%) in coaching intervention. The mean age of the usual care group was 68 ± 11 \((min = 46 \text{ years}, \ max = 89 \text{ years})\) and the mean age of the coaching intervention group was 67 ± 12 \((min = 38 \text{ years}, \ max = 85 \text{ years})\). During randomization participants were stratified for age and those results are presented in Table 3. The majority of participants \(n = 56, \ 80\%\) in both groups were either overweight (Body Mass Index [BMI] 25 - 29.9) or obese (BMI 30 - 39.9). While participants were admitted to hospital with a primary cardiac diagnosis many had multiple cardiac diagnoses. The most common cardiac diagnosis for both groups was CABG (usual care \(n = 16, \ 44\%\); coaching intervention \(n = 15, \ 44\%\)) followed by PCI (usual care \(n = 12, \ 33\%\); coaching intervention \(n = 12, \ 35\%\)).
Co-morbid characteristics of the sample are reported in Table 4. Participants generally had multiple co-morbidities with the mean number of co-morbidities per participant being two in both the usual care and the intervention group. The most common co-morbid conditions in both groups were arthritis (usual care \( n = 18, 50\% \); coaching intervention \( n = 18, 53\% \)), diabetes mellitus (usual care \( n = 11, 31\% \); coaching intervention \( n = 11, 32\% \)), and angina (usual care \( n = 9, 25\% \); coaching intervention \( n = 9, 27\% \)). The mean length of stay of the usual care group was \( 11 \pm 8 \text{ days} \) (\( \text{min} = 1\text{ day}, \text{max} = 34 \text{ days} \)) and the mean length of stay of the coaching intervention group was \( 10 \pm 9 \text{ days} \) (\( \text{min} = 1\text{ day}, \text{max} = 40 \text{ days} \)).
Table 2 Baseline Characteristics of Participants

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>Usual Care (n = 36)</th>
<th>Coaching Intervention (n = 34)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single/never married</td>
<td>1 (2.8)</td>
<td>2 (5.9)</td>
</tr>
<tr>
<td>Separated/Divorced</td>
<td>4 (11.1)</td>
<td>7 (20.6)</td>
</tr>
<tr>
<td>Married/Stable</td>
<td>22 (61.1)</td>
<td>18 (52.9)</td>
</tr>
<tr>
<td>Widowed</td>
<td>9 (25)</td>
<td>7 (20.6)</td>
</tr>
<tr>
<td>Level of Education</td>
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<tr>
<td>Elementary School</td>
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<td>14 (41.2)</td>
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<tr>
<td>High School</td>
<td>14 (38.9)</td>
<td>13 (38.2)</td>
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<td>College/University</td>
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<td>7 (20.6)</td>
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<tr>
<td>Post Graduate Degree</td>
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<td>Current Employment</td>
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<tr>
<td>Full-time</td>
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<td>4 (11.8)</td>
</tr>
<tr>
<td>Part-time by choice</td>
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<td>6 (17.6)</td>
</tr>
<tr>
<td>Part-time due to illness</td>
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</tr>
<tr>
<td>Unemployed due to illness</td>
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<tr>
<td>Unemployed</td>
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<td>Homemaker</td>
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<td>Retired</td>
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<td>BMI</td>
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<tr>
<td>Underweight (&lt;20)</td>
<td>0 (0)</td>
<td>3 (8.8%)</td>
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<td>Normal (20 – 24.99)</td>
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<td>8 (23.5)</td>
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<tr>
<td>Overweight (25 – 29.99)</td>
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<td>14 (41.2)</td>
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<td>Obese (30 – 39.99)</td>
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<td>Morbidly Obese (&gt;40)</td>
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<tr>
<td>Not provided</td>
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<td>CCS Function</td>
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</tr>
<tr>
<td>Class I</td>
<td>2 (5.6)</td>
<td>4 (11.8)</td>
</tr>
<tr>
<td>Class II</td>
<td>4 (11.1)</td>
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</tr>
<tr>
<td>Class III</td>
<td>2 (5.6)</td>
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<tr>
<td>Class IV</td>
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<td>21 (61.8)</td>
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<tr>
<td>NYHA Classification</td>
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<tr>
<td>Class I</td>
<td>6 (16.7)</td>
<td>7 (20.6)</td>
</tr>
<tr>
<td>Class II</td>
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<tr>
<td>Cardiac Diagnosis*</td>
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<td>Myocardial Infarct</td>
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<td>10 (29.4)</td>
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<td>Angina</td>
<td>1 (2.9)</td>
<td>2 (5.9)</td>
</tr>
<tr>
<td>CABG</td>
<td>16 (44.4)</td>
<td>15 (44.1)</td>
</tr>
<tr>
<td>CHF</td>
<td>3 (8.3)</td>
<td>2 (5.9)</td>
</tr>
<tr>
<td>PCI</td>
<td>12 (33.3)</td>
<td>12 (35.3)</td>
</tr>
<tr>
<td>CABG + Valve</td>
<td>4 (11.1)</td>
<td>6 (17.6)</td>
</tr>
</tbody>
</table>

*Participants could have more than 1 cardiac diagnosis

Table 3 Participants Stratified for Age
<table>
<thead>
<tr>
<th>Stratified Age</th>
<th>Usual Care</th>
<th>Coaching</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt; 55</td>
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<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Age 55 - 70</td>
<td>15</td>
<td>14</td>
<td>27</td>
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<tr>
<td>Age &gt; 70</td>
<td>18</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>34</td>
<td>66</td>
</tr>
<tr>
<td>Co-Morbid Characteristics of Participants</td>
<td>Usual Care ($n = 36$)</td>
<td>Coaching ($n = 34$)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------------------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
<td></td>
</tr>
<tr>
<td>Previous MI</td>
<td>8 (22.2)</td>
<td>7 (20.6)</td>
<td></td>
</tr>
<tr>
<td>Angina</td>
<td>9 (25)</td>
<td>9 (26.5)</td>
<td></td>
</tr>
<tr>
<td>Previous CABG</td>
<td>1 (2.8)</td>
<td>2 (5.9)</td>
<td></td>
</tr>
<tr>
<td>Previous CHF</td>
<td>1 (2.8)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Previous PCI</td>
<td>7 (19.4)</td>
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<tr>
<td>Previous CABG + valve</td>
<td>0 (0)</td>
<td>1 (2.9)</td>
<td></td>
</tr>
<tr>
<td>Stroke or TIA</td>
<td>4 (11.1)</td>
<td>3 (8.8)</td>
<td></td>
</tr>
<tr>
<td>PVD</td>
<td>3 (8.3)</td>
<td>3 (8.8)</td>
<td></td>
</tr>
<tr>
<td>Diabetes (Type 1 or 2)</td>
<td>11 (30.6)</td>
<td>11 (32.4)</td>
<td></td>
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<tr>
<td>Arthritis</td>
<td>18 (50.0)</td>
<td>18 (52.9)</td>
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<tr>
<td>Depression</td>
<td>4 (11.1)</td>
<td>6 (17.6)</td>
<td></td>
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<tr>
<td>COPD</td>
<td>6 (16.7)</td>
<td>4 (11.8)</td>
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<tr>
<td>Osteoporosis</td>
<td>4 (11.1)</td>
<td>8 (23.5)</td>
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<tr>
<td>Degenerative Disc Disease</td>
<td>6 (16.7)</td>
<td>6 (17.6)</td>
<td></td>
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<tr>
<td>Hearing Impairment</td>
<td>9 (25.0)</td>
<td>3 (8.8)</td>
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<tr>
<td>Neurological disease</td>
<td>2 (5.6)</td>
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<tr>
<td>Mean # of co-morbidities/participant</td>
<td>2.56</td>
<td>2.44</td>
<td></td>
</tr>
</tbody>
</table>

MI = myocardial infarction  
CABG = coronary artery bypass graft  
CHF = congestive heart failure  
PCI = percutaneous coronary intervention  
TIA = transient ischemic attack  
PVD = peripheral vascular disease  
COPD = chronic obstructive pulmonary disease
Coaching Activity Log

To develop an understanding of the coaching intervention, a Coaching Activity Log was completed for each patient contact. There were 146 contacts made by the coach, including 120 connections and 26 attempted connections (See Figure 5).

One hundred percent of coaching calls to participants were within 2 weeks of discharge. The mean duration of a coaching telephone call was 13.9 minutes (SD = 5.9), with a range of 2 to 35 minutes. Eighty percent (n = 99) of the calls were greater than 10 minutes in duration and 99% (n = 118) of the calls were less than or equal to 28 minutes in duration. Nineteen (56%) of the participants received 3 coaching interventions, 7 (21%) received four coaching interventions and 6 participants (18%) received 5 coaching interventions. Coaching activities provided are reported in Table 5. The concepts of self-management, goal setting and the benefits of cardiac rehabilitation (n = 33, 100%) were discussed with all participants at least once. Action plans, partnerships with HCP and the communication method “Take PART” were discussed at least once with most participants (n = 31, 93.9%).
146 Contacts

120 Connections

26 Attempts

25 Messages

1 No Answer

Figure 5 Schema of Coaching Interventions
Table 3 Structured Coaching Intervention

<table>
<thead>
<tr>
<th></th>
<th># Participants Receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
</tr>
<tr>
<td>Self-Management</td>
<td>33 (100)</td>
</tr>
<tr>
<td>Benefits of CR</td>
<td>33 (100)</td>
</tr>
<tr>
<td>Goal Setting</td>
<td>33 (100)</td>
</tr>
<tr>
<td>HCP Partnerships</td>
<td>32 (96.9)</td>
</tr>
<tr>
<td>Take &quot;PART&quot;</td>
<td>32 (96.9)</td>
</tr>
<tr>
<td>Action Plans</td>
<td>31 (93.9)</td>
</tr>
<tr>
<td>Barriers to CR</td>
<td>26 (78.8)</td>
</tr>
<tr>
<td>Communication Skills</td>
<td>24 (72.7)</td>
</tr>
<tr>
<td>Resources Identified</td>
<td>23 (69.7)</td>
</tr>
<tr>
<td>Myths about CR</td>
<td>21 (63.6)</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>18 (54.5)</td>
</tr>
<tr>
<td>Action Plan Follow up</td>
<td>17 (51.5)</td>
</tr>
</tbody>
</table>
Participants were asked to identify any barriers to attending cardiac rehabilitation and the most common barriers are presented in Table 6. The most common barrier to cardiac rehabilitation program attendance repeatedly identified was that the program was too hard to get to (n = 44, 33%). Specifically, seven women (20.6%) did not drive and 5 (14.7%) did not have access to a car. Other women thought the parking would be too expensive (n = 4, 11.7%) or felt that the program was too far away (n = 3, 8.8%). Eight women (23.5%) felt that they were not well enough to attend while three women (8.8%) felt they were too well to attend cardiac rehabilitation. One woman (2.9%) was told by her physician that she was too young to attend cardiac rehabilitation.
Table 4 Common Barriers to Cardiac Rehabilitation Participation

<table>
<thead>
<tr>
<th></th>
<th>120 Completed Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
</tr>
<tr>
<td>Too Hard to Get To</td>
<td>40 (33.3)</td>
</tr>
<tr>
<td>Not Well Enough to Attend</td>
<td>11 (9.2)</td>
</tr>
<tr>
<td>To Well to Attend</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>Program is Not Important</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>Too Young to Attend</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>Too Old to Attend</td>
<td>0 (0)</td>
</tr>
<tr>
<td>No One Told Me to Go</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>
Participant Experience of the Coaching Intervention

Thirty-two participants (97%) completed their coaching intervention evaluations. One participant completed the evaluations with the Research Assistant despite not completing the telephone coaching intervention due to hospitalization. This participant did find the coaching interventions she received supportive and helpful as they provided useful information and helped her to interact with her physician. She identified that she did not have enough contact with the coach. Coaching intervention experiences are reported in Table 7. All participants (n= 32 indicated that the coach provided useful information and most thought the coach helped them develop action plans (n = 25, 79%) and identify resources (n = 26, 81%). All respondents liked the telephone contact, and found the information and support provided helpful. Most participants (n = 31, 97%) indicated the coach called when planned and felt they had enough contact with the coach. All participants would recommend this intervention to a friend.
Table 5 Participant Experience of the Coaching Intervention

<table>
<thead>
<tr>
<th>Provided useful information (n = 32)</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>19 (59.4)</td>
<td>13 (40.6)</td>
<td></td>
</tr>
<tr>
<td>Assisted me in identifying resources (n = 32)</td>
<td>0 (0)</td>
<td>4 (12.5)</td>
<td>2 (6.3)</td>
<td>19 (59.4)</td>
<td>7 (21.9)</td>
</tr>
<tr>
<td>Helped me develop action plans (n = 32)</td>
<td>0 (0)</td>
<td>3 (9.4)</td>
<td>4 (12.5)</td>
<td>19 (59.4)</td>
<td>6 (18.8)</td>
</tr>
<tr>
<td>Assisted me solve my problems (n = 31)</td>
<td>0 (0)</td>
<td>3 (9.7)</td>
<td>6 (19.4)</td>
<td>10 (32.3)</td>
<td>12 (38.7)</td>
</tr>
<tr>
<td>Helped me set goals (n = 32)</td>
<td>0 (0)</td>
<td>4 (12.5)</td>
<td>7 (21.9)</td>
<td>13 (40.6)</td>
<td>8 (25.0)</td>
</tr>
<tr>
<td>Helped me talk to my doctor (n = 32)</td>
<td>1 (3.1)</td>
<td>6 (18.8)</td>
<td>5 (15.6)</td>
<td>15 (46.9)</td>
<td>5 (15.6)</td>
</tr>
<tr>
<td>I liked the telephone contact (n = 32)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>19 (59.4)</td>
<td>13 (40.6)</td>
</tr>
<tr>
<td>I found the information helpful (n = 32)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>22 (68.8)</td>
<td>10 (31.3)</td>
</tr>
<tr>
<td>I found the support helpful (n = 32)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>18 (56.3)</td>
<td>14 (43.8)</td>
</tr>
<tr>
<td>I would recommend this to a friend (n = 32)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>17 (53.1)</td>
<td>15 (46.9)</td>
</tr>
<tr>
<td>My coach telephoned when planned (n = 32)</td>
<td>0 (0)</td>
<td>1 (3.1)</td>
<td>0 (0)</td>
<td>18 (56.3)</td>
<td>13 (40.6)</td>
</tr>
<tr>
<td>I had enough contact with my coach (n = 32)</td>
<td>0 (0)</td>
<td>1 (3.1)</td>
<td>0 (0)</td>
<td>23 (71.9)</td>
<td>8 (25.0)</td>
</tr>
</tbody>
</table>
Exploratory Questions

*Attendance at Cardiac Rehabilitation Intake*

To determine the effects of a targeted coaching intervention the following exploratory research question was addressed: What is the effect of a coaching intervention designed to support self-management, delivered by telephone, on attendance at CR intake appointment? Additionally, an estimate of effect size was obtained to inform the sample size for the main trial.

Participants were telephoned by a research assistant to determine if they had attended their CR intake appointment. If participants had not attended their initial intake they were asked if they had rescheduled the appointment. Participants who indicated a rescheduled appointment were telephoned to confirm attendance at CR intake. Chi square tests for group differences in CR intake appointment attendance were statistically significant (Pearson Chi-Square = 3.911, df = 1, \( p = 0.048 \)) (Table 6).

Effect size was obtained using Pearson Correlation and was 0.243 which is a small effect size (Cohen, 1988).

The sample was stratified for age as previous research has reported individuals older than 70 years and younger than 55 years of age were less likely to participate in CR. Chi square tests for group differences in CR intake appointment attendance were not statistically significant (Pearson Chi-square = 0.766, df = 2, \( p = 0.682 \)).
Table 6 Attendance at Cardiac Rehabilitation Intake

<table>
<thead>
<tr>
<th></th>
<th>Usual Care</th>
<th>Coaching Intervention</th>
<th>Pearson Chi-Square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended CR Intake</td>
<td>11 (33.3)</td>
<td>19 (57.6)</td>
<td>3.911</td>
<td>0.048</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>df = 1</td>
<td></td>
</tr>
</tbody>
</table>
Table 7 Attendance at CR Intake Stratified by Age

<table>
<thead>
<tr>
<th>Stratified Age</th>
<th>Attended CR Intake</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Age&lt; 55</td>
<td>Usual Care</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Coaching</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Age 55 – 70</td>
<td>Usual Care</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Coaching</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Age &gt;70</td>
<td>Usual Care</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Coaching</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>Usual Care</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Coaching</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>36</td>
</tr>
</tbody>
</table>

Pearson Chi-Square = 0.766

df = 2

p = 0.682
The 37 participants who chose not to attend the CR intake appointment were asked for reasons for non-attendance. Both the usual care group and the coaching intervention group gave multiple reasons for not attending their CR intake appointment (See Table 8). Transportation was cited most frequently (n = 10, 27%) and included issues with lack of public transportation, not knowing how to drive and financial issues around parking. Nine participants (24.3%) had health concerns, which included wound healing issues and co-morbid complaints such as leg and back pain and lung disease. Several participants (n = 8, 21.6%) stated that the timing of CR did not work, as they wanted to spend the summer with family and friends. Even in the setting of automatic referral, two participants had referral issues with participants having to obtain another referral, as the CR program had not received the original referral. Lack of physician endorsement impacted seven participants (18.9%), of whom two were told they were too well to attend CR, one was told she was too “low level” to attend and four thought the physicians did not think CR was important.

Additional data

Data obtained during the coaching intervention revealed some of the complexities these women faced following their discharge from hospital. While only three participants in the intervention group identified health concerns as a reason for non-attendance at CR intake, many women spoke of their medical problems and sought help in finding resources. Six had open chest wounds requiring intra-venous antibiotic treatment +/- homecare nursing care. One participant had an open leg wound requiring intravenous antibiotic therapy and
two were placed on oxygen following discharge from the hospital. Two patients were re-admitted to hospital, one who was unable to complete the intervention due to hospitalization and the other who had a brief hospitalization due to complications of diabetes management. Two women commented on the care they were providing for a sick spouse.

Transportation was identified as an issue in both the usual care group and the intervention group. In an effort to understand this phenomenon, the distance from place of residence to the closest CR program was calculated for all participants (See Table 9). Distance was categorized into 5 and 10 kilometre intervals demonstrating that 34 lived within 9.9 kilometres of a CR program and another 21 lived within 19.9 kilometres of a CR program. This leaves 25 women living more than 20 kilometres from CR. One woman lived more than 60 kilometres from the closest CR program.
<table>
<thead>
<tr>
<th>Reason</th>
<th>Usual Care (n = 23)</th>
<th>Coaching (n =14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Transportation</td>
<td>5 (21.7)</td>
<td>5 (35.7)</td>
</tr>
<tr>
<td>Health Concerns</td>
<td>6 (26)</td>
<td>3 (21.4)</td>
</tr>
<tr>
<td>Timing</td>
<td>7 (30.4)</td>
<td>1 (7.1)</td>
</tr>
<tr>
<td>Lack of Physician Endorsement</td>
<td>5 (21.7)</td>
<td>2 (14.3)</td>
</tr>
<tr>
<td>Referral Issues</td>
<td>0 (0)</td>
<td>2 (14.3)</td>
</tr>
</tbody>
</table>
## Table 9 Distance to Closest CR Program

<table>
<thead>
<tr>
<th>Distance from CR Program</th>
<th>Attended CR Intake</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>&lt; 5 kilometers</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>5 - 9.9 kilometers</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>10 - 14.99 kilometers</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>15 - 19.99 kilometers</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>20 - 24.99 kilometers</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>25 - 29.99 kilometers</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>30 - 39.9 kilometers</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>40 - 49.9 kilometers</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>50 - 59.9 kilometers</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 60 kilometers</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>
**Self-Efficacy**

To determine indicators of the effects of a telephone coaching intervention on secondary outcomes, the following exploratory research question was addressed: What is the effect of a coaching intervention designed to support self-management, delivered by telephone on (a) self-efficacy for cardiac exercise and (b) self-efficacy to attend CR intake?

**Self-efficacy for cardiac exercise**

Self-efficacy for cardiac exercise was determined using the Cardiac Exercise Self-Efficacy Instrument (CESEI). The CESEI includes 16 items rated on a 5-point Likert scale. The overall score is calculated as a mean rather than a sum. The Cardiac Exercise Self-Efficacy (CESEI) scores are reported in Table 10. Distribution of scores is presented in Figure 6. An independent-samples Student $t$-test was conducted to compare CESEI scores in the intervention ($M=3.35$, $SD=0.782$) and control group ($M=3.097$, $SD=0.798$). There was no statistically significant group differences in CESEI scores reported 10 weeks post hospital discharge; $t (64)=1.325$, $p=0.190$.

The overall Cronbach’s alpha for the CESEI scores was 0.9, which is very high and indicates strong internal consistency among the 16 exercise efficacy items. Further testing to examine the contribution of each item included corrected item-total correlation and Cronbach’s alpha if item deleted. Results indicated that all items should be retained.
<table>
<thead>
<tr>
<th></th>
<th>Usual Care (n=33)</th>
<th>Coaching Intervention (n=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CESEI</td>
<td>3.097 (.798)</td>
<td>3.35 (.782)</td>
</tr>
<tr>
<td>Minimum, Maximum</td>
<td>1.31,4.31</td>
<td>1.25,4.94</td>
</tr>
<tr>
<td>T (df)</td>
<td>-1.325 (64)</td>
<td></td>
</tr>
<tr>
<td>p</td>
<td>0.190</td>
<td></td>
</tr>
</tbody>
</table>

M = Mean

SD = Standard Deviation

CESEI = Cardiac Exercise Self-Efficacy Instrument (0-5)
Figure 6  Distribution of CESEI Scores
Self-efficacy to Attend Cardiac Rehabilitation

Self-efficacy to attend cardiac rehabilitation was determined using the Self-Efficacy to Attend Cardiac Rehabilitation Instrument (SEACRI). The SEACRI includes 14 items rated on a 10-point Likert scale. The overall score is calculated as a mean rather than a sum. The SEACRI scores are reported in Table 11. An independent-samples Student t-test was conducted to compare SEACRI scores in the intervention (M=66.06, SD=22.5) and control group (M=60.1, SD=24.7). There was no statistically significant group difference in SEACRI scores reported 10 weeks post hospital discharge; \( t (64)=1.039, p=0.303 \).

The overall Cronbach’s alpha for the SEACRI scores was 0.94, which is very high and indicates strong internal consistency among the 14 efficacy for attendance items. Further testing to examine the contribution of each item included corrected item-total correlation and Cronbach’s alpha if item deleted. Results indicated that all items should be retained.

Pearson Correlation was used to assess the relationship between attendance at CR intake and SEACRI score. The result was \( r = 0.484, p=0.01 \).
<table>
<thead>
<tr>
<th></th>
<th>Usual Care (n=33)</th>
<th>Minimum, Maximum</th>
<th>Coaching Intervention (n=33)</th>
<th>Minimum, Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M (SD)</strong></td>
<td>60.01 (24.7)</td>
<td>0.100</td>
<td>66.06 (22.5)</td>
<td>0.9538</td>
</tr>
<tr>
<td><strong>T (df)</strong></td>
<td></td>
<td></td>
<td></td>
<td>-1.039 (64)</td>
</tr>
<tr>
<td><strong>p</strong></td>
<td></td>
<td></td>
<td></td>
<td>0.303</td>
</tr>
</tbody>
</table>

M = Mean

SD = Standard Deviation

SEACRI = Self-Efficacy to Attend Cardiac Rehabilitation (0-100)
Figure 7  Distribution of SEACRI Scores
CHAPTER 6

Discussion

This chapter focuses on a description of the methodological strengths and limitations of the pilot trial and a review of the results in light of available evidence.

The purpose of this pilot trial was to test all procedures for a larger, definitive trial, and to estimate the effect of the coaching intervention on attendance at CR intake appointment. Nineteen women in the intervention group and 11 women in the usual care group attended their CR intake appointment, resulting in a statistically significant difference between groups $x^2(1, n=66) = 3.91, p=0.048$.

There were no statistical differences between groups for CESEI or SEACRI, however SEACRI predicted attendance at CR intake appointment. The women in the intervention group were generally very satisfied with the coaching intervention and reported finding the telephone calls helpful.

Study Strengths and Limitations

Study validity depends on whether the study was designed and conducted in such a way to justify conclusions concerning the intervention and magnitude of the resulting outcomes. The methods employed in this pilot trial were robust and addressed methodological weaknesses noted in prior trials.
employing a telephone call to increase attendance at CR intake appointment (Harkness et al., 2005; Pasquali, Alexander, Lytle, et al., 2001). This included using a RCT design, having a single researcher deliver the intervention, achieving good compliance, controlling for various sources of bias and developing a trial specific database to ensure data accuracy.

The RCT design minimizes threats to internal validity by controlling for potentially confounding variables, that is, a factor which may be related to the outcome of interest. This provides increased confidence that the effects are indeed due to the independent variable, in this case the coaching intervention. If random allocation is carried out properly the intervention group and control group should be equivalent except for the intervention. Participants were recruited just prior to hospital discharge and eligibility criteria were confirmed on discharge. Participants were randomized following discharge. The primary investigator (PI), responsible for recruiting participants, as well as the participants themselves, were unaware of the next assignment in the randomization sequence. A research assistant, not responsible for participant recruitment, administered randomization. Randomization was centrally controlled and concealed using a web-based randomization service (www.randomize.net) with stratification based on age, using variable block sizes of 4 and 8. This adequate concealment allocation ensured the investigator could not manipulate group allocation, which maintains the balance in the treatment and control groups preventing selection bias, a systematic difference between groups. Randomization can also be corrupted during the data analysis
process. If patients who do not receive their assigned intervention are omitted from analysis the results may be biased as the reasons participants do not complete their intervention may be related to the outcome of interest, in this case attendance at CR intake appointment. To preserve the value of randomization in this study the investigator adhered to the intention to treat principle and ensured all participants remained in the group to which they were randomized for data analysis.

Even in the setting of an RCT it is important to address potential sources of bias that may influence the study findings. Instrumentation or measurement bias refers to the effect that variations in instruments or data collection procedures have on study outcomes (McMillan, 2007). The instruments remained constant throughout the trial and were standardized and reliable outcome measures. While the patients and PI providing the intervention were not blinded to group allocation, the research assistant was blinded to group allocation during data collection and assessment preventing detection bias. The Participant Experience of the Coaching Intervention was included in all the assessment packages and administered only after all other outcome assessments had been completed. Testing and statistical regression bias were avoided as participants’ outcomes were measured once only, following completion of the intervention (Gliner & Morgan, 2000).

Loss to follow-up is problematic when there is a differential loss of participants from the groups following randomization as this results in unequal groups at the termination of the study (McMillan, 2007). The attrition rates were
low in both groups, with the usual care group having a slightly higher rate of attrition (8%, n=3) compared to the coaching intervention group (3%, n = 1). Loss to follow up of less than 5% is generally of little concern, while a loss of > than 20% is a serious threat to validity (Sackett, Strauss, & Richardson, 2000). Attrition was related to the inability to contact two participants (1 in each group) for completion of the final outcome measures and the refusal to complete outcome measures (n = 2 in the usual care group). The low attrition rate in the intervention group suggests high acceptability of the intervention.

Treatment fidelity may have been affected as the PI delivered the coaching intervention. This could have resulted in the PI going “all out” to convince participants to attend CR intake resulting in an over-estimation of the effectiveness of the intervention. To ensure treatment fidelity and preserve internal validity, Resnick et al. and Borelli et al. (Borrelli, 2011; 2005; Resnick et al., 2005) suggest that the intervention be theoretically-based, by a trained interventionist, and the intervention be supervised. The intervention was based on the Stanford CDSMP, which has been shown to enhance self-efficacy and assist in behaviour change. The PI is a Master Trainer for the CDSMP and has delivered the program to several patient groups. The intervention was not supervised but in a replication study this would occur. In addition an intervention check list and data collection tool were designed and utilized to ensure content was delivered in a structured manner.

Other types of errors in research studies include intervention or exposure biases. Intervention biases involve differences in how the intervention was
carried out and include contamination bias, compliance bias and co-intervention bias (Hartman, Forsen, Wallace, & Neely, 2002).

Contamination bias occurs when members of the control group inadvertently receive the experimental intervention thus reducing the differences in outcomes between groups (Sackett, 1979). The telephone coaching intervention was administered only to those participants in the intervention group, minimizing the risk of contamination. To ensure standardization of the intervention all telephone calls were scheduled and coach-generated and made between hospital discharge and CR intake appointment. In addition, the PI was the only interventionist and followed a strict protocol with relation to the timing of calls, number of calls and call content.

Compliance bias can occur in studies where participants are required to adhere to therapy (Sackett, 1979). In this trial compliance was defined as participating in 3 telephone calls where all planned content was delivered. Compliance with the intervention was very good with all but 2 women in the intervention group completing the intervention.

Co-intervention bias occurs when some of the participants receive another unaccounted-for intervention at the same time as the study intervention (Hartman et al., 2002). This is a potential limitation of this trial as there was no control over participants in the usual care group receiving self-management support from their physician, HCP or from a formal self-management support group such as Stanford's CDSMP. Similarly, there was no control over participants in the coaching intervention group receiving self-management
support from their physician, HCP or from a formal self-management support group such as Stanford’s CDSMP. This co-intervention could have occurred in a similar fashion to participants in both the intervention and usual care groups. Ideally, randomization ensured that participants using other strategies and self-management supports in the community were distributed between the intervention and usual care group. In a future trial formal self-management support should be tracked.

A Type I error would be to reject a true null hypothesis, that is, finding a result which occurs by chance alone. A Type II error is defined as when the test fails to reject a false null hypothesis, that is, failing to recognize an effect when there is indeed one (Munro, 2001). As this was a pilot trial there were concerns that the small sample size, small effect size, or lack of power may lead to a Type II error (Cohen, 1988, 1992). This was not the case as the exploratory outcomes revealed a significant difference between the control and intervention groups. A post hoc power analysis revealed that on the basis of the between-group comparison effect size observed in the present study ($r = 0.243$) an $n$ of approximately 130 would be required to obtain statistical power at the recommended 0.80 level (Cohen, 1988).

A strength of the trial was the development of a trial-specific database to enter and manage data. Data were entered into a Microsoft Access database and logic and range checks were in place to verify the accuracy of data. Logic checks included ensuring admission date was prior to discharge date which occurred prior to randomization. Range limits were set on age and the outcome
measures of CESEI and SEACRI. The PI, who had been trained in the use of the database and has extensive experience entering both research and clinical data into Microsoft Access databases, entered all data.

Review of the Coaching Trial Findings

Research Objectives: Feasibility and Acceptability Findings

The primary outcomes of interest in this pilot trial were to test the feasibility and acceptability of all procedures for a definitive trial. This section begins with a discussion about the feasibility of a telephone coaching intervention designed to increase women’s attendance at CR program intake, specifically addressing (a) patient recruitment rates, (b) intervention dose, (c) common coaching interventions offered to participants and (d) participant’s satisfaction with the coaching intervention.

Recruitment

Determining recruitment rate is one reason for performing a feasibility study (Guyatt, 2006). This trial set a sample size at 70 participants and allocated 5 months for recruitment. Recruitment was completed on time in 5 months plus 1 day. This would indicate successful recruitment strategies as a literature summary and recent Cochrane review suggest that less than 50% of clinical trials will meet their recruitment targets or they will need to extend the time for recruitment (Hunninghake, Darby, & Probstfield, 1987; Treweek et al., 2010).

Of the 89 participants screened, five (5.6%) were ineligible as they did not qualify for automatic referral to CR. These women all underwent angiography and had significant CAD which was not amenable for PCI.
Institutional policy does not allow for automatic referral for these patients even though they would benefit from CR, and indeed the national guidelines recommend referral to CR for these women (Canadian Association of Cardiac Rehabilitation, 2009; Grace et al., 2011; Oh et al., 2009). Anecdotal evidence from these patients indicated they felt at loose ends as they were not eligible for PCI or surgery and were left wondering what options were available for them.

Thirteen women (14.6% of all patients approached and 15.6% of eligible patients approached) refused to participate in the trial. Four of these women stated that they would not attend CR so it would not be worthwhile participating in the study. Four women cited competing responsibilities, which would interfere with study participation. These included: participation in another study (2) and caring for a sick spouse (2). Interestingly, 2 of these women stated that they planned to attend CR but just did not have time for study participation with their additional responsibilities. These findings are similar to those found in the literature in a similar populations of women with CVD being recruited for nursing studies (Friedman & King, 1994; Rowe & King, 1998) who cited being too busy and participating in other studies as reasons for refusal to participate in the studies.

In addition, four women felt they were too sick or too old to attend CR and therefore would waste their time by participating in the study. Friedman and King also identified feeling too ill as a barrier to recruitment in women (1994). Indeed, older age and feeling too ill have been reported as important predictors of CR non-attendance (Ades, Waldmann, McCann, et al., 1992) even though
systematic reviews have consistently shown that participation in CR improves mortality and morbidity outcomes (Heran et al., 2011). More recent studies have identified similar findings in participants who are older and have multiple co-morbidities (Listerman, Bittner, Sanderson, & Brown, 2011; Wise & Patrick, 2012).

Recruitment strategies in this pilot trial are considered successful given that recruitment targets were obtained within the specified time frame of 5 months. The PI, following an introduction to the trial by the NP geographically located on the patient unit, did all recruitment. In future trials, clinical trial personnel should spend the time explaining that CR is an important component in the recovery of all cardiac patients and remind patients that their physician or NP has referred them to CR because they are appropriate to attend CR.

*Intervention Dose*

Pilot trials are also utilized to determine if the intervention can be delivered as planned, in this case what number of telephone calls were required to deliver the intended content and what percentage of participants completed the intervention. This information is used to determine the most effective intervention delivered in the most appropriate number of calls. As per trial design the researcher initiated all coaching telephone calls and the initial call occurred within two weeks of hospital discharge. All telephone numbers were collected from participants prior to hospital discharge. The minimum number of calls was set at three to ensure coaching content delivery. Additional calls were driven by individual needs and time to initial CR intake appointment. All but two
participants (6%) completed the minimum dose of three coaching interventions. One patient did not complete the intervention due to re-hospitalization and the other patient was not available at the scheduled telephone times. One of these patients was available for final data collection and her results are included in the intervention arm as per intention to treat principles. Reviews of other trials using a telephone intervention in a cardiac population report adherence rates of 67 – 92% (Allison & Keller, 2004; Clark et al., 2007; Hartford, Wong, & Zakaria, 2002; Vale, Jelinek, & Best, 2005; Yates, Anderson, & Hertzog, 2005), indicating the adherence rate in this trial to be high at 94%. These trials also indicate a wide variation in the number of telephone calls required to complete the intervention, but in general correlate the number of calls to the length of the intervention planned.

The high rate of completion of the intervention may be attributed to the scheduling of the telephone interventions similar to scheduling an in-person appointment. All calls were scheduled at times convenient to the participants and could occur during the day, evening or on a weekend. Participants were given a time frame for the telephone call to occur and would negotiate timing depending on their needs and other commitments. Participants were also given the opportunity to reschedule telephone appointments at the time of contact to avoid any unnecessary stress due to changes in situation or health. This occurred several times when a participant had an unexpected health appointment and was leaving the house when the call was scheduled. In addition, the researcher’s email address was on the consent form and several
participants did email the researcher to reschedule telephone calls. This ability to be flexible was advantageous and should be continued in the larger trial. The ability to have women schedule their own telephone appointments via email may also be useful for some of participants. Future considerations should include the use of technology such as video calling, which allows the participant and provider to see each other.

Coaching Intervention

This pilot trial was testing a telephone coaching intervention based on Stanford’s CDSMP and designed to support participants’ self-management skills immediately post discharge as they waited for CR intake appointment. The intervention included both practical information such as the benefits of CR, location of CR programs, and guidelines on communicating with HCP but also employed strategies to promote behaviour change such as goal setting, action planning and problem solving skills.

To evaluate the content of the coaching intervention coaching logs were completed during each telephone call. These logs recorded the duration of the call, content covered and patient concerns. All participants were provided with information concerning self-management, goal setting, and the benefits of CR. This information was loosely scripted and repeated on several occasions during the series of telephone calls. While participants would discuss action planning, few were able to remember their plan on follow up telephone call and frequently asked for review of the benefits of CR and communication strategies. In addition, participants were very interested in learning how to form partnerships
with HCP and using the take “PART” strategy (Lorig et al., 2006; Lorig & Holman, 2003) for communicating with their physicians. This strategy for communication involves having patients prepare for appointments by generating lists of questions, ask the questions, repeat instructions and take action – either by following instructions or voicing concerns and barriers to the plan. Many participants had ongoing medical issues following their discharge and this lead to specific medical questions concerning such issues as wound healing and medication usage. These participants were encouraged to discuss these issues directly with their physician and the take “PART” strategy for communication was reviewed, helping participants to formulate specific questions. In particular, participants were not aware that letting their physician know they were unwilling or uncomfortable taking certain medications would help the physician make alternative suggestions. Participants who complained of chest discomfort were reminded of the directions for nitroglycerin use and when to seek medical aid. Future interventions may consider providing patients with some basic cardiac health education as part of the coaching intervention.

Many patients had specific questions concerning resources such as accessing physicians or a specific CR. Often participants had not reviewed their discharge package, which contained this information. Future interventions should consider providing participants with templates for developing action plans and goal setting.
Participant Satisfaction with Coaching Intervention

Although the content and dose of the intervention varied, participants were satisfied with the individuality of their coaching experience. The information provided was useful and assisted them in identifying resources. Participants indicated that the telephone coaching assisted them in solving their problems and helped them talk to their doctors. All participants indicated they would recommend this intervention to a friend and only one felt she did not have enough contact with her coach. Results from this pilot trial are consistent with others who have found favourable participant evaluations of their self-management support or coaching experience. Participants in the coaching intervention had complex medical issues such as open wounds, infections and respiratory complications requiring home oxygen therapy. While no medical advice was provided the researcher was able, by virtue of her cardiovascular expertise, to assist participants in seeking medical care and dialoguing with HCP.

Exploratory Questions

Although this pilot trial was not powered to determine significant group differences, exploratory questions are discussed that examined the indicators of the effects of a coaching intervention delivered by telephone versus usual care on (a) attendance at CR intake appointment, (b) self-efficacy for cardiac exercise and (c) self-efficacy to attend CR intake.
Primary - Attendance at Cardiac Rehabilitation Intake

“What is the effect of a coaching intervention designed to support self-management, delivered by telephone, on attendance at CR intake appointment?”

The primary exploratory question sought to determine the impact of a telephone coaching intervention based on Stanford University’s CDSMP on attendance at CR intake appointment compared to usual care. Barriers to attendance at CR intake will also be discussed.

Positive results were found for the treatment group who were significantly more likely to have attended their CR intake appointment as compared to the usual care group. The coaching intervention group had a 57.7% rate of attendance at CR intake, compared to a 33.3% attendance rate of the usual care group. The rate of attendance for the usual care group is similar to the rate of attendance at CR intake for all patients referred to the primary CR site for this institution (30%) (Clark, 2009). These numbers reflect previous literature which has documented the under-utilization of CR programs over the last 15 years (Ades, 2001; Daly et al., 2002; Evenson & Fleury, 2000; Evenson et al., 1998; Halm et al., 1999; King et al., 1999; Lieberman et al., 1998). Of interest is that women are typically less likely to receive CR than men yet in this study the usual care group attended at a rate similar to the literature in general.

The difference in attendance between the coaching group and the usual care group represents an absolute difference of 24.3%. These results are similar to those found in two other telephone intervention studies designed to
educate participants about the benefits of CR and remind them of their CR intake appointment where attendance improved from 25 to 28% (absolute difference) (Harkness et al., 2005; Pasquali, Alexander, Lytle, et al., 2001). While the results are similar, these studies were not RCT’s and the interventions were different from both content and dose perspective with Harkness (2005) and Pasquali (Pasquali, Alexander, Lytle, et al., 2001) each delivering a single telephone call to a CABG surgery population. In addition, one of the studies took place in a setting without automatic referral and found the primary reason for nonparticipation to be lack of physician referral (78%) (Pasquali, Alexander, Lytle, et al., 2001) effectively leaving the patient without access to CR and maybe not knowing anything about CR. If the participants were interested, the researcher went on to facilitate referral for the participant by contacting the closest CR program or the participants’ family physician. This means that the 25% increase in attendance Pasquali (2001) found may be primarily related to the referral process. The Harkness study (Harkness et al., 2005) was specifically designed to remind the patient of their CR Intake appointment, giving them concrete information concerning the timing and location of the appointment. In the present study, the investigator was frequently asked for this information. Participants were given the CR program telephone numbers and encouraged to connect with the program to obtain this information. In the immediate discharge period being able to give the appointment time and location directly to the participants may have strengthened the intervention and enhanced attendance at CR.
The structured coaching intervention in this trial utilized self-management support to empower participants by giving them knowledge and support as they worked toward the self-management of their cardiac disease and achieving their health goals. The intervention was based on Stanford University’s CDSMP, a six-week program designed to help people with chronic illness develop self-management strategies. While no other trials were found which specifically used the Stanford model to enhance attendance at CR intake, a systematic evaluation of interventions to improve uptake found self-management strategies to show some promise in improving uptake of CR (Beswick et al., 2005).

Two components of the coaching intervention, information and problem solving, have been suggested as improving CR intake in other studies. A qualitative study designed to describe the factors affecting women’s attendance at a CR program interviewed 40 participants following MI. While the attenders and non-attenders reported similar barriers, those women who attend CR intake remembered CR staff helping them to explore solutions to personal barriers (McSweeney & Crane, 2001). Similarly, the telephone intervention in Harkness et al.’s (2005) study asked participants to identify barriers and then the nurse clinician helped problem solve transportation, scheduling and language barriers. This would be similar to the problem-solving component of the coaching intervention, where women were asked to identify potential barriers to CR intake attendance and then discuss potential solutions. Several studies have suggested that patients with more cardiac education and information concerning the benefits of CR may be more likely to attend CR intake (Arthur et al., 2000;
Bunker, McBurney, & Aikman, 1998; Cooper et al., 2002; Grace et al., 2005; Harkness et al., 2005). While direct comparisons cannot be made due to variations in design, specific interventions and timing of outcome measurements, these findings suggest that increased knowledge and assistance with problem-solving could be the underlying mechanisms by which a coaching intervention, such as the one in the current study, achieves improved attendance outcomes.

In this pilot trial the most common reason for non-attendance in both groups was transportation. Transportation and location of CR program have been identified as practical problems, which impact intake to and uptake of CR (Ades, Waldmann, McCann, et al., 1992; Johnson et al., 1998; King et al., 1999). This pilot trial was conducted at a tertiary care hospital that serves the greater northern Toronto area. There are 11 cardiac rehabilitation programs associated with the study hospital. Eleven of the participants lived more than 30 kilometres away from the nearest CR centre. Several studies have reported patients who live in the city or in close proximity to a CR centre are more likely to enroll than rural dwellers (Brady et al., 2005; King, Humen, Smith, Phan, & Teo, 2001; King et al., 1999; Smith et al., 2006).

Although distance may be part of the issue, six women living within 10 kilometres of a site still found transportation issues difficult to overcome. Reasons cited included having to pay for parking, not knowing how to drive, not having a car or having only one car and not wanting to inconvenience others in the household. Being unable to drive and therefore more reliant on public
transportation or others has previously been reported as a barrier to CR in elderly women (Halm et al., 1999).

Eight participants were concerned about the timing of the CR program, with several participants saying they would prefer to participate at another time. This concern is not widely reflected in the literature with only one other study found indicating that timing was a barrier (Plach, 2002).

While traditional centre-based CR programs are usually offered to individuals after a cardiac event, a recent systematic review found that home-based CR is equally effective in improving the clinical outcomes in patients following MI and revascularization (Taylor, Dalal, Jolly, Moxham, & Zawada, 2010). Most women in the intervention group did not remember hearing about home-based programs. During the coaching intervention the option of a home program was offered and the contact information for programs providing home programs was supplied. Having this information may increase the likelihood of attending CR intake, as women may be hesitant to present at a CR intake appointment if they feel their only option is to attend in-person exercise session and then cope with ongoing transportation and timing issues. This information concerning home programs given to the coaching participants may account for some of the increased attendance at CR intake.

Health concerns were the next most frequently cited reason for non-attendance with nine women ($n = 66, 13.6\%$) stating that they did not feel well enough to attend CR. Poor perceived health has been frequently cited as a barrier to CR participation in both men and women (Allen, Scott, Stewart,
Several studies specifically identify the presence of comorbidities such as arthritis, peripheral vascular disease and hospital re-admission as one of the most common reasons for not attending CR (Brown et al., 2009; Grace et al., 2009; Halm et al., 1999). In this study over 50% of the participants complained of arthritis and 30% had diagnosed diabetes mellitus, 2 significant comorbidities. In addition, during the coaching intervention, seven participants identified sternal or leg wound healing problems requiring intravenous antibiotics and ongoing nursing care. During final data collection only three participants in the coaching group said that their health concerns were the primary reason for non-attendance at CR intake appointment. This may indicate their wound healing problems had resolved or the intervention concerning the importance of CR may have helped women understand the additional resources CR would provide.

Seven patients commented on the lack of physician endorsement with relation to CR programs. Four of these patients perceived that their physician did not think CR was important and cited this as their major reason for non-attendance. This reflects results from the literature reporting that physician recommendation is the most powerful predictor of patient participation in CR programs for both men and women (Ades, Huang, et al., 1992; Gallagher et al., 2003; Heid & Schmelzer, 2004; Lieberman et al., 1998). Two participants in the intervention group were told that they “were too well” and their physicians indicated that they did not need to attend a CR program. This is interesting as
these patients would have heard about the benefits of CR from the study nurse, and several studies have found that women rate the opinion of nurses right after physician recommendation as an important influence in the decision to attend CR (Gallagher et al., 2003; Heid & Schmelzer, 2004; Lieberman et al., 1998).

This may be due to participants perceiving that the nurse scientist was a “researcher” not an “expert cardiovascular nurse” as she introduced herself as a research nurse and was clear that she was not providing medical advice but rather supporting participants in their self-management during recovery.

Several studies have reported on the success of telephone interventions in secondary prevention for participants with CVD (Redfern et al., 2008, 2009; Vale et al., 2003). Vale et al. (2003) showed a reduction in cholesterol levels following a telephone coaching intervention designed to assist participants understand cardiac risk factors, in particular lipid values, set goals and communicate with their physicians. The authors attributed success to information giving, empowerment and decision-making support. Redfern et al. (2009) delivered a patient-centred intervention which included a one hour consultation and four 10-minute follow-up phone calls over three months designed to provide information and assist participants set goals and develop written action plans. The authors reported significantly reduced risk factor level for the intervention group as compared to the control group. While these two RCT’s were not designed to enhance attendance at CR intake, they do demonstrate the effectiveness of telephone interventions in a similar population. In addition, the successful interventions were similarly based on information
giving, goal setting and action planning and assistance with communication with HCP’s.

Results from this trial support previous studies’ delivering telephone interventions to cardiac patients. While the intervention successfully increased attendance at CR intake, 42% of the participants in the intervention group still did not attend CR intake. Suggestions to strengthen the intervention include: a) being able to let the participant know date, time and location of CR intake appointment as many participants reported not knowing when their appointment was, b) sending the attending physician a letter stating the benefits of CR and indicating their patient has been referred to CR, c) having participants develop written action plans, and d) asking participants to make a personal commitment to the written action plan (Harkness et al., 2005; Lorig et al., 2006; Redfern et al., 2009; Vale et al., 2003).

Secondary – Self-Efficacy

“What is the effect of a coaching intervention designed to support self-management, delivered by telephone on (a) self-efficacy for cardiac exercise and (b) self-efficacy to attend CR intake?”

Self-efficacy for cardiac exercise. The mean self-efficacy for cardiac exercise was 3.23 (SD = 0.794) with the highest possible score being 5. There was no difference in self-efficacy between usual care and the coaching intervention groups. In addition post-hoc analysis revealed no correlation observed between self-efficacy for cardiac exercise and attendance at CR intake (r = 0.060, p < 0.633).
Self-efficacy for cardiac exercise in the coaching group was 3.35 (SD = 0.782) and 3.10 (SD = 0.798) in the usual care group. A recent review of self-efficacy for exercise in cardiac rehabilitation (Woodgate & Brawley, 2008) identified 11 studies which utilized interventions to increase self-efficacy for exercise all indicating that self-efficacy can be improved with intervention and support a positive relationship between self-efficacy and activity. While these would not be directly comparable with the present trial, as these studies compare self-efficacy for exercise pre and post intervention, it is worthwhile looking at the interventions. Five of the studies were on-site exercise-only interventions and therefore not comparable to the present trial which had no on-site exercise intervention. Exercise was coupled with psychosocial interventions in three studies. Two of these studies compared traditional CR programs with modified programs designed to increase exercise self-efficacy through enhanced education, vicarious persuasion and decreased supervised exercise time (Carlson et al., 2001; Rejeski et al., 2003). Both found that self-efficacy increased following the intervention. While these interventions showed improvements in exercise self-efficacy they differ from the present trial in several aspects. The interventions were substantially longer, about 36 hours in total over three months and were delivered face to face. On-site exercise was a significant component of both interventions; this allows participants to experience performance accomplishment and to have physiologic issues addressed as they occur. The third study enrolled 40 participants who had participated in inpatient cardiac rehabilitation and randomly assigned to 3
different groups; a) routine care, i.e. no supervised exercise or teaching, b) exercise testing and teaching and c) exercise testing, teaching and exercise training (Gulanick, 1991). All groups showed an increase in self-efficacy score with the exercise-training group attaining the highest scores. The difference between groups was not significant and the author concluded this sample of uncomplicated, motivated participants all had substantial improvements in self-efficacy prior to out patient rehabilitation.

Three studies were solely psychosocial interventions and used both information and vicarious experience to enhance self-efficacy for exercise. All studies occurred in a cardiac surgical population and the samples were comprised almost entirely of men who have been found to have higher self-efficacy for exercise than women in general (Blanchard, Rodgers, Courneya, Daub, & Black, 2002; Jenkins & Gortner, 1998; Parent & Fortin, 2000; Schuster & Waldron, 1991). Two studies used telephone counseling by an RN (Gilliss et al., 1993; Gortner & Jenkins, 1990), and the third used a peer to provide counseling and support in the participant’s home (Parent & Fortin, 2000). The three studies each found that self-efficacy for exercise increased over time in both the experimental groups and the usual care groups. Gilliss et al. (1993) found the participants in the experimental group had higher self-efficacy for walking when compared to the usual care group at eight weeks following discharge. Gortner and Jenkins (1990) had similar findings at eight weeks, but found no significant differences between the experimental group and usual care group at 12 or 24 weeks following discharge. Parent and Fortin (2000)
measured self-efficacy for exercise at 5 days following surgery finding the intervention group had higher self-efficacy than the control group, but at 4 weeks following surgery they found no significant differences between the experimental and usual care groups. The increase in self-efficacy for both intervention and control groups reflects the progressive healing and confidence patients gain during their initial recovery. The lack of difference between groups as time progresses suggests that there may be a ceiling effect post event. In the immediate post event phase expectations are dynamic and quickly changing as physical recovery progresses. This suggests that self-efficacy should be measured earlier in the recovery trajectory. In this pilot trial self-efficacy for exercise was measured at 10 – 12 weeks following discharge. The lack of significant between groups supports findings of these studies. Future trials should consider measuring self-efficacy for exercise at baseline. A measure of physical activity could be added to examine the relationship between self-efficacy for exercise and actual activity.

**Self-efficacy to attend CR intake.** The mean self-efficacy to attend CR intake was 66.06 (SD = 23.65), with the highest possible score being 100. There was no difference in self-efficacy between usual care and the coaching intervention group. While there was no significant difference between the intervention group and the control group, post-hoc analysis revealed a positive correlation observed between self-efficacy to attend CR and attendance at CR intake \(r = 0.484, p < 0.01\). While no other studies have examined interventions to enhance self-efficacy to attend CR intake, several studies have shown self-
efficacy to be positively correlated with exercise participation and CR participation. An early study of 40 men post MI demonstrated that self-efficacy measured following exercise treadmill testing predicted participation in exercise as well as intensity and duration of exercise (Ewart, Taylor, Reese, & DeBusk, 1983). When compared to functional evaluation (peak treadmill heart rate) the self-efficacy judgments of these participants were more predictive of ongoing exercise compliance. Robertson and Keller (1992) demonstrated that self-efficacy predicted cardiac patients' adherence to a recommended exercise program. Several studies have shown that self-efficacy is positively correlated to CR participation (Boogaard, 1984; Grace et al., 2002; Schuster & Waldron, 1991; Vidmar & Rubinson, 1994). The positive findings across studies, despite differences in timing and measurement of self-efficacy support the relationship between self-efficacy and attendance at CR. Future trials should consider measuring SEACRI at different points in time to determine if the intervention has a positive impact on self-efficacy judgments.
Summary, Implications and Conclusion

Summary of the Study

Cardiovascular disease continues to be the leading cause of death of Canadian women and while treatment for CVD has improved dramatically, women typically fare worse than men. Cardiac rehabilitation (CR) is well established as a key intervention in the treatment of CAD and has been shown to be effective in both men and women. CR remains largely underutilized, especially in women who comprise only 12 – 24% of contemporary CR programs, even though the prevalence of CAD in men and women is similar (American Heart Association, 2009).

Several factors have been identified which increase CR program intake in women. These include strong physician referral, higher education and income, living in an urban community and strong social support. Barriers identified include transportation issues, co-morbidities, family commitments, timing of the program and anxiety (Arthur, 2001; Stone, 2004). Existing processes, including automatic referral, do not adequately address the issue of CR utilization by female cardiac patients (Grace et al., 2004a; Harkness et al., 2005). Several studies have shown telephone interventions as effective in increasing attendance to CR intake appointment. Methodological problems related to
retrospective design, sample selection and prognostic factors preclude generalizations.

The objectives of this pilot trial were to test the feasibility of all procedures for a larger, definitive trial, to inform the content of the coaching intervention and to determine the effects of telephone coaching on women’s attendance at CR intake appointment, self-efficacy for cardiac exercise and self-efficacy to attend CR. The telephone coaching intervention was based on Lorig’s Chronic Disease Self-Management Program, which is grounded in Social Cognitive Theory. Telephone coaching, designed to support self-management, was proposed to have an effect on health behaviour, attendance at CR intake appointment by improving confidence to exercise, increasing knowledge concerning the benefits of CR and assisting with problem-solving to overcome barriers to attending CR.

There were 70 women randomized prior to hospital discharge to either the control (usual care) or the intervention group (usual care plus telephone coaching). Participants were mainly married, had a high school education and were retired. The most common reason for admission was coronary artery bypass graft surgery. The age range of the sample was 38 to 89 years and most women would be classified as obese or larger by BMI. All trial outcomes were measured just prior to CR intake appointment, about 10 weeks following discharge, including (a) attendance at CR intake appointment, (b) confidence for cardiac exercise (CESEI) and (c) confidence to attend CR (SEACRI). Since this was a pilot trial, there were no formal tests of hypotheses. Although this pilot
trial was not powered to determine significant group differences, exploratory research questions were used to determine indicators of telephone coaching on CR intake attendance, self-efficacy for cardiac exercise and self-efficacy to attend CR intake. Properties of their distribution were assessed by group: including the frequencies and percentages for categorical variables and mean and variance for continuous variables. Also, chi-square and t-tests were used to detect significant group differences.

Recruitment for the trial went as planned, with only 15% of eligible patients refusing to participate, the majority reporting being too ill or too busy with competing responsibilities to participate. Off those who participated, the majority ($n = 32$) were satisfied with their coaching experience; they found the information provided to be helpful with goal setting, action planning and assisted them in their interactions with their health care providers. Participants found that the telephone calls occurred as planned and most felt that they had enough contact with the coach. The primary investigator had no difficulty making the initial contact with the participants within two weeks of hospital discharge. Most of the participants received 3 calls ($n = 19, 56\%$) prior to CR intake appointment and the telephone calls were generally less than 28 minutes in duration ($n = 118, 99\%$). The focus of the calls was to: (a) discuss self-management (b) discuss the benefits of cardiac rehabilitation (c) discuss goal-setting and action planning and (d) discuss problem-solving in relation to barriers to CR attendance.
The telephone coaching intervention group was statistically more likely to attend CR intake appointment when compared with the usual care group. At ten weeks post-discharge, 57.6% of women in the intervention group had attended CR intake compared to 33.3% in the usual care group (p=0.048). The most common reason for non-attendance in both groups was transportation, followed by health concerns and lack of physician endorsement. This reflects previously reported barriers to CR attendance. Self-efficacy for cardiac exercise and self-efficacy to attend CR intake did not differ between groups when measured at ten weeks post-discharge. However, there was a positive correlation observed between self-efficacy to attend CR and attendance at CR intake (r = 0.484, p < 0.01).

Implications for Research

The main purpose of this pilot trial was to test the feasibility of all procedures for a larger, definitive trial. This pilot did demonstrate the feasibility of recruitment (83.3%), adherence (94%) and acceptability of the intervention with 100% of participants saying they found the intervention useful and would recommend to a friend. In addition, participants in the intervention group were more likely to attend CR intake appointment (p= 0.048), which reflects previous trials using telephone interventions to increase attendance at CR intake. Other trials have shown good evidence for the use of telephone interventions in secondary prevention in patients with CVD. Therefore replicating this trial using the same intervention is likely not warranted. A telephone coaching intervention has been shown to be feasible and effective, especially for women who live in
large geographical areas, where distance and access to transportation may restrict their ability to access information.

However, given that the effect size of the intervention was small (\(\Phi = 0.243\)) a case could be made for strengthening the intervention and conducting a second trial. Strategies to strengthen the intervention include: a) giving information concerning the exact time and place of CR intake appointment, b) providing basic cardiac health education such as nitroglycerine use, the importance of medication use and when to call the doctor or activate the health care system and c) the use of written action plans. Similarly, participants did require flexibility in re-scheduling telephone calls and providing an email address to schedule appointments may be considered in future telephone interventions. Increased focus on transportation and location of CR programs and availability of formal home CR programs could be a more formal aspect of the telephone intervention.

While telephone interventions are successful society is quickly embracing the Internet with Statistics Canada reporting 80% of Canadians over the age of 16 used the Internet for personal reasons in 2009 (Statistics Canada, 2011). Women in particular (74%) used the Internet to search for health and medical information. A coaching intervention designed to support self-management could be delivered via Internet and this is worthwhile exploring and evaluating.

Self-efficacy for exercise and self-efficacy to attend CR were measured at ten to twelve weeks post discharge (SECEI and SEACRI). There were no significant differences between groups in this trial. With respect to exercise,
other studies have suggested that self-efficacy for exercise will improve in all cardiac patients over time and that there may be a ceiling effect at four or eight weeks. This would suggest that the measurement of self-efficacy for exercise at ten to twelve weeks occurs too late to detect a difference between groups. In addition, the SECEI score was not correlated with attendance at CR intake. This may not be an appropriate measure for this population as other studies suggesting patients with higher self-efficacy are more likely to attend CR programs used generalized measures of self-efficacy (Boogaard, 1984; Grace et al., 2002; Robertson & Keller, 1992; Schuster & Waldron, 1991).

There was a positive correlation observed between the SEACRI and attendance at CR. This finding supports similar findings in previous studies but more research is needed to confirm this relationship. Future research examining the predictive value of this scale is warranted. If patients with high SEACRI actually attend CR intake with no intervention the scale may be utilized to determine which patients require telephone interventions following discharge to enhance attendance at CR intake. In addition, in a future coaching intervention trial it would be important to measure self-efficacy to attend CR at enrollment and following intervention. This would help determine if self-efficacy to attend CR increases as a result of time in the control group and if the telephone intervention makes any difference in SEACRI.

Further research is warranted on the messaging cardiac patients hear concerning the importance of CR. All participants were recruited from the same institution, yet took home different information regarding the importance of CR in
general and for herself in particular. This is an area worthy of further exploration. Recent guidelines support the use of a bedside liaison strategy prior to discharge (Grace et al., 2011). In addition, studies report patients value what nurses have to say concerning CR (Gallagher et al., 2003; Heid & Schmelzer, 2004; Lieberman et al., 1998). Therefore research to examine the exact timing and content of the information giving at the bedside would be an important step. Present practice could be examined and a liaison strategy could be developed and evaluated.

**Implications for Practice**

In this pilot trial the telephone coaching intervention group was significantly more likely to attend CR intake than the usual care group ten weeks post cardiac discharge. As such, a telephone coaching intervention, based on Lorig and Holman’s (2003) self-management core skills, has the potential to address a major identified gap in CR utilization in Canada. The Canadian Cardiovascular Society and the Canadian Association of Cardiac Rehabilitation have expressed an urgent need for interventions to address the low rates of CR utilization in Canada due to the low rate of enrollment of eligible cardiac patients (approximately 30%) (Grace et al., 2011). In particular, “liaison” strategies are recommended to supplement systematic referral and include a bedside discussion of the benefits of CR and potential barriers to participation. A coaching intervention delivered by telephone provides this information, in addition to providing self-management support, and may be advantageous in this era of shortening length of hospital stay. Specifically, those women who
present for PCI or have primary PCI may be discharged within 24 hours making bedside discussion difficult.

The high enrollment and low attrition rates may represent a desire for self-management support in the follow-up time period extending from hospital stay to twelve weeks post discharge. This study found high participant satisfaction with the telephone intervention. The importance of self-efficacy enhancing interventions and the development of self-management skills was recently stressed in the 3rd edition of the *Canadian Guidelines for Cardiac Rehabilitation and Cardiovascular Disease Prevention* (Canadian Association of Cardiac Rehabilitation, 2009; Prior, Francis, Reitav, & Stone, 2009). The authors strongly recommend incorporating self-efficacy enhancing interventions into a framework designed to train participants in self-management skills. The early provision of these skills could serve as a bridge to entry to CR. Telephone coaching interventions may be especially important for those women waiting to attend CR programs who live in rural areas, where distance and geography may restrict access to other forms of self-management support.

**Conclusion**

Cardiac rehabilitation is an important component of the CVD care continuum, improving functional status and decreasing mortality and morbidity. In Ontario, only 30% of eligible cardiac patients enroll in CR programs. As a result of this a recent position paper calls for systematic referral strategies, including a bedside discussion. Previous evidence suggests that even in the setting of systematic referral and bedside discussion less than 70% of eligible
patients will attend CR intake. Interventions based on self-management support and delivered by telephone have shown promise in changing health behaviours but none were found focusing on women with cardiac disease. The results of this pilot trial suggest that a telephone coaching intervention designed to enhance self-management is feasible and may improve attendance at CR intake for women following hospital discharge with a cardiac event. However, an adequately powered larger trial needs to be undertaken to determine the effect of a telephone coaching intervention on self-efficacy for exercise, self-efficacy to attend CR and attendance/enrollment in CR. Consideration should be given to determining the health care costs associated with a telephone coaching intervention for women following cardiac discharge.
REFERENCES


Daly, J., Sindone, A. P., Thompson, D. R., Hancock, K., Chang, E., & Davidson, P. (2002). Barriers to participation in and adherence to cardiac rehabilitation programs: a critical literature review. Prog Cardiovasc Nurs, 17(1), 8-17.


APPENDICES
Appendix A

[HOSPITAL LETTERHEAD]

A Pilot Trial of a Coaching Intervention Designed To Increase Women’s Attendance At Cardiac Rehabilitation Intake

PATIENT INFORMATION AND CONSENT

Primary Investigator: Jennifer Price 416 323 6400 x 4464
Jennifer.price@utoronto.ca
Supervisor Dr. Diane Doran 416 978 2866
Diane.doran@utoronto.ca

Purpose and Background
This study is a partial requirement of the PhD thesis requirements of the Lawrence S. Bloomberg Faculty of Nursing, University of Toronto.

Women who experience a cardiac event (heart attack, coronary bypass or valve surgery or angioplasty) sometimes have barriers to attending Cardiac Rehabilitation intake appointment. The purpose of this study is to examine whether telephone calls from a registered nurse can help women overcome barriers to Cardiac Rehabilitation.

Invitation
You are being invited to participate in the study Coaching Women to Attend Cardiac Rehabilitation Intake

Eligibility
To be eligible to participate you must
1) have a cardiac diagnosis (MI, angina, congestive heart failure, Coronary Artery Bypass Graft, Coronary Artery Bypass Graft/valve or valve surgery or Percutaneous Coronary Intervention)
2) be referred to Cardiac Rehabilitation and ready for discharge to home (either their own or to family/friends)
3) have access to and are able to communicate over a telephone
4) able to read, write and understand English.

Procedures
If you agree to participate in this study, the following things will happen:
1. You will be asked to provide information concerning yourself and your health status. In addition, you will be asked to fill out a questionnaire prior to your scheduled cardiac rehabilitation intake appointment. While encouraged to answer all the questions, you are under no obligation to do so.
2. You may be asked to schedule regular telephone calls, with a registered nurse, which will occur every two weeks until your intake appointment at cardiac
rehabilitation to a maximum of 5 calls. These phone calls will last between 15 and
30 minutes and will include talking about any problems or barriers you may have
with attending the intake appointment. The nurse will be assisting you to develop
goals and action plans to deal with any identified problems or barriers.

3. You understand that the telephone calls you receive are not meant to replace your
regular ongoing treatment. You should not change any aspect of your regular
treatment without first talking to your doctor.

Right to Refuse or Withdraw
Your participation in this study is entirely voluntary and you are free to refuse to take
part in the study or withdraw at any time without affecting or jeopardizing your health
and medical care.

Potential Benefits
There are two potential benefits of this study. By participating in the telephone calls
you may be more likely to attend cardiac rehabilitation which has proven health
benefits. Secondly, the results of the study might help health care professionals better
understand ways to help women with cardiac disease overcome problems/barriers to
attending cardiac rehabilitation programs.

Potential Risks
There are no known risks to participating in the study and speaking with the registered
nurse. If you find the telephone calls upsetting, you can speak with the nurse, the
researchers conducting the study or your doctor to discuss the problem.

Confidentiality
Information about specific individuals in this study will be kept strictly confidential, and
will not be available to anyone except the researchers. Only an identification number
will appear on the questionnaires, and therefore your responses will remain
anonymous. One copy of your name and your study identification number will be kept
in a locked file drawer in the researcher's office. No one but the researchers will have
access to the file. All information obtained in this study will be used for research
purposes only.

Cost
There is no cost for receiving the telephone calls from the registered nurse.

Financial Compensation
There is no financial compensation to participate in this study.

Rights of Participants
Your signature on this form indicates that you have understood to your satisfaction the
information regarding your participation in the research project and that you agree to
participate. In no way does this waive your legal rights nor release the investigators,
sponsors, or involved institutions from their legal and professional responsibilities.

I, ____________________________________________, the undersigned, agree to my
participations in the research study described. Any questions I had have been
answered and I understand what is involved in the study. I realize that participation is voluntary and that there is no guarantee that I will benefit from my involvement. I acknowledge that a copy of this form has been offered to me.

(Signature of Participant)  (Date)

(Printed Name of Participant)

To be signed by the Research Nurse:

To the best of my ability I have fully explained to the participant the nature of this research study. I have invited questions and provided answers. I believe that this individual fully understands the implications and voluntary nature of the study. I have been given a copy of this consent form.

(Signature of Research Nurse)  (Date)

(Printed Name of Research Nurse)

Contact
If you have any concerns about your treatment and rights as a research participant, please contact Jill Parsons, Health Sciences Ethics Review Officer, Ethics Review Office, University of Toronto at (416) 946-5806 or by email: jc.parsons@utoronto.ca.

Dissemination of Findings
If you wish, the researchers will send you a copy of the results of the study.
Appendix B
Cardiac Exercise Self-Efficacy Instrument

Beside each item below, please circle the number that represents how much confidence you have about performing it.

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<td>2. Exercising without getting chest pain.</td>
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<td>1 2 3 4 5</td>
<td>3. Knowing when I have exercised too much and need to stop.</td>
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<td>4. Exercising when it is inconvenient.</td>
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<td>5. Knowing what my heart rate should be before and after exercise.</td>
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<td>6. “Cooling down” after exercise.</td>
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<td>7. Fitting exercise into a busy day.</td>
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<td>9. Knowing what exercise is healthy for me.</td>
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<td>11. Enduring moderate exercise.</td>
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<td>12. Taking my heart rate before and after exercise.</td>
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<td>13. Resuming my pre-hospital level of activity.</td>
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<td>14. Enduring light exercise.</td>
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<td>15. Exercising for at least 20 minutes three times each week.</td>
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<td>16. Exercising at home by myself.</td>
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Appendix C

Self-Efficacy to Attend CR Intake Instrument

Participant Study #:        

Participant’s Date of Birth:        
year  month  day

Self-Efficacy to Attend CR Intake Instrument

There are a number of possible situations that can make it hard for you to attend your Cardiac Rehabilitation (CR) intake appointment. The following questions ask you to rate how confident you are that you can attend your CR intake appointment under the following circumstances. Please indicate how confident you are for each of the following situations, using the following scale.

Please circle the number that corresponds to how CONFIDENT you are that you will be able to attend your cardiac rehabilitation intake appointment in the following situations:

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## Self-Efficacy to Attend CR Intake Instrument

**Please circle the number that corresponds to how CONFIDENT you are that you will be able to attend your cardiac rehabilitation intake appointment in the following situations:**

1. **When I am feeling tired**

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2. **When I am feeling anxious**

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3. **When I am feeling down**

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4. **When I am not sure what to expect**

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Self-Efficacy to Attend CR Intake Instrument

Please circle the number that corresponds to how CONFIDENT you are that you will be able to attend your cardiac rehabilitation intake appointment in the following situations:

5. When I think it is too difficult to get there

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6. When I have too much work to do at home

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7. When I am feeling under pressure at work

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8. When I don’t feel strong enough

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Appendix D

Patient Contact Form

CONFIDENTIAL: Retain separately from participant file

Participant Study #: ____________

Participant’s Date of Birth: ____________ ____________ ____________
year month day

Participant’s Date of Randomization: ____________ ____________ ____________
year month day

Allocation Group: ○ Usual Care
○ Coaching Intervention

______________________________________________________________

Contact Information

Patient’s Contact Information:

Name: ________________________________

Address: ________________________________
________________________________________

Telephone: ________________________________

Cell phone: ________________________________

Email: ________________________________
Appendix E
Participant Entry Form

Participant Study #: 

Participant’s Date of Birth: 

Baseline Information at Randomization (complete immediately before randomization)

1. Marital Status (Mark ONE ONLY)
   - Single/never married
   - Separated/Divorced
   - Married or living in a stable relationship
   - Widowed

2. Level of Education Completed (Mark ONE ONLY)
   - Elementary School
   - High School
   - College of University
   - Post Graduate degree

3. Current Employment Status (Mark ONE ONLY)
   - Employed Full Time
   - Employed Part Time by Choice
   - Employed Part Time due to Illness
   - Unemployed due to Illness
   - Unemployed by Choice
   - Unemployed
   - Homemaker
   - Student
   - Retired

4. Describe employment
Participant Entry Form

Participant Study #: [ ] [ ] [ ]

Participant’s Date of Birth: [ ] [ ] [ ]
  year  month  day

Baseline Information at Randomization (complete immediately before randomization)

5. Height (Mark ONE ONLY): [ ] [ ] ○ feet/inches
   ○ centimetres

6. Weight (Mark ONE ONLY): [ ] [ ] ○ feet/inches
   ○ centimetres

7. Waist Circumference (Mark ONE ONLY): [ ] [ ] ○ feet/inches
   ○ centimetres

8. Canadian Cardiovascular Society (CCS) Functional Classification (Mark ONE ONLY):
   ○ Class I
   ○ Class II
   ○ Class III
   ○ Class IV
   ○ Not documented

9. New York Heart Association (NYHA) Functional Classification (Mark ONE ONLY):
   ○ Class I
   ○ Class II
   ○ Class III
   ○ Class IV
   ○ Not documented

10. Cardiac Diagnosis (Mark ALL THAT APPLY THIS ADMISSION)
    ○ MI
    ○ CHF
    ○ Angina
    ○ PCI
    ○ CABG
    ○ CABG+valve

Page 2 of 3
Participant Entry Form

Participant Study #: 

Participant’s Date of Birth: 
year  month  day

Baseline Information at Randomization (complete immediately before randomization)

11. Co-morbidities (Mark ALL THAT APPLY):
   - Previous MI
   - Angina
   - Previous CABG
   - Stroke or TIA
   - Diabetes types I and II
   - Arthritis
   - Depression
   - Visual Impairment
   - Anxiety or panic disorder
   - Previous CHF
   - Previous PCI
   - Previous CABG+valve
   - Peripheral Vascular Disease
   - COPD
   - Osteoporosis
   - Degenerative disc disease
   - Hearing impairment
   - Neurological disease

12. How long was the hospital stay:  days

RANDOMIZATION PROCEDURE:

STEP 1: Complete Participant Entry Form
STEP 2: Log on to www.randomize.net. Follow the instructions to determine the study group assigned by the Randomization Service.
STEP 3: Complete the remaining portion of the Participant Entry Form (below)

Assigned Study Group (enter the group assigned by the Randomization Service):
   - Usual Care
   - Coaching Intervention

Date of Randomization: 
year  month  day
Appendix F

Structured Coaching Intervention

Individualized coaching, designed to support self-management, will be delivered by telephone between discharge from hospital and scheduled CR intake appointment. All telephone calls will be scheduled occurring approximately every two weeks. This will result in three to five calls to each participant depending on wait time to CR intake and the individual participant. Self-management includes having the confidence to deal with health care professionals, role management and emotional management of their condition. The structured coaching intervention used in this study is based on Lorig’s Chronic Disease Self-Management Program (CDSMP). Throughout the intervention the four modes of efficacy influence will be utilized to enhance participants’ beliefs in their ability to attend CR intake. These include mastery of physical/similar activities, vicarious learning, verbal persuasion and correct misinterpretations of physiological state.

Week 1-2 (first call)

After re-introducing herself and the study the first telephone call will introduce the participant to self-management and assess the participants understanding of CR. “Today I want to talk to you about your heart disease and how you are managing with any changes your “cardiac event” brought about. Many patients have chosen to actively manage their health by learning self-management skills which can help them to take care of their health, carry out normal activities and manage emotional changes.” “I understand that you have been referred to a cardiac rehabilitation program. Can you tell me what attending a CR program would mean to you?” The benefits of CR and myths concerning CR will be reviewed. Giving participants timely and appropriate information aids decision-making, an important self-management skill. Other information shared may concern physiological symptoms when exercising, what to do if chest pain occurs and when to follow up with the HCP.

Benefits of CR include:

*Exercise based CR decreases cardiac and total mortality*

*Improvements in cardiac risk factors*

*Increased activity tolerance*,

Examples of myths include:

*too old to go to CR*

*too sick to go to CR*

*too well to go to CR*

Setting goals and making action plans will be explained. Taking action is one of the skills associated with behaviour change. Action plans involve the steps toward attaining a goal of the participant. Action plans should be achievable and action specific. They answer the questions *what, how much, when and how*
often. Finally, they should be something the participant is fairly sure she can accomplish. The participant will be encouraged to develop an action plan. The investigator can provide support and positive re-enforcement as the patient attains goals but may also assist the patient in identifying other supports such as peers or family members who have attended CR or made positive behaviour changes such as implementing an exercise program (vicarious learning).

Week 3 – 4 (second call)

The investigator will follow up on the goals and action plan set by the participant on the previous call. Any questions the participants identify concerning the benefits of CR will also be addressed. The participants will then be asked if they perceive any barriers to attending their CR Intake appointment. This leads into education concerning problem solving, another important self-management skill. Basic problem solving skills will be taught and include: identification of the problem/barrier, generation of possible solutions (includes asking for assistance with ideas from friends or HCP), select and implement a solution, assess results, substitute another solution if necessary, and utilize other resources. Together the investigator and participant will work through potential barriers to attending CR intake and generate solutions which could work for this participant. The investigator will provide encouragement and resources to promote problem solving. Finding and utilizing resources is an important self-management skill. The investigator will assist participants to identify consultants who can assist participants as they look for resources such as transportation, babysitting or eldercare solutions. Consultants may be the participant’s family or friends, their health care providers or a community resource program. To complete the call the participant will be asked to make an action plan – this could concern an identified barrier or could potentially be a plan to exercise.

Week 5 – 6 (third call)

The investigator will follow up on the goals and action plan set by the participant on the previous call. Any questions concerning barriers to CR intake will also be followed up – asking the participant if they have thought of a solution or would like assistance finding a solution. Solutions are generated in partnership – not by the investigator. In preparation for meeting with HCP the “Take PART” method of communication will be shared with participants. This method involves preparing for a visit with the HCP by developing a list of questions and concerns and prioritizing them. The second part is to ask about diagnosis, test results, treatment options and follow-up plans. Repeating these results helps to clarify findings and can enhance understanding. Finally, take action, there is a clear understanding of next steps, perhaps this concerns medications, lifestyle changes or preparation for a test. This is when barriers to action should also be discussed with the HCP.
Week 7 - 11 (depending on the timing of CR intake appointment and participant needs two more calls may be made))

Follow up on previous goals and action planning occurs at the beginning of every call. It is anticipated that these telephone calls will focus on specific barriers to CR intake which participants have identified. The investigator will work with the participant to problem-solve concerning potential barriers.
Appendix G
Coaching Activity Log

Participant Study #: __________

Participant’s Date of Birth: __________ __________ __________
year month day

A. Contact # __________ B. Date (year-month-day) __________ __________ __________

C. Type of Contact (check one only):
   o Talked to participant
   o Left message
   o No answer

D. Duration of Contact: __________ minutes

E. Mark activities you completed with the participant (check all that apply):
   o Reviewed self-management
   o Discussed benefits of CR
   o Discussed myths around CR
   o Explored barriers to CR
   o Explained goal setting
   o Explained Action plans
   o Reviewed problem solving techniques
   o Action plan follow up
   o Discussed partnerships with HCP
   o Identified resources
   o Explained Take PART
   o Reviewed other communication strategies

F. Mark barriers to CR identified by participants (check all that apply):
   o Too hard to get to ___________________________________________________________________
   o Don’t feel well enough __________________________________________________________________
   o Feel too good
   o Too old
   o Program is not important
   o Too young
   o No one told me to go

Page 1 of 2
Coaching Activity Log

Participant Study #: 

Participant’s Date of Birth: 

<table>
<thead>
<tr>
<th>year</th>
<th>month</th>
<th>day</th>
</tr>
</thead>
</table>

A. Contact #  
B. Date (year-month-day) 

<table>
<thead>
<tr>
<th>year</th>
<th>month</th>
<th>day</th>
</tr>
</thead>
</table>

G. Please provide information concerning resources/solutions identified:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

H. Call Notes – other important details including reasons for incomplete or missed calls:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Women’s Hearts
Appendix H

Participant Experience of Coaching Intervention

Participant Study #: 

Participant’s Date of Birth: 

year  month  day

Today’s Date  (year-month-day)  

Participant Experience of The Coaching Intervention

Directions:

In answering the following questions, please think about your coaching experience. The following questions ask you to pick a number which best describes your feelings. While you may not find an answer that exactly matches your feelings, please indicate the number that comes closest to how you feel.

1  2  3  4  5
Strongly Disagree  Disagree  Unsure  Agree  Strongly Agree

Women’s Hearts
Participant Experience of Coaching Intervention

<table>
<thead>
<tr>
<th>In general, my coach</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Unsure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Provided useful information</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2 Helped me set goals</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3 Helped me develop action plans</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4 Assisted me solve my problems</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5 Assisted me in identifying resources</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6 Helped me talk to my doctor</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In general</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Unsure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 My coach telephoned when planned</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2 I liked the telephone contact</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3 I had enough contact with my coach</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4 I found the information helpful</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5 I found the support helpful</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6 I would recommend this to a friend</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Participant Experience of Coaching Intervention

Participant Study #: [Redacted]

Participant's Date of Birth: [Redacted] [Redacted] [Redacted]
year month day

Today's Date (year-month-day) [Redacted] [Redacted] [Redacted]

Participant Experience of The Coaching Intervention

Is there anything else you would like to tell us about your experience working with the coach?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Appendix I

Attendance at Cardiac Rehabilitation Intake Appointment

Participant Study #: 

Participant’s Date of Birth: 

year month day

Scheduled Intake Date: . Date (year-month-day) 

Did the participant attend her scheduled CR Intake Appointment (Mark ONE ONLY):

○ Yes   ○ No

If no, was the appointment rescheduled (Mark ONE ONLY):

○ Yes   ○ No

Please document any reasons given for non-attendance:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Appendix J

[HOSPITAL LETTERHEAD]

Letter of Information

Research Study

Title of the Project: A Pilot Trial of a Coaching Intervention Designed To Increase Women’s Attendance At Cardiac Rehabilitation Intake

Background

If you have had a heart attack, heart surgery or angioplasty; have access to and are able to communicate over a telephone; are able to read, write and understand English; and plan to be discharged home [either to your home or to family/friends] you will be invited to participate in a research study directed by Ms. Jennifer Price. The purpose of this study is to examine whether telephone calls from a registered nurse can help women overcome barriers to Cardiac Rehabilitation. This study is a partial requirement of the PhD thesis requirements of the Lawrence S. Bloomberg Faculty of Nursing, University of Toronto.

Details of the Study:
If you choose to participate in this study, you will be randomly assigned (like flipping a coin) to one of two groups. If you are assigned to Group 1 you will receive the standard or usual care for patients after heart attack, heart surgery or angioplasty at Southlake Regional Health Centre. If you are assigned to Group 2, you will be asked to receive coaching by telephone between discharge from hospital and scheduled cardiac rehabilitation intake appointment. A registered nurse will provide the coaching which will consist of 3 – 5 telephone calls. A research nurse will call you prior to your cardiac rehabilitation intake appointment to ask you questions about your experience with coaching and your confidence to attend cardiac rehabilitation. Data collection interviews will take no longer than 45 minutes.

Other Information
Regardless of your group assignment you will have access to all the standard usual care available to patients following discharge from heart attack, heart surgery, or angioplasty. While you may not benefit directly from this study, results from this study will assist in planning a larger study investigating coaching for patients following heart attack, heart surgery or angioplasty. Results from this larger study may benefit patients in the future. All information obtained during the course of the study is strictly confidential and your anonymity will be protected at all times. Your participation in this study is voluntary. You may withdraw from this study at any time and your withdrawal will not affect your future medical care at Southlake Regional Health Centre.
You have been identified by your Southlake care provider(s) as a possible candidate for participation in the health/healthcare related research study described above. Because of privacy legislation, persons organizing this study cannot contact you regarding possible research study participation unless Southlake first obtains your permission for them to do so. If your permission is given, Southlake would share basic contact information (like your name, phone number and address) with study organizers.

Your consent to such contact would be valued and, ultimately, would help to promote ongoing health and healthcare related research at Southlake. However, it is important for you to understand that you are not required to consent to being contacted by members of the research team. If you decide not to consent to further contact, that decision will not affect the quality of care you would normally receive here at Southlake.

If you do agree to being contacted, a member of the team organizing the research study will be in touch with you to describe the study in greater detail and to make arrangements for you to review and understand the consent for the actual study itself.

This contact will occur within 1 week of today’s consent to further contact.

If you agree to being contacted and if you have not heard from a research organizer within the period of time noted above, and you wish to know why, you may contact a study organizer at (416) 323-6400 Ext. 4464. Note that you will be under no obligation to do so.

Declaration:

By signing below, I declare that I have read and understood the information given above and I hereby give Southlake Regional Health Centre permission to share basic contact information (like my name, phone number and/or address) with persons organizing the above named health-related or healthcare-related research study. I understand that I am under no obligation to do so.

_______________________        _____
(Signature of Participant)    (Printed Name)                                  (day mon yr)
Date: ___ / ___ / ___