

An examination of factors that influence long-term adherence to structured exercise in individuals with established heart disease

By

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of MSc is entirely my own work, that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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Publications and Presentations

Refereed Journal Articles

Appendix A

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Refereed Abstracts

Appendix B

Martin, A. M.; Woods, C. B. (2010). What sustains long-term adherence to Phase IV community-based cardiac rehabilitation? *Irish Association of Cardiac Rehabilitation Annual Scientific Conference*, Dublin, Ireland. (Poster Presentation).

Appendix C

Martin, A. M.; Woods, C. B. (2011). How does a peer mentoring intervention effect adherence to a community based cardiac rehabilitation programme? Preliminary findings. *CARDI Ageing Globally – Ageing Locally International Conference*, Croke Park, Dublin, Ireland. (Poster Presentation).

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Abstract

By: Antonia Martin

Title: An examination of factors that influence long-term adherence to structured exercise in individuals with established heart disease

Background: Long-term adherence to physical activity (PA) following a cardiac event is uncommon. Interventions aiming to address this issue must take into account the influences and motivations of successful long-term adherers and strive to utilise available resources to ensure cost-effectiveness and sustainability. The purpose of this study was to examine factors influencing sustained adherence to an established Phase IV community-based cardiac rehabilitation programme: HeartSmart. This information was used to design, implement and evaluate an intervention to increase adherence among programme newcomers.

Methods: Twenty-four long-term adherers of HeartSmart (N=15 men, 9 women; aged 67.7 years ± 16.7) took part in focus group discussions to determine factors assisting adherence. Results influenced the development of a Peer Mentor (PM) training programme. Eight long-term adherers (100% male, 64-77yrs) completed PM training (8 hours) covering social support, self-efficacy, benefits and barriers of PA adherence and goal setting. The PM role was to provide support, during 2 weekly exercise sessions, to programme newcomers (Mentees). Mentees (N=13, 82% male, 50-77yrs), who had recently experienced a cardiac event were recruited and paired with a PM. Outcome measures included focus groups with PMs and 1-1 interviews with Mentees. Attendance rates, psychosocial correlates (Mentees only) and PA levels were also measured.

Results: Social support, elements of the structured class, health benefits and self-efficacy were the strongest influences of long-term adherers of HeartSmart. PMs rated training highly and reported a positive experience in the role. Challenges identified included assistance with exercise mastery and gauging support required by the Mentees. Mentees: Eight Mentees (7 male) were still attending HeartSmart at 6-weeks (mean 67% adherence) and reported positive experiences of the PM intervention. Reasons for dropout included injury (N=2), illness (1), pace too challenging (N=1) and feeling too young for the class (N=1).

Conclusion: The intervention demonstrated positive results for both PMs and Mentees. It helped newcomers 'fit in' to an 'old programme'. However, peer mentoring alone was insufficient to address adherence issues for all participants; future research needs to examine this problem further.

Chapter 1: Introduction

1.0 Background

Cardiovascular disease (CVD) refers to a range of conditions which affect the heart (cardio) and the blood vessels (vascular). CVD includes direct abnormalities in the structure or function of the heart, for example, heart failure, rheumatic heart disease and cardiomyopathy or disease of the blood vessels transporting the blood around the body. Coronary heart disease (CHD; also know as ischemic heart disease) refers to abnormalities of the blood vessels supplying blood to the heart muscle (Ross, 1999).

CVD is the most common cause of mortality and morbidity in the world, accounting for 30% of all cause mortality (WHO, 2011). In Ireland, CVD accounts for 35% of all cause mortality and approximately 10,000 deaths each year, 52% of these as a result of CHD (Central Statistics Office; CSO;

http://www.cso.ie/en/statistics/). Although we have achieved a great reduction in mortality from CVD in the last forty years, we now face new challenges as this has resulted in an increase in CVD related morbidity (National CV Policy, 2010-2019).

Physical inactivity is one of the leading causes of mortality worldwide and accounted for 5.2 million of all-cause premature deaths in 2008 (Lee, et al., 2012). Research on the adverse effects of low physical activity (PA) levels and high sedentary behaviour indicates their combined association on relevant health outcomes (Lee, et al., 2012). In contrast, active individuals who engage in recommended levels of PA, a minimum of 150 minutes of moderate to vigorous PA per week (DOH, 2009; WHO, 2010), have a significantly reduced risk of all-cause mortality (Lee, et al., 2012; Leitzmann et al., 2007). Warburton and colleagues (2006) provide evidence of a linear relationship between PA and CVD, with increased PA and fitness levels leading to decreased risk of CVD. Approximately 31% of the world's population do not meet the recommended PA guidelines (Hallal et al., 2012).

1.1 Identification of Research Area

In individuals with existing CVD, increased PA levels can result in significant reduction in CVD risk factors (Warburton et al, 2006). Individuals who have suffered a cardiac event are encouraged to gradually increase their PA levels

through participation in Cardiac Rehabilitation (CR). CR is defined as 'the process by which patients with cardiac disease, in partnership with a multidisciplinary team of health professionals, are encouraged and supported to achieve and maintain optimal physical and psychological health. The involvement of partners, other family members and carers is also important' (SIGN, 2002, guideline 57, p.1). In Ireland, CR consists of four phases; Phase I occurs in the hospital immediately following cardiac surgery and consists of education on CVD and secondary prevention; Phase II involves out-patient education and support to assist individuals with the implementation of recommended behaviour change; Phase III generally consists of a 6-12 week outpatient exercise, educational programme usually located in the hospital; Phase IV provides support to the individual to sustain long-term behaviour change (www.iacr.info/).

1.2 Identification of the Research Need

The benefits of participation in CR have been well established and include reduced mortality (Adams et al, 2008; Larcombe, 2004; Lawlor et al., 2011), increased aerobic capacity (Adams et al, 2008; Salvetti et al., 2008) and improved quality of Life (Cheuk-Man Yu et al., 2004; Dalal et al., 2006; Marchionni et al., 2003). Despite these benefits, uptake and adherence to CR programmes is low (Lavie & Milani, 2011) and for those who do attend, sustained adherence to recommended levels of PA is uncommon (Bethell et al., 1999; Bock et al., 2003).

Recent research has addressed this issue by developing, implementing and evaluating interventions aimed at increasing maintenance of PA post Phase III CR (Arrigo et al., 2008; Butler et al., 2009; Hughes et al., 2007; Lear et al., 2003; Luszczynska et al., 2006; Moore et al., 2006; Pinto et al., 2011; Sniehotta et al., 2005; Yates et al., 2005). These studies demonstrate varying levels of success through the use a broad spectrum of intervention components and a wide range of outcome measures. In conclusion, whilst the results inform us that additional support can increase PA adherence rates post Phase III CR, the findings leave us unclear as to what intervention components and methods of delivery are most appropriate to use to increase PA adherence rates in this clinical population. In addition, the majority of this research focuses on home-based programmes with little emphasis on adherence to structured Phase IV community-based CR (CBCR).

Wing (2000) suggested that in order to properly understand behaviour change, it is necessary to observe individuals who have successfully sustained change. Thow and colleagues (2008) sought to understand factors influencing long-term adherence to a structured Phase IV CR programme through a combination of qualitative and quantitative research with individuals who had sustained adherence for ≥ 5 years. Their results revealed that the social support received during class, ill health avoidance, nimbleness, class enjoyment, revitalisation and affiliation were all factors that influenced long-term adherence in this community-based clinical population.

Of particular interest to this thesis is the influence of social support on adherence to PA. Social support received within structured exercise classes has been shown to positively influences adherence in both non-clinical (Stathi et al., 2010; Wendel-Vos et al., 2007) and cardiac (Dolansky et al., 2006; Jones et al., 2009; Thow et a., 2008; Woodgate et al., 2007) populations. In a study by Woodgate and colleagues (2007), the importance of social support within a structured Phase IV CR programme was emphasised. Their results revealed that those participants with higher perceived social support from the Phase IV programme also reported higher levels of exercise self-efficacy. This is an important finding as high levels of exercise self-efficacy have been shown to positively correlate with PA adherence in both cardiac (Luszczynska & Sutton, 2006; Blanchard et al., 2007) and general older adult (Rodgers et al., 2009; Stigglebout et al, 2006) populations.

One method of formalising social support is through Peer Mentoring. The term Mentor derives from Greek mythology and is used to describe an individual who acts as a role model, teacher, approachable councillor, trusted advisor, challenger and encourager (Carruthers, 1993). The Mentor forms a relationship with a Mentee or Protégé. "Protection and development of the protégé make up the core of what has been meant by mentoring down through the centuries" (Carruthers, 1993, p.9). Peer Mentors (PMs) have been shown to be effective in positively influencing the factors which lead to improvements in health related behaviours in adult populations in a variety of settings (Webel et al., 2010). With regards to PA, research provides evidence that PMs can facilitate positive outcomes in both non-clinical (Buman et al., 2011; Castro et al., 2011; Dorgo et al., 2009; Webel et al., 2010) and cardiac (Clark et al., 2011; Coull et al., 2004; Parent & Fortin, 2000) older adult populations. These studies provide us with useful insight about the delivery of

successful PM interventions; however, they predominantly focus on the outcomes for the Mentees and little evaluation has been completed from the PM perspective. One PM study was found that focused specifically on community-based PA following Phase III CR (Clark et al., 2011). This study delivered a half day training programme to PMs which entailed the role and responsibilities of the PM and key PA health promotion messages. Clark reported positive changes in the PA levels of the Mentees in comparison however, limited information is provided on the development and delivery of the PM training programme or the experiences of the PMs.

Knowing how to most appropriately intervene in order to increase adherence to PA post cardiac event is a research challenge. Intervention design and delivery must consider the specific needs of the population in question and the particular research setting. In relation to adherence to structured Phase IV CBCR, a more indepth understanding is required of what helps sustain adherence prior to intervention design. Additionally, it is vital that researchers attempt to create cost-effective and sustainable interventions that can prevail in the current challenging economic climate. The use of PMs to formalise social support and deliver intervention components to programme newcomers in Phase IV CBCR programmes is an area that has received little research attention. Exploratory research is required to gain a greater understanding of how best to utilise this relatively untapped resource.

1.3 Identification of Specific Research Setting

A structured Phase IV CBCR programme, "HeartSmart" was established in 2006 by Dublin City University with three partner hospitals. HeartSmart is predominantly a structured exercise programme which offers graduates of Phase III CR the opportunity to exercise regularly in a supervised community-based setting. Five weekly structured exercise classes are offered (Tuesday and Thursday morning; Tuesday evenings and two on Saturday mornings) to cater for both retired and working participants. Each class lasts approximately one hour and includes a 15 minute warm-up, 30 minute cardiovascular phase and 15 minute cool-down. HeartSmart instructors are specially qualified to the British Association of CR Phase IV standard (www.bacrphaseiv.co.uk/) and operate at a high instructor to participant ratio. All participants must complete an induction prior to commencing the programme. At the induction, new participants are shown around the programme

venue and the principles, safety guidelines, aims, structure and content of HeartSmart are explained. Twenty participants attended the first HeartSmart class in November 2006. Participant rates have grown rapidly since then and the Tuesday and Thursday morning classes now attract approximately 50 to 80 individuals per class. This has led to a problem of complex mixed-abilities within one class. Many of the regular attendees are those individuals who have been with the programme since 2006, and are now very experienced, active and for some quite fit. These high retention rates reveal the HeartSmart programme has the necessary components to assist individuals adhere to PA long-term. However, the excessive growth has led to reduced support for programme newcomers and low retention rates for these participants. In addition to common challenges older adults may encounter when commencing a new exercise programme (Rhodes et al., 1999), newcomers to HeartSmart must also combat the barrier of trying to "fit in" with a close knit group of experienced exercisers. Research is required to find a solution to this problem and assist newcomers overcome all barriers to enable long-term adherence to HeartSmart.

1.4 Study Aims and Objectives

Aim

To design, implement and evaluate **the efficacy** of PM intervention in a community-based Phase IV cardiac rehabilitation programme (HeartSmart)

Objectives

- i) To establish the factors which help sustain long-term adherence to HeartSmart through qualitative research (Study 1);
- ii) To utilise the findings of Study 1 to develop and deliver a PM training programme to long-term adherers of HeartSmart (Study 2);
- iii) To assess the effectiveness of the PM training programme and subsequent implementation from a PM perspective. This was undertaken by means of interim and final focus group discussions and assessment of PA levels pre and post PM programme (Study 2).
- To assess the effectiveness of the PM programme from a Mentee perspective.This was undertaken by means of qualitative analysis of Mentees perception

of the assistance their PM provided and quantitative analysis of PA levels, psychosocial variables and adherence to HeartSmart (Study 3).

The outcomes of this research will be feedback to HeartSmart Staff via written report and oral presentation following completion of all studies.

1.5 Research Design

This thesis uses a mixed methods approach consisting primarily of qualitative research methods. The use of a mixed method approach was dictated by the belief that a combination of methods would yield a greater insight into the research questions than either a qualitative or quantitative approach alone. The predominant use of qualitative methods was deemed most appropriate for the majority of data collection as the researcher sought to gain insight into individuals' experience of HeartSmart either as a long-term adherer, a trained PM or a newcomer paired with a PM.

"Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting."

(Creswell, 1998, p. 15).

The topic – adherence to structured exercise by a CR population – is poorly understood (Bellg, 2003), and existing evidence is insufficient to explain how best to intervene to increase the likelihood of compliance with structured exercise programmes. In order to address these issues researchers need to be able to describe the meaning of personal experiences concerning a particular phenomenon (adherence to a CBCRP) for several individuals. Therefore, a phenomenological approach was used to guide the qualitative research in this methodology. This approach allows us to understand the behaviour from the participants' view (Creswell, 1998). *Individual and group descriptions of adherence to the HeartSmart programme were sought from well established exercisers through to newcomers to the programme. This continuum of experiences provided an insight into the factors most likely to sustain longterm adherence to the HeartSmart programme.*

Quantitative methods will be used to provide objective statistical evidence relating to changes in PA levels (PMs and Mentees) adherence to HeartSmart, and psychosocial variables (Mentees only).

1.6 Limitations of Thesis

This thesis is limited by a number of factors which are outlined in detail in each individual study. These limitations include:

- Only one structured Phase IV CBCR programme was examined which may limit the transferability of the findings to other cardiac population;
- Knowledge that information received would be feedback to HeartSmart staff may have resulted in reluctance by participants in all three studies to provide negative feedback (despite notification that identities would be kept confidential);
- The lack of an objective instrument to measure the input and strategies used by PMs in Study 2 renders it impossible to state their exact contribution to their Mentee/s;
- The small numbers of Mentees in Study 3 reduce the impact of the quantitative results. The need to replicate the current operational procedures of HeartSmart limited potential recruitment ability of Mentees. Mentee recruitment was dependent on hospital referral rates and were therefore outside the control of the researcher.

1.7 Structure of Thesis

This thesis consists of six chapters. Chapter two explores the relevant literature pertaining to i) the relationship between PA and CVD and the benefits of exercise-based CR as a means of reducing the risk of secondary occurrence; ii) interventions aimed at increasing adherence to PA post Phase III CR and factors influencing sustained adherence and iii) the potential of Peer Mentors as resource to assist individuals increase their PA levels or adherence to CR. Chapter three (Study 1) outlines factors which influence sustained adherence to HeartSmart. Chapter four (Study 2) describes the development, delivery, implementation and evaluation of a PM training programme, from the PM perspective, in HeartSmart. Chapter five (Study 3) evaluates the introduction of PMs into HeartSmart from the Mentee's Perspective. Studies 1, 2 and 3 are described in chapters three, four and five and are

discussed and concluded within these chapters. Chapter six provides an overall conclusion to the thesis.

Chapter 2: Literature Review

2.0 Introduction

This review of literature aims to gain an understanding of what assists individuals adhere to recommended levels of physical activity (PA) following a cardiac event. The review is separated into three sections to increase clarity of what is being discussed. Part 1 will outline the definition, prevalence, impact and associated risk factors of cardiovascular disease (CVD). The relationship between PA and CVD will then be examined. The definition, goals and phases of cardiac rehabilitation (CR) will be explained and specifically the role of exercise-based CR as a means of preventing secondary occurrences of cardiac events will be analysed. Issues concerning referral and participation in CR programmes will also be highlighted. Part 2 will focus on interventions specifically aimed at increasing longterm adherence to PA following a cardiac event. Behaviour change theories on which these interventions are based will be highlighted and key outcomes analysed. In addition, findings from studies seeking to understand factors influencing sustained PA adherence in this target group will be presented. Part 3 will examine the potential of Peer Mentors as a means of assisting individuals increase their PA levels or adherence to CR.

This review of literature will be used to determine what areas of research are required to enhance our understanding of factors influencing long-term adherence to PA and types of interventions that are successful in assisting this population to adhere.

PART 1

2.1 Cardiovascular Disease

CVD refers to diseases of the heart, blood vessels and vascular diseases of the brain. The majority of CVD is caused by atherosclerosis which is a process in which fatty material and cholesterol builds up in the lumen of the arteries causing the inner surface of the blood vessels to narrow limiting the flow of blood through them (Ross, 1999). Excessive build up can lead to a clot and if this occurs in a coronary

artery it may cause a heart attack (Myocardial Infarction; MI) or a stroke if it develops in the brain (Ross, 1999).

2.1.1 Prevalence and Impact of Cardiovascular Disease

CVD is the most common cause of mortality and morbidity in the world and accounted for 17.3 million deaths and 30% of all cause mortality in 2008 (WHO, 2011). This figure is expected to rise to 23.6 million in 2030. In Ireland, CVD accounts for 35% of all cause mortality, and approximately 10,000 deaths each year, with 52% of these deaths occurring as a result of CHD (CSO; http://www.cso.ie/en/statistics/). Whilst Ireland has exceeded targets set out in the first CV strategy (Building Healthier Hearts, 1999) and experienced a 67% decline in age-standardised CVD related mortality since 1970 (predominately as a result of decreased CHD mortality), we still rank below average in the EU15 (15 EU member states in 2004) for life expectancy (National CV Policy, 2010-2019). This reduction in deaths has however led to new challenges due to the increase in CVD related morbidity (Law, 2002).

The health service is one area that has had to adapt to this changing trend with a 200-300% increase in procedures such as angiograph and angioplasty and a 3.9% increase in bed days used for CVD between 1998 and 2008 (National CV Policy, 2010-2019). A report published by the European Health Economy (Allender et al., 2008) estimated that CVD cost the EU Economy €192 billion in 2006 with healthcare for those affected accounting for 57% of this cost. The remainder costs were attributed to loss of productivity (21%) and informal care provided by family and friends (22%). Despite the high prevalence and resultant burden on healthcare and larger economy, the EU27 (current 27 EU member states) spends an average of only 10% of its budget on CVD. Ireland rates lower with an average spend of 6% (Allender et al., 2008).

2.1.2 Cardiovascular Disease Risk Factors

The World Health Organisation (WHO) identifies several factors that increase the risk of CVD (WHO, 2011). These can be classified as modifiable and non-modifiable. Non-modifiable risk factors include increasing gender, heredity race and age. Men are more likely than pre-menopausal women to suffer from CVD (Lerner & Kannel, 1986). Family history particularly that of first degree relatives,

increases the risk of developing CVD (Williams et. al., 2001). Disportionate rates of CVD are found in racial and ethnic minority populations (Kurian & Cardarelli, 2007). Increased age is also a non-modifiable risk factor and in Ireland 87% of death due to CVD occur in people aged 65 years and over (CSO; http://www.cso.ie/en/statistics/). With the number of people over 65 years living in Ireland projected to increase by 250% by the year 2041 (CSO; http://www.cso.ie/en/statistics/), we are likely to experience an equivalent increase in the amount of people affected by CVD.

Seven modifiable risk factors account for almost 60% of the disease burden in the 52 European member states: high blood pressure/hypertension (12.8%), tobacco smoking (12.3%), alcohol (10.1%), high cholesterol (8.7%), obesity and overweight (7.8%), low fruit and vegetable intake (4.4%) and physical inactivity (3.5%) (WHO, 2006). Type I and II diabetes are also major risk factors with up to 50% of deaths in this population resulting from CVD (Morrish et al., 2001). In an effort to reduce the incidence of CVD, Ireland published its first National Cardiovascular Health Strategy, Building Healthier Hearts, in 1999 (Department of Health). An audit on progress made since the publication of this strategy was carried out by the Health Service Executive (Ireland: Take Heart – HSE) in 2007 revealed that targets for the reduction of CVD mortality had been exceeded, dropping from 31% in 1999 to 26% in 2004. However, the reduction of risk factors associated with the disease is less promising. Whilst the decline in mortality rates is predominately attributed to uptake of treatments and reductions in population cholesterol, there has been an increase in other risk factors namely, obesity, physical inactivity and diabetes (Health Service Executive, 2007). This audit plus additional publications on population health in Ireland (SLÁN, 2002 & 2007) led to the development of a National Cardiovascular Health Policy, Changing Cardiovascular Health: 2010-2019. This policy document sets out specific targets to achieve over a 10-year period prioritising specific health behaviours which influence cardiovascular health. The document specifically highlights five priority areas: maintaining a healthy body weight, healthy eating and PA, reducing salt intake, refraining from or quitting smoking and consuming alcohol responsibly (Department of Health and Children, 2010).

The specific focus of this research is the relationship between PA and CVD.

2.2 Physical Activity, Exercise and Physical Fitness

Physical activity (PA) is defined as any volitional movement of skeletal muscle that results in energy expenditure greater than at rest (Caspersen et al., 1985). It can be categorised into activity performed while sleeping, at work, for transport, at home or for recreation (Kariska & Capersen, 1997). Health is influenced by the amount or dose of PA an individual performs. Dose is determined by calculating the frequency, duration and intensity of PA. Frequency is the number of times PA is performed. It is usually expressed in the amount of sessions or bouts of PA an individual engages in on a weekly basis. Duration informs us of the time spent performing each individual bout of exercise. Intensity refers to the effort afforded to the performance of the PA i.e. how hard the individual is working. Metabolic equivalents (METs) are a physiological measure of the energy required to perform PA. The Compendium of Physical Activities provides a comprehensive list of different types of PA and their associated MET values (Ainsworth et al., 2011). This can be used to characterise sedentary behaviour (1.0 - 1.5 METs), low-intensity (1.6 - 1.5 METs)-2.9 METs), moderate-intensity (3.0 – 5.9 METs) and vigorous-intensity (≥ 6 METs) PA (U.S. Department of Health and Human Services; USDHHS, 2008).

Exercise is a subcategory of PA and describes PA that is planned, structured, repetitive, purposive and performed in a labour-producing manner in order to improve or maintain one or more aspect of physical fitness (Caspersen et al., 1985). Cardiorespiratory fitness also referred to as aerobic fitness or physical fitness is the ability of the cardiovascular and respiratory systems to supply oxygen to fuel the working muscles during sustained exercise (Caspersen et al., 1985). From a public health perspective, cardiorespiratory fitness is important as it strengthens the heart muscle resulting in decreased risk of CVD related mortality and morbidity (Blair et al., 2001; Bouchard & Shephard, 1994).

2.2.1 Measuring Physical Activity

Movement is quantified by determining PA (behaviour) or energy expenditure (energy required to perform the behaviour). Assessments of PA behaviour can be subjective or objective.

Subjective measures of PA include PA diaries and PA recall surveys and questionnaires. They generally use MET values to quantify the energy expended from these activities (Kriska & Capersen, 1997). These assessment tools require the

individual to self-report the PA they have engaged in during a specific period of time. PA diaries require the individual to record all PA over a set period of time. Whilst these can be more accurate than recall surveys, they are time consuming, may be difficult for investigators to interpret, may not reflect long-term PA patterns and may influence the behaviour being recorded (Baumgartner et. al, 2007). Recall surveys are less time consuming for the individual and do not affect PA behaviour (Kariska & Capersen, 1997). There are numerous available PA surveys and questionnaires all varying in complexity from self-administered single-item questions to interviewer-administered surveys of lifetime PA (Kariska & Capersen, 1997). Time-frame varies widely between surveys, with some questionnaires concerned with usual activity and others on activity which has taken place in the previous week, month, year or lifetime. Another aspect of the PA survey is the type of PA or the particular setting in which the activity takes place i.e. work, home, leisure-time etc. Limitations regarding use of self-report PA recall surveys include the variance in scoring protocols which can result in substantially different conclusions (Sarkin et al., 2000), over-reporting (Ottevaere, et al., 2011) due to tendency to give socially desirable responses (Rzewnicki et al., 2003; Sallis & Saelens, 2000), and lack of ability to capture spontaneous or light PA (Masse et al., 1998).

Objective measures of PA behaviour include pedometers and accelerometers. Pedometers are a relatively inexpensive objective method of measuring PA levels. A pedometer is a small device usually the size of a match box that measures vertical movement and can give an accurate account of walking related activity in free living individuals (Bassett et al., 1996). Pedometers have been shown to be a good motivational tool in the promotion of PA with the accumulation of 10,000 steps per day being equivalent to 30 minutes of walking (Tudor-Locke et al., 2008). However, most pedometers do not provide information on intensity and duration of specific bouts of walking activity and therefore the accumulation of 10,000 steps does not necessarily mean the individual is meeting the recommended PA guidelines (Welk et al., 2000). The inability of pedometers to measure non-horizontal movements such as cycling and swimming also limit their capacity to measure total PA.

Accelerometry is based on the theory that acceleration is directly proportional to muscular forces and therefore related to energy expenditure (Melanson & Freedson, 1996). Accelerometers are small devices that can be worn

on the waist, hip, wrist or ankle. They measure PA patterns on multiple planes and can record volume and intensity of activity (Welk et al., 2002) thus offering the researcher the capacity to record energy expenditure over a given time period (Trost et al., 2000). The time sampling interval (or epoch) historically used with adults is 60-second epoch (Ward et al., 2005) although lower epochs have been shown to be more sensitive to vigorous PA (Rowlands et al., 2006). It is recommended that for the data to be included in the analyses, participants should wear the accelerometer for at least 10 hours per day on at least 5 of the 7 days (Copeland & Esliger, 2009; Trost, et al., 2005).

Accelerometers have been shown to be a viable method of PA data collection in community dwelling older adults (Davis et al., 2007; Pruitt et al., 2008). Software available from the manufacturers allows the conversion of raw data into activity counts and cut-points which provide an objective measure of movement duration and intensity (www.theactigraph.com). Cut-points are activity count thresholds that have been developed to determine the relationship between accelerometer activity counts and energy expenditure. Cut-points are generally used to determine if the PA engaged in is light-, moderate- or vigorous-intensity. A cut point of <50 counts is used to distinguish sedentary time in older adults (Esliger et al., 2005; Gardiner et al., 2011). A limitation to the analysis of accelerometer data is the existence of several different cut-point ranges meaning identical data can be interpreted differently (Matthews, 2005). In addition, the majority of cut-points were established using participants under 50 years of age and therefore use of these cutpoints may underestimate the intensity of PA performed by older adults (Matthews, 2005). However, recent efforts have been made to establish cut-points for older adults (Copeland & Esliger, 2009; Miller et al., 2010).

Further drawbacks to the use of accelerometers in providing an overall picture of PA levels include their inability to provide information regarding the specific type of PA engaged in; the fact they cannot be worn during water-based activities and also their restricted capacity in measuring non horizontal activities such as cycling and weight lifting. Additionally, the high cost of accelerometers in comparison to either self-report methods or pedometers limits their capacity for use in certain trials.

2.3 Physical Activity and Cardiovascular Disease

The role of regular PA in the prevention of CVD was first established by Morris and colleagues (1953) in the early 1950's whose prospective cohort designed study revealed CHD mortality rates of bus conductors and postmen were 50% lower than those of bus drivers and telephonists. Subsequent research by Morris and colleagues (1990) followed 9,376 male civil servants (aged 45-64 at entry) for nine years and four months and concluded that PA needs to be performed at a vigorous intensity to provide protection from CVD. The importance of participation in vigorous PA as a means of improving public health was highlighted in 1975 with the American College of Sports Medicine (ACSM) publication of 'Guidelines for Graded Exercise Testing and Exercise Prescription'. This publication recommended that all healthy individuals should engage in 20 to 60 minutes of vigorous PA on at least three days per week.

The shift from recommendations of vigorous PA to moderate PA were first seen in the early 1990's and were included in a publication by the Centre for Disease Control (CDC)/ACSM Report in 1995 advocating the benefits of ≥ 30 minutes of moderate intensity PA per day (Pate et al., 1995). These new recommendations emerged from a belief that 'the greatest public health gain would result from moving the large sedentary segment of the population into a regularly active pattern' (Pate, 2007). However, the presence of a dose-response relationship between PA and CVD risk has been acknowledged (U.S. Department of Health and Human Services, 1996; Haskell et al., 2007).

The relationship between cardiorespiratory fitness (measured objectively through a VO ₂ Max treadmill test) and CVD risk factors was highlighted by Aspenes and colleagues (2011) in a cross-sectional sample of 4,631 healthy Norwegian men (n=2368) and women (n=2,363) aged 20 to 90 years. Results revealed that woman below the median VO₂ peak were five times and men below the median VO₂ peak were eight times more likely to have a cluster of CVD risk factors in comparison with individuals in the highest quartile of VO₂ peak.

The relationship between PA and CVD has been assessed in numerous studies. One of the largest studies in this area was undertaken by Tanasescu and colleagues (2002). This study followed 44,452 male health professionals, aged 40 to 75 years, at 2-year intervals for a 12 year period from 1986 to 1998. The study

measured PA levels by asking participants the average time per week spent performing a number of activities (time spent walking - casual ≤2mph; normal 2-2.9mph; striding ≥4mph -, outdoor hiking, jogging, running, cycling, lap swimming, tennis, squash, racquetball, calisthenics or rowing [heavy outdoor work added in 1998; weight training added in 1990]). Each activity was assigned a MET value and these were multiplied by the time spent in that activity per week. Average exercise intensity of each individual was calculated by dividing the total weekly volume of exercise in METs by the total weekly time spent in PA. The authors concluded that increased levels of PA resulted in decreased levels of CHD in a dose-response manner. Results also revealed that a higher walking pace provided additional risk reduction independent of walking MET-hours. Resistance exercises such as weight training were also found to significantly reduce CHD risk.

To address the lack of women included in studies assessing the relationship between PA and CVD, Oguma & Shinoda-Tagawa (2004) completed a review of literature to establish the relationship between initially healthy women's relative volume of PA and CVD risk. The review included 23 studies (18 prospective cohort studies, 1 retrospective cohort study and four case-control studies) published between 1996 and 2003 focusing on the effect of physical fitness or PA on CHD, cerebrovascular disease and overall CVD-related mortality. The number of subjects in the selected studies ranged from 148 to 80,348 with an age range of 15 to 101 years. Follow up in the cohort studies spanned from 5 to 32 years. Findings revealed a dose-response relationship between PA levels and risk of developing CVD. Analysis also provided evidence that one hour walking was associated with reduced risk of CHD, stroke and overall CVD indicating that for sedentary woman, slight increases in PA would reduce overall risk of CVD.

The 2008 Physical Activity Guidelines Advisory Committee Report states that approximately 85% of diseases such as CVD could be prevented by engaging in regular exercise and maintaining a healthy diet (DOH, 2009; WHO, 2010). Guidelines from this report state that adults should engage in a minimum of 150 minutes of PA levels per week or 75 minutes of vigorous activity per week or equivalent combination. The report also recommends performance of strength-based exercises (7 major muscles) twice a week. Comparison of mortality risk of 242,397 adults based on whether or not they met these guidelines revealed that all-cause mortality rates were 27% lower amongst people without co-existing morbidities and

almost half in those with chronic co-morbidities in those meeting these guidelines (Schoenborn & Stommel, 2011).

2.3.1 Recommended Levels of Physical Activity for Individuals with Cardiovascular Disease

Despite the pre-existence of CVD, small increases in cardiorespiratory fitness are associated with a significant reduction in CVD risk (Warburton et al, 2006). In the case of individuals with existing CHD, evidence suggests that, after adjustments for age, exercise capacity is the strongest predictor of mortality in comparison with other known cardiovascular risk factors (Myers et al., 2002). The American College of Cardiology and American Heart Association have laid out PA guidelines for individuals following a cardiac event stating that:

- For all patients, assess risk with a PA history and/or exercise test to guide prescription;
- For all patients, encourage 30-60 minutes of moderate intensity aerobic activity such as brisk walking on most, preferably all, days of the week, supplemented by an increase in daily lifestyle activities (e.g., walking breaks at work, gardening, and household work);
- Encourage resistance training 2 days per week;
- Advise medically supervised programmes for high-risk patients (e.g. recent acute coronary syndrome or revascularisation, heart failure).

(Smith et al., 2006; Table 1, p.2131).

Whilst there are similarities, the UK National Institute of Health and Clinical Excellence (NICE) guidelines are broader and recommend substantially less PA:

- Patients should be advised to undertake regular PA sufficient to increase exercise capacity;
- Patients should be advised to be physically active for 20–30 minutes a day to the point of slight breathlessness. Patients who are not achieving this should be advised to increase their activity in a gradual, step-by-step way, aiming to increase their exercise capacity. They should start at a level that is comfortable, and increase the duration and intensity of activity as they gain fitness;

 Advice on PA should involve a discussion about current and past activity levels and preferences. The benefit of exercise may be enhanced by tailored advice from a suitably qualified professional.

(NICE clinical guideline 48, 2007, p.9).

The NICE guidelines recommend that all cardiac patients, appropriate to their clinical needs, should be given advice about and encouraged to attend Cardiac Rehabilitation with an exercise component (NICE clinical guideline 48, 2007).

2.4 Cardiac Rehabilitation

Cardiac Rehabilitation (CR) is offered predominately to individuals who have suffered an acute Myocardial Infarction (MI), Percutaneous Coronary Intervention (PCI), Coronary Artery Bypass Surgery (CABS) or Heart Valve Surgery (www.iacr.info/). The first developments concerning CR occurred in New York in the late 1930's as a result of a survey conducted by the New York State Employment Service, which reported that 80% of individuals receiving disability allowance were coronary patients that had not returned to work (Certo, 1985). However, it was the 1960's before CR focused on PA in an attempt to counteract the negative effects of reduced ambulation during prolonged hospital stays. At this time, CR referrals predominately targeted middle-aged men in an attempt to increase the probability of them returning to work (Certo, 1985).

The World Health Organisation (1993) defines CR as "the sum of activities required to influence favourably the underlying cause of the disease, as well as to ensure the patients best physical, mental and social conditions, so that they may by their own efforts, preserve or resume when lost, as normal a place as possible in the life of the community" (World Health Organisation, 1993; 831: 1-122). More recently, the Scottish Intercollegiate Guidelines Network (SIGN) have expanded the definition to include the role of both health professionals and the individuals social support in aiding recovery, stating that CR is, 'the process by which patients with cardiac disease, in partnership with a multidisciplinary team of health professionals, are encouraged and supported to achieve and maintain optimal physical and psychological health. The involvement of partners, other family members and carers is also important' (SIGN, 2002, guideline 57, page 1). This has subsequently been adopted by the British Association for Cardiovascular Prevention and Rehabilitation

(BACPR) as the official UK guideline. The Irish Association of Cardiac Rehabilitation (IACR) reference both these definitions and advocate that CR programmes incorporate a multifaceted and multidisciplinary approach (Irish Cardiac Rehabilitation Guidelines, 2007). Exercise is classified as an integral component of CR in both U.S. and European guidelines (Balady et al., 2007; Graham et al., 2007; SIGN, 2002).

2.4.1 Goals of Cardiac Rehabilitation

The IACR lists the goals of CR under the heading of medical, psychological, behavioural, social and health service goals. Medical goals relate to improving cardiac function, preventing disease progression and relieving symptoms.

Psychological goals include relief of anxiety and depression, improved stress management and self-confidence. Behavioural goals are concerned with smoking cessation, healthy dietary choices, and adherence to PA and medication regimes. The social goals are concerned with regaining independence to enable a return to previous social activities and finally health service goals are concerned with a reduction in medical costs and reducing cardiac-related re-admissions. (Irish Cardiac Rehabilitation Guidelines, 2007).

2.4.2 Phases of Cardiac Rehabilitation

Both the IACR and the BACR endorse the SIGN recommendations regarding CR Phase content and format (SIGN, 2002). These guidelines comprise of four Phases as follows:

Phase I CR

Phase I takes place in the hospital directly following the cardiac event. A member of the hospital cardiac rehabilitation team visits the patient and provides them and their family with information regarding their diagnosis, modifiable lifestyle risk factors (i.e. smoking cessation, PA levels, alcohol consumption, stress management and diet), medications and work/social issues. They also work with the patient and their families to establish individual modifiable risk factors and discuss lifestyle changes necessary to reduce their risk of secondary cardiac events. The individual's medical diagnosis/condition will determine the rate at which their activity/function levels are progressed. Patients are closely monitored at this stage.

Phase II CR

Phase II occurs immediately after discharge from the hospital usually for a period of 4-6 weeks. The goals of this phase are to assist the patient to adhere to the lifestyle changes agreed to in Phase I. The focus at this stage is on health education and recommencement of physical activity. The patient and their family are provided with additional information and educational support to reinforce the need for these risk factor modifications.

Phase III CR

Phase III generally consists of a 6-12 week exercise programme that takes place at the hospital in combination with health education and psychosocial interventions. It consists of supervised exercise classes and education for both the patient and their families on the following topics:

- Cardiac anatomy and physiology;
- Pain and symptom management;
- Management of risk factor and behaviour modifications;
- Dietary advice for a healthy heart;
- Benefits of participation in PA;
- Medication;
- Activities of daily living;
- Smoking cessation;
- Sexual activity;
- Stress management.

Prior to commencement of the Phase III programme, patients undergo an exercise stress test to establish functional capacity. Supervised exercise classes typically consist of a warm-up, aerobic conditioning phase and a cool down. Resistance training may also be included.

Phase IV CR

The aim of Phase IV CR is to assist the patient to maintain the lifestyle and behaviour change modifications promoted in the previous three phases. Depending on the specific hospital, Phase IV may consist of a variation of the following components:

- Additional education sessions;
- Support groups;
- Outreach programmes;
- Telephone support.

In certain areas, patients may be referred to specific community programmes to aid with the maintenance of healthy behaviours (SIGN, 2002, guideline 57, pages 1-2).

These four Phases are used to categorise CR in Europe, however, in the USA, Australia and Canada, there are just three Phases as Phases I and II are combined to form one Phase. In the remaining review of the literature, the stage of CR stated will be categorised according to the four European Phases as summarised in Table 2.1. The main area of interest in this research study is Phase IV CR with a specific focus on long-term adherence to PA.

Table 2.1 Outline of Four Phases of Cardiac Rehabilitation

Phase I	Phase II	Phase III	Phase IV
In-patient risk	Out-patient	Out-patient	Supports to assist
assessment and	education and	exercise and	long-term
supply of	support to assist	educational	maintenance of
information	behaviour change.	programme usually	behaviour change.
regarding		located in hospital	
diagnosis, risk		for 6-12 weeks	
factors, medication		post discharge.	
and work/social			
issues.			

2.4.3 Provision of Cardiac Rehabilitation in Ireland

The IACR is a multi disciplinary group of professionals representing all disciplines of CR including CR co-ordinators, cardiologists, physiotherapists, occupational health therapists, physicians and nurses. It is run under the auspices of the Irish Heart Foundation and was established in 1995. Its primary aim is to promote a greater understanding of CR in Ireland, create a platform for communication between interested parties and advocate for the development of CR

services. This is achieved through the promotion of conferences, scientific meetings, publications and contact with relevant international agencies and release of regular press releases and appropriate submissions and lobbying to the Government (www.iacr.info/).

The first national survey of CR service provision in Ireland was undertaken, in 1998, on behalf of the IACR, following a European Union survey which ranked Ireland amongst the lowest of EU Member States for the provision of CR programmes per head of population (McGee et al., 2001). The aim of the Irish survey was to establish the geographical distribution of the current CR programmes and to outline the structure, staff profiles and patient participation in available programmes. This survey was to act as a basis to advocate or plan for programme development. All 41 general hospitals in the Republic of Ireland that admitted patients to cardiac or intensive care units were surveyed via postal questionnaire. Results revealed that only 12 of the 41 hospitals surveyed (29%) were providing Phase III CR programmes (no reference was made to Phase I, II or IV CR in this survey). Phase III programme duration ranged from 3 to 12 weeks, delivering 1 to 4 sessions per week and catering for 2 to 20 participants. Twelve additional hospitals revealed they were in the process of planning for the introduction of a CR programme.

The most recent national survey of CR service provision in Ireland, carried out in 2005 also by postal questionnaire, showed substantial improvement had been made since 1998 (Delaney et al, 2006). Only 37 hospitals were surveyed in the 2005 report, indicating a reduction of 4 hospitals admitting patients to cardiac or intensive care units. This survey revealed that all 37 hospitals (100%) provided Phase I CR, 36 (97%) provided Phase II, 35 (95%) Phase III and 16 (43%) provided formal Phase IV CR. The Phase III programmes lasted from six to nine weeks and included three to eighteen exercise sessions and three to ten education sessions. Three centres did not offer exercise sessions due to lack of facilities. Exercise sessions generally catered for 6 to 8 patients at a time and educational sessions catered for 6 to 11.

Results regarding Phase IV CR is outlined under the heading *Post-Phase III programmes* where it is stated that only 19% of patients were referred to Phase IV CR (12% to hospital sessions, 7% to Community Based Programmes). Whether or not this 19% refers to eligible patients or all patients is not specified and information regarding the content of Phase IV programmes is not provided. However, even with

these improvements, it was found that the level of multidisciplinary input across the programmes was varied, with 11 programmes being run single-handedly by a CR coordinator. With regards to future development of the programmes, Delaney and colleagues (2006) revealed that the predominant barriers were lack of staff (66%) and lack of available space (23%).

Dublin City University and partner hospitals, namely Beaumont, The Mater and Connolly Hospital Blanchardstown initiated the "HeartSmart" programme in November 2006. This is a Phase IV structured exercise community-based CR (CBCR) programme which aims to provide patients leaving Phase III CR with the opportunity and support to maintain optimum levels of physical, mental and psychosocial wellbeing. Whilst the primary focus of HeartSmart is on structured exercise, the programme encompasses all multidisciplinary components of CR. Participants are referred to HeartSmart from the Phase III programmes at the three partner hospitals, indirectly through community referral or individuals can enrol independently by contacting HeartSmart and arranging pre-screening with the specialised staff. Classes are approximately 1 hour in duration and consist of a 15 minute warm up, 30 minute cardiovascular phase and 15 minute cool-down. Strength and flexibility exercises are also included. Blood pressure is taken and recorded for all participants prior to each class and individuals are encouraged to assess their rate of perceived exertion (RPE) throughout each session. Classes are taught by a team of specially qualified instructors (BACR exercise instructor training qualification), University staff and hospital personnel. Participants exercise in a group setting and progress along a continuum from 'beginner' to 'advanced'. Beginners and advanced participants exercise together although all are encouraged to go at their own pace.

Participants are encouraged to view HeartSmart as a transition between the highly supervised Phase III programmes and eventual fully independent exercise (Dublin City University, HeartSmart Operating Procedures, 2008).

2.4.4 Benefits of Participation in Cardiac Rehabilitation

Extensive research informs us that participation in CR provides multiple positive health benefit to its participants (Heran et al., 2011). A Position Paper of the working Group on CR and Exercise Physiology of the European Society of Cardiology summarised the specific benefits of CR. The paper was based on a

review of the scientific literature (including authoritative reports of the Working Group on CR and Exercise Physiology of the European Society of Cardiology, the European Societies on coronary prevention, the American College of Physicians, the American Heart Association and the American Association of Cardiovascular and Pulmonary rehabilitation and a Cochrane review). Results revealed benefits of CR as reduction in symptoms, improvement in exercise tolerance and physical work capacity, improvement in blood lipid levels and global risk profile, reduction in cigarette smoking, improvement in psychosocial well-being and stress management, attenuation of the atherosclerotic process, decreased rates of subsequent coronary events, reduced hospitalisation and decreased morbidity and total mortality (Giannuzzi et al., 2003).

The most recent systematic review carried out by the Cochrane Collaboration searched seven databases - CENTRAL, HTA, and DARE (using The Cochrane Library Issue 4, 2009), MEDLINE (1950 to December 2009), EMBASE (1980 to December 2009), CINAHL (1982 to December 2009), and Science Citation Index Expanded (1900 to December 2009) – in an effort to establish the effectiveness of CR on mortality, morbidity and health related quality of life (HRQOL) of individuals with CHD (Heran et al., 2011). Forty-seven RCTs (62% European) were included in the analysis with a total of 10,794 (80% male) participants aged 46 to 84 years. All participants had experienced a MI and/or revascularisation or had diagnosed CHD through angioplasty or diagnosed angina pectoris. Trial participants were randomised to either exercise-based only CR (17 studies), multidisciplinary CR (29 studies) or usual care. Trials lasted from 2 weeks to 30 months with follow up periods of 6 to 120 months. Duration, frequency and session length of exercise components varied ranging from 1 - 12 months, 1 - 7sessions/week and 20 - 90 minutes per session respectively. Both centre- and home-based programmes were included with the majority incorporating individually tailored exercise prescription. Results revealed a reduction in overall and cardiovascular mortality in participants of medium to long-term follow up (≥ 12 months) and hospital admissions in short-term follow up (< 12 months). Seven of the ten studies measuring HRQOL reported significantly greater levels in exercise only groups in comparison to usual care groups at follow up. However, completion of univariate meta-regression analyses showed no statistically significant associations between outcomes for all-cause mortality, CVD mortality, recurrent MI or revascularisation and specific cardiac

diagnosis, type of CR engaged in (i.e. exercise only or multidisciplinary), dose of exercise intervention, follow-up period or intervention date. Heran and colleagues (2011) acknowledge several limiting factors in the review. Firstly, study subjects were predominately white males without co-morbidities. Secondly, mean age of participants was 56 years which was likely influenced by the exclusion of individuals with co-morbidities (more likely to be present in older age groups). Thirdly, losses to follow up and drop out were high and often not reported. Finally, poor descriptions of methodologies and results within the RTCs reduce the clarity of the evidence. Whilst the results of this review provide evidence of the benefits of CR in relation to mortality and subsequent cardiac related morbidity, it leaves us unclear as to the ideal structure and length of the exercise component given that the dose of the exercise interventions included varied greatly and participant's level of PA was not included in the analysis (Heran et al., 2011).

The relationship between the type and dose of the CR exercise component and exercise capacity has been examined in several studies (Arthur et al., 2002; Hevey et al., 2003; Marchionni et al., 2003). Arthur and colleagues (2002) randomly assigned 242 participants (197M, 45F; age not stated) to either a 6-month home- and hospital-based CRP. Results revealed a significant increase in exercise capacity for both groups at 6-months with peak VO_2 increasing by 36% in the hospital group and 31% in the home-based group. Analysis of participant exercise logs showed that the home-based group exercised more frequently than the hospital-based group (6.5 \pm 4.6 and 3.7 \pm 2.6 sessions per week respectively. However, duration of exercise bout for the hospital-based group was greater (55.6 \pm 21.1 min versus 47.2 \pm 13.2 min).

Hevey and colleagues (2003) examined changes in exercise capacity of 60 cardiac patients randomly assigned to either a 10-week (30 exercise sessions) or 4-week (20 exercise sessions) CR programme. All exercise sessions were 50 minutes in duration with participants exercising at 60-80% of submaximal HR. Participants were also provided with guidelines for exercising outside the CR programme and an individual exercise prescription on completion. Exercise capacity was measured at baseline, immediately following completion and six-months post completion of the CR programme. No significant difference was found between the two groups with both groups showing significant improvement in exercise capacity over the three time points.

These findings inform us that the exercise component of CR positively influences PA and exercise capacity, however, the type and dose required is unclear.

2.4.5 Factors Influencing Referral to and Participation in Cardiac Rehabilitation

Despite the established benefits of CR, referral, uptake and adherence to such programmes remain low with as few as 12.5% of those with a coronary diagnosis actually attending (Suaya et al., 2009). The majority of research from both the U.S. and Europe concerning referral and participation in CR focuses on Phase III CR. The primary focus of this research is on Phase IV CR, however as participation in Phase III CR increases the likelihood of adherence to PA following programme completion (Bethell et al, 1999; Reid et al., 2008), it is necessary to develop an understanding of factors affecting participation in Phase III CR programmes. Factors affecting referral are distinct from those affecting participation and therefore the following section is presented in two parts: i) referral and ii) participation. Studies cited in the remainder of this section were undertaken in Europe, the US and Australia. All of these studies are concerned with out-patient exercise and educational programmes, referred to as Phase III in the European model. Combinations of qualitative and quantitative studies are included.

i) Referral

Referral by a medically trained individual (nurse, consultant or General Practitioner) has been reported as the strongest predictor of CR attendance (Barber et al., 2005; Dolansky et al., 2006; Jackson et al., 2005) with as high as 85% of attendees stating they did so following advice from a health care professional (Seward et al, 2008). However, in some cases, as few as 20% of those eligible for CR are actually referred (Brown et al., 2009).

Factors affecting the decision by health professionals to refer include the patients' age (Audelin et al., 2008; Barber et al., 2001), gender (Barber et al., 2001; Gallagher et al., 2003; Sherry et al., 2010; Wyer et al., 2001b), race (Barber et al., 2001), specific cardiac event suffered, and health insurance status (Jackson et al., 2005). Reduced referral of older adults is possibly due to more severe presence of cardiac disease and the presence of co-morbidities (Beswick et al., 2004). This may also influence the lack of referral of women given that women who experience a

cardiac event are more likely to be older (Barber et al, 2001) and therefore have poorer health and more chronic illnesses (Wyer et al., 2001b).

Brown and colleagues (2009) performed an analysis of data from 156 U.S. hospitals participating in the American Heart Association's 'Get with the Guidelines' (GWTG) Programme. This is a voluntary observational data collection and quality improvement initiative requiring participating hospitals to record clinical information concerning in-patient care and outcomes of all patients hospitalised for CHD, stroke or heart failure. In total, 72,817 patients discharged following a MI, CABG or PCI between January 2000 and September 2007 were included in the analysis. Results revealed only 56% of patients were referred to a CR programme at hospital discharge. The distribution of referral rates showed 35% of hospitals referred fewer than 20% of eligible patients. Characteristics of patients most likely to be referred included having undergone CABG or PCI, being of younger age, male, white race, having unspecified or non-ST-segment elevation MI, presence of co-morbidities (with the exception of smoking and dyslipidema), more likely to have health insurance and more likely to have undergone PCI or CABG surgery.

This research suggests that further education is required for health professionals to emphasis the benefits of CR for all cardiac patients and highlight the importance of referral to these programmes.

ii) Participation

A quantitative review by Jackson and colleagues (2005) sought factors affecting individuals' decision to attend CR. The authors searched four databases (PsychoInfo, MedLine, Web of Science and PubMed) plus relevant secondary references of studies published between 1990 and 1994. Analysis revealed positive predictors for CR attendance were ease of access to programme location, high self-efficacy (although type of self-efficacy was not specified), high social support, high socioeconomic status and high educational attainment (Jackson et al., 2005).

It has also been reported that older individuals are less likely to participate in CR programmes (Audelin et al., 2008; Barber et al., 2001) even though participation by older adults has been shown to be safe and provide similar improvements as younger participants regarding physical function (Audelin et al., 2008). Lower participation by women in CR programmes has been consistently reported (Barber et al., 2001; Jackson et al., 2005; Sherry et al., 2010; Suaya et al, 2009; Wyer et al., 2001b). Older women are also more likely than men to live alone resulting in

reduced social support which also decreases the likelihood of CR participation (Wyer et al., 2001b). In addition it has also been found that women with families are concerned that attending CR programmes will impact negatively on their ability to maintain household obligations and on their role as a caregiver in the home (Jackson et al, 2005, Wyer et al., 2001b). Additional factors cited in the literature as impacting negatively on CR participation include the presence of co-morbidities (Kerins et al., 2011; Farin et al., 2007), other commitments, lack of interest (De Angelis et at., 2008), cost, lack of understanding of what CR entails, lack of belief in the benefits (Dolansky et al., 2006) and dislike of group activities (Clark et al., 2004; Tod et al., 2002).

A study by Wyer and colleagues (2001a) interviewed 21 participants who were eligible for CR. Participants were grouped into three groups according to CR uptake: attendees of CR (n = 9), accepters but non-attendees (n = 6) and non-accepters, non-attendees (n = 6). Results revealed that participants' views followed either a psychological or a medical model. The authors found that whilst the attendees held the psychological model, the non-attendees held a medical model. This means attendees saw themselves as being responsible for their own health and therefore engaged in health enhancing behaviours whilst non attendees believed that the medical profession were responsible for their health and therefore placed a greater importance on the role of medication. Table 2.2 is taken from this study and sums up the key emerging themes from the research.

Table 2.2 Psychological versus Medical Model Views of Cardiac Patients

Theme	Accepters/Attenders	Accepters/Non-attenders	Non-accepters/Non-
			attenders
Internal model	Psychological model:	Medical model: keep	Medical model: keep
	own behaviour is	taking the tablets	taking the tablets
	important		
Illness perception	Serious	Initially serious	Not so serious
Locus of control	Control over recovery	Control external or	Control external
	and lifestyle – it's up	ambiguous	
	to you		
Cause attribution	Lifestyle	Lifestyle	Events immediately prior
			to MI
Coping strategy	Information & help	Minimise	Denial, avoidance
	seeker		
View of CRP	CRP perceived as	Limited view of CRP, seen	Limited view of CRP,
	beneficial	as not beneficial	seen as not beneficial
			(Wyon at al. 2001a)

(Wyer et al. 2001a)

The psychological model is supported by results from other studies reporting that those who attend Phase III CR recognise the health benefits of being physically active (Dolansky et al., 2006) and view their participation as a method of controlling their health and avoiding the pitfalls that lead to their cardiac event in the first place (Clark et al., 2004). Other factors positively influencing CR adherence and participation include social support from family and friends (De Angelis et al., 2008; Jackson et al., 2005; Barber et al., 2001) and fellow participants within structured CR (Clark, 2004; Dolansky et al., 2006; Jones et al., 2009). The support of fellow participants in CR programmes is heightened by their sharing of a common medical history (Clark et al., 2004; Jones et al., 2009; Thow et al., 2008). Elements of the structured class, including the range of exercises taught and the presence of specialised staff, have also been cited as factors influencing sustained adherence in both Phase III (Thornhill & Stevens, 1998) and Phase IV (Thow et al., 2008) CR.

Research concerning referral to and participation in Phase III CR reveals vast and complex challenges. Factors associated with referral to CR are outside the scope of this thesis but were included as this is a major contributing factor in the uptake of CR. Eliminating the issue of referral, these findings inform us that CR participation is influenced by both individual circumstances and beliefs. Changes in beliefs

concerning the benefits of PA and motivation to change PA behaviour can be modified through specifically tailored interventions (Marcus & Forsyth, 2003). The following section addresses theories of behaviour change and interventions aimed at increasing adherence to exercise-based CR.

PART 2

In order to understand how to assist individuals adhere to PA following a cardiac event, it is first necessary to understand why and how people change negative behaviours and adhere to positive new ones.

2.5 Theories of behaviour change

Theories of behaviour change strive to explain how people become motivated to change behaviour, how they transfer this motivation into action and how they maintain the behaviour change long term. Several theories have been developed to explain behaviour change. The following section describes some of the most commonly used behaviour change theories.

2.5.1 Social Cognitive Theory

Social Cognitive Theory (SCT) is based on the idea that environmental influences, attributes of the behaviour itself and personal factors interact to determine human behaviour (Bandura, 1986). The SCT posits that people learn not only by their own experiences but also by observing the actions of others and the results of these actions. An individual's social environment determines the people or models from whom they can learn. Behavioural factors refer to the activity itself for example, if it might produce the desired outcomes, how often the person would have to engage in the behaviour and how hard the behaviour might be to execute. Personal factors include previous experiences, a belief in the benefits of engaging in the behaviour (expected outcomes) and self-control towards behaviour goal attainment. SCT proposes that the individual must value the expected outcomes in order to engage in the behaviour. Expected outcomes may be immediate (e.g. feeling energised following PA) or long-term (e.g. decreasing risk of developing CVD).

A central concept to the SCT is self-efficacy which refers to an individuals' confidence in their ability to perform a particular behaviour, i.e. "what people think, believe and feel affect how they behave" (Bandura, 1986, p, 25). The information and feedback an individual obtains from the performance of a task are referred to as sources of self-efficacy. Four key information sources influence an individual's self-efficacy: performance accomplishment, role-modelling, verbal persuasion and physiological & affective states (Bandura, 1997).

Performance accomplishment is the most powerful source of self-efficacy as it provides evidence that the individual is capable of performing the desired behaviour. It is based on personal experience and therefore has greater authenticity for the individual. In order to successfully perform complex behaviours, it is necessary to first break them down into easily mastered sub-skills and hence gradually increase confidence. It is important that small successes are praised before more challenging tasks are attempted to ensure the individual experiences continued success when mastering the behaviour. Greater support is therefore needed in the initial stages of behaviour change to help build confidence and minimise frustration. If the individual experiences repeated failures, self-efficacy is reduced. Once the behaviour has been successfully mastered, the individual is then aware that they have the capacity to perform the particular task and are therefore are more likely to recover from future setbacks regarding this behaviour. However, capability cannot be judged by performance alone. Other factors that affect successful mastery of a task include situational obstructions, assistance provided by others, resources available and circumstances in which the activity is performed. If an individual attributes their success to any of these external factors, self-efficacy will not increase as the credit will be attributed to the external source.

Role modelling can provide individuals with ideas about how they can perform certain tasks. It occurs when individuals observe others perform a task that they are attempting to learn and inspires confidence that they too can perform this task successfully. The person they are observing may therefore be viewed as a role model. If the individual identifies with the role model and views them as possessing similar characteristics to themselves, it is likely to increase self-efficacy in their own ability to perform the task.

Verbal persuasion is used to build self-efficacy by praising effort and accomplishments. The impact of verbal persuasion is reliant on a respect towards the

person providing the appraisal i.e. the greater the perceived credibility and expertise of the appraiser, the greater the impact of the appraisal on the self-efficacy of the individual. It is important that verbal persuasion is honest and relates to the particular skills of the individual concerned as it must be believable in order for self-efficacy to be increased.

The final source of self-efficacy is an individual's perception of their physiological or effective response to behaviour. If individuals are unused to these responses, they may interpret them as negative and threatening, for example, during exercise, individuals' may interpret their fatigue, breathlessness and aching muscles as signs of their physical inefficiency which may lead to reduced self-efficacy. It is therefore important to educate new exercisers on the expected responses to PA in an effort to assure them that this is normal and therefore reduce potential stress.

2.5.2 Transtheoretical Model

The Transtheoretical Model (TTM) of behaviour change was developed by Prochaska & DiClementi (1983) by combining a number of different psychological theories such as the SCT (Bandura, 1977) and learning theory (Skinner, 1953). The model describes how people modify problem behaviours or acquire positive new ones (Prochaska & Velicer, 1997). The TTM interprets change as a process involving progress through a series of five stages (precontemplation, contemplation, preparation, action and maintenance) known as the stages of change (Prochaska & Velicer, 1997). People are thought not to progress through stages in a linear fashion but rather to move back and forth at varying rates before attaining the goal of maintenance (Prochaska & DiClementi, 1983). It is generally accepted that adherence to the behaviour change for six-months substantially increases likelihood of long-term maintenance (Marcus et al., 2000; Prochaska & DiClementi, 1983).

In order for efficient self change to occur, the individual will use a set of independent variables known as the processes of change (Prochaska & DIClementi, 1983). There are a total of 10 processes of change. The first five are classified as experiential processes and are used primarily in the early stages of change and the second five, known as behavioural processes, are used in the later stages of transition (Prochaska & DiClementi, 1983). The processes of change are: consciousness raising, dramatic relief, environmental re-evaluation, social liberation and self re-evaluation (experiential processes); stimulus control, helping relationships, counter

conditioning, reinforcement management and self-liberation (behavioural processes). The TTM therefore depends on doing the right thing (processes) at the right time (stages). In addition to the processes of change, the TTM also hypotheses that decisional balance and self-efficacy are required to mediate behaviour change. Decisional Balance was conceptualised by Janis and Mann (1977) as a method of comparing potential gains and losses of behaviour change in the form of a balance sheet. Decisional Balance is used in the TTM as a means to list the positives and negative of a engaging in a particular behaviour.

2.5.3 Goal Setting Theory

Goal setting theory is based on the assertion that conscious goals affect action (Ryan, 1970). Goal setting theory states that the setting of SMART goals (Specific, Measurable, Attainable, Relevant and Time-bound) in combination with appropriate feedback motivates superior task performance (Locke, 1968). Commitment is essential in order to achieve goals. Goal commitment is facilitated by factors relating to the importance of goal attainment including the expected outcomes and also a belief in the ability to achieve the goal i.e. high self-efficacy (Locke & Latham, 2002). Moderately difficult tasks have been shown to produce the greatest level of effort whilst lowest effort levels are associated with very easy or very difficult tasks (Atkinson, 1958). In contrast, difficult personal performance goals have been shown to produce the highest levels of effort when these goals are specific (Locke & Latham, 1990). Locke and Latham (2002) describe four mechanisms through which goals affect performance. The first is by the provision of a directive function i.e. goals focus attention and effort on the activities associated with the goal. Secondly, goals provide energy for goal-related activities. Thirdly, goals influence task persistence (depending on the time span allocated to achieve the stated goal). Finally, cognition and motivation are enhanced as a means to achieve goals.

2.5.4 The Relapse Prevention Model

The Relapse Prevention Model (RPM) was initially developed as a therapy to assist individuals following the treatment for addictive behaviours such as smoking and drinking (Marlatt & Gordon 1985). Where the previous mentioned theories are concerned with reasons individuals adopt behaviour change, the RPM is concerned with maintaining the behaviour change over the long-term. The theory is based on

social-cognitive psychology and incorporates a set of cognitive and behavioural strategies to prevent or limit relapse episodes. The RPM is designed to assist individuals who are trying to maintain a behaviour to identify high risk situations relating to non-adherence to the behaviour change and establish coping strategies to prevent relapse (Marlatt & Gordon 1985). These high risk situations can include negative emotional states, situations that involve another person or group of people that may induce negative emotions, social pressure and positive emotional states (Larimer et al, 1999). Larrimer and colleagues (1999) stress that it is not these high-risk situations that cause the relapse but rather the individual's response to these situations. It is therefore necessary for the individual to develop a set of coping skills to maintain positive behaviour change in these high-risk situations (Larimer et al, 1999).

2.5.5 The Theory of Self-Determination

The Theory of Self-Determination (SDT) is a psychosocial framework that proposes a continuum of motivation ranging from amotivation at one end to intrinsic motivation at the other. Amotivation refers to a state where the individual has no intention of engaging in a particular activity whilst intrinsic motivation is the most autonomous kind and refers to human predisposition to seek out and engage in enjoyable, novel and challenging activities (Deci & Ryan, 2000). As most human behaviour is not intrinsically enjoyable, extrinsic motivation is often required to initiate and sustain behaviour. SDT postulates four types of extrinsic motivation exist depending on the extent to which the behaviour is controlled or autonomous: external regulation, introjected regulation, identified regulation and integrated regulation (Deci & Ryan, 1985; 2000). External regulation is the least selfdetermined and is motivated by external demand by others or by an individuals' attempt attain a reward. Introjected regulation is governed by a need to avoid negative emotions (e.g. guilt) or to expand the ego. Identified regulation is when behaviour is motivated by a belief in the benefits to be derived from engaging in a specific activity. The most autonomous form of self-determined motivation is integrated regulation and occurs when the behaviour has been fully united to the individuals personality or being. SDT postulates that the individuals' level of selfdetermined motivation depends on the degree to which three psychological needs autonomy, competence and relatedness – are present. Autonomy refers to the level

of choice an individual has about engaging in a particular behaviour. Competence stipulates an individual can interact effectively with the environment and successfully influence desired outcomes. The need for relatedness refers to feeling connected in ones social environment and having a sense of belonging (Deci & Ryan, 1985).

2.5.6 The Health Action Process Approach

The Health Action Process Approach (HAPA; Schwartzer, 2008) is based on SCT (Bandura, 1986) and volition theory (Heckhausen, 1991). HAPA extends previous models such as to the Theory of Reasoned Action (Ajzen & Fishbein, 1975 & 1980), the Theory of Planned Behavior (Ajzen, 1991) and Protection Motivation Theory (Rogers, 1975), to include postintentional factors. These factors are believed to close the gap between intention and behaviour performance. HAPA theory postulates that self-reported planning servers as the link between intentions and behaviour as it facilitates the integration of new behaviours into existing routines (Schwartzer, 2008).

The choice of behaviour change theory on which an intervention is based must take into consideration the specific population for whom the behaviour change is recommended and the particular intervention setting. This thesis is concerned with long-term adherence to PA following a cardiac event in a CBCR setting. It is therefore necessary to take an in-depth look at research focusing on factors influencing PA adherence in this setting and interventions aiming to increase adherence rates.

2.6 Maintenance of Physical Activity Following a Cardiac Event

For those who do attend Phase III CR, evidence suggests PA levels gradually decline post programme completion (Bethell et al., 1999; Bock et al., 2003), with as few as 22 to 31% achieving recommended levels of PA at six months (Dohnke et al., 2010; Dolansky et al., 2010; Moore, et al., 2006). These statistics on decline and drop-out are higher than for normal populations (Dishman, 1994).

Bock & Colleagues (2003) examined participation in PA following Phase III CR. Pre-study data revealed that only 25% of participants at a specific CR site enrolled in the Phase IV CR programme (at the same site) following completion of Phase III. This Phase IV CR programme allowed participants to use the exercise

facility as often as they liked and interact with on-site CR staff as required although it was not a structured exercise class. One hundred and sixty nine participants (75% male, aged 37 to 85 years) who had completed Phase III CR 6-24 months previously were mailed with details of study and consent forms. One hundred and three individuals (78% of those invited) consented to partake in the study. Individual records of study participants were collected from the CR programme staff and included information on Phase III and IV CR programme attendance. Participants also completed a self-report 7-day PA recall questionnaire (Blair et al., 1985). Participants were classified into three groups: those who had completed Phase III CR only (group 1), those who had completed Phase III and IV (group 2), and those who were currently enrolled in Phase IV (group 3). Results revealed that 67.5% of group 1, 86.6% of group 2 and 100% of group 3 were still engaging in moderate intensity PA. A key finding of this study revealed that participation in Phase IV, even if discontinued, favourably influenced adherence to recommended levels of PA with 78.8% of group 3, 66.7% of group 2 and only 27% of group 1 meeting the guidelines. It is likely that these results overestimate levels of PA post Phase III CR as those who chose to participate in the study were likely to be more motivated to engage in PA than those who did not. Further limitations to this study include the lack of randomisation to longer or shorter CR programmes (it is possible that individuals who selected to enrol in Phase IV CR were more highly motivated to adhere to PA) and the absence of an objective measure of PA.

Woolf-May and Bird (2005) carried out an observational trial to examine long-term PA adherence of 31 males (aged 53-77 years) post Phase III CR. Participants were required to complete exercise diaries detailing date, duration and intensity of activity performed for a 16-week period post Phase III CR. PA levels were recorded as total PA (all reported PA and exercise), leisure-time PA (LTPA; structured exercise including Phase IV classes), and PA exclusively performed in Phase IV structured exercise classes. Participants were classified into four categories depending on the number of structured Phase IV exercise classes completed: category i) no Phase IV classes at all; category ii) ≥ 1 class; category iii) 1-10 classes and category iv) 27-46 classes. Results revealed no significant differences in participant characteristics between any of the four groups. Participants who attended 27-46 Phase IV classes (~6 per month) engaged in 24% more LTPA than those who attended no Phase IV classes and were the only group to expend weekly amounts of

estimated gross energy expenditure sufficient to slow progression of CVD. Analysis of LTPA independent of Phase IV classes revealed no difference between any of the four groups with none performing at the intensity required to improve aerobic capacity. A possible limitation in this study is the inclusion of an exercise diary which may have positively influenced PA levels of all participants as exercise diaries have been shown to act as a motivational tool (Baumgartner et al., 2007). It is possible therefore that PA levels reported in this study were higher that what could generally be expected. Despite these limitations, these findings suggest that following Phase III CR, if support is given, through additional structured exercise classes, the likelihood of maintaining the recommended PA levels required to reduce the risk of secondary occurrence is increased. In order to gain a better understanding of what helps individuals sustain recommended levels of PA post cardiac event it is necessary to take a closer look at interventions specifically designed to achieve this.

A literature search was carried out to specifically identify studies that assessed interventions to increase maintenance of PA after Phase III CR. As part of this review Medline (OVID), Google scholar, ScienceDirect, and Wiley InterScience were searched from the year 2000 to 2011. Cardiac Rehabilitation was the dominant keyword used, alone and in combination with the following descriptive precursors: Phase IV, long-term adherence, exercise-based, home-based, hospital-based and centre-based. To be considered for inclusion in the review, studies had to be randomised control trials (RCT's), involve individuals who had recently suffered a myocardial infarction and since completed the first three phases of CR, consist of an intervention that included a PA component and include at least one PA and psychological or psychosocial outcome measure. References lists of the selected studies were then searched for additional studies that fit the inclusion criteria.

Table 2.3 outlines the results of this review. Column one identifies the author, year the study was published, research design, location of the study and source of publication. Column two describes the purpose of the study. Column three outlines the study population and recruitment strategies. Column four details the specific intervention/s applied. Column five lists the field tests and assessments completed and column six gives an account of the key results. Studies are listed chronologically starting with the most recent. Abbreviations are expanded in notes below.

Table 2.3 – Interventions to Increase Long-term Adherence to Physical Activity Following Phase III CR

Author, Purpo Design, Location	se Population, Recruitment	Intervention	Assessments / Field Tests	Results / Comments
Pinto et al. To assess the effectivenes home-based exercise pro to support maintenance following Pl CR. American Journal of Preventative Medicine	CR (N=130; 103M, 27F). IG: n=64; 50M, 14F CG: n=66; 53M, 13F	Intervention Group: Received PA diary and pedometer plus 14 PA counselling phone calls over 6-mths (weekly: mths 1-2, biweekly: mths 2-4, mthly-mths 4-6). Calls based on TTM, SCT and Motivational Interviewing and included advice & feedback on PA diaries. PA plus CV health tip-sheets were posted to coincide with each call. Feedback & motivation letter sent mthly for the 6-mth period. Bi-mthly phone calls to prompt and reinforce regular PA adherence from 6-12 mths. Control Group: Received calls administering symptom Q to monitor general health. These calls were at same intervals as IG calls. Received CV health tip-sheets in line with IG.	Physical Activity: 7-day PA recall Q (3-day accelerometer to validate). Psychological: TTM stage of motivational readiness for exercise. Physiological: Maximal exercise stress test (Bruce protocol) SF-36 Physical Function Scale. Lipids and inflammatory markers. All measured at baseline, 6 and 12 months except exercise stress test which was only measured at baseline and 6-months.	Physical Activity: IG reported sign greater PA at 12 mths (non-sign. at 6- mths). PA levels of IG gradually increased from baseline while CG gradually decreased. Between group difference of 32 min in PA/wk at 6-mths and 80min/wk at 12-mths. Psychological: CG more likely to regress in motivational readiness for exercise scale. Physiological: Sign \in in physical function scale in IG at 12-mths. No significant differences in exercise stress test of blood lipids.

Author, Design, Location	Purpose	Population, Recruitment	Intervention	Assessments / Field Tests	Results / Comments
<u> </u>	To evaluate the efficacy of a pedometer-based exercise intervention on increasing PA levels of patients following Phase III CR.	Recruitment Outpatients of two CRPs who had completed at least the first session of group CR (N = 110; 83M, 27F). IG: n=55; 38M, 17F CG: n=55; 45M, 10F Participants recruited over a 10-month period.	All: Received generic PA brochures Intervention Group: Received a pedometer (plus training), step calendar and walking safety sheet and were requested to record normal walking activity for one week. Recorded daily steps for a further 6-weeks incorporating weekly and long-term goals. Received 4x 15 min phone calls. Calls at weeks 1 & 3 offered behavioural counselling and goal setting. Calls at weeks 12 & 18 offered feedback & additional support. Control Group: No pedometer or phone calls.	Physical Activity: Active Australia Survey Psyhological: Psychological distress (Kessler 6 scale), Exercise SE Scale, Outcome expectancy (adapted from Kobau & Dilorio), Behavioural & Cognitive Self-Management Strategy use (adapted from Saelens et al., 2000). Physiological: Submax CV bicycle ergometer test, BP, HR, height, weight, waist circumference. All recorded at baseline, 6 weeks and 6 months.	Physical Activity: IG achieved sign. greater improvements in total PA sessions, walking mins & sessions at 6 weeks and 6 months (after adjusting for baseline differences). Sign. ↓ in PA levels in CG. Physiological: Both groups showed sign. improvements in behavioural and cognitive self-management strategies at 6-mths but improvements were sign. greater in IG. No change in other measures. Physiological: At 6 months, the IG had significantly ↑ in CV fitness (but not sign. greater than CG). Significant ↓ in waist circumference in IG males at 6-wks.

Author, Design, Location	Purpose	Population, Recruitment	Intervention	Assessments / Field Tests	Results / Comments
	To assess the effects of a predominately home-based CR intervention on PA adherence and risk factors following Phase III CR in comparison with usual care.	Graduates of two CRPs (N = 228; 199M, 29F). IG: n=105; 91M, 14F CG: n=123; 104M, 19F Patients were recruited following a 4-week inpatient or 12-week outpatient CRP.	Intervention group: Instructed how to use PA diary sheets where all PA had to be described and recorded in minutes. Participants were invited to attend a physician supervised group exercise session once every 3 months where diary sheets were collected and questions discussed at individual and group level. Control group: Requested to return in 1 year for re-assessment.	Physical activity: PA assessed by asking if participants were exercising ≥ 3 times per week for at least 30 minutes (i.e. regularly), IG kept PA diary sheets. Psychological: HRQOL (MacNew Q). Physiological: Exercise capacity test (type not specified), BMI, TC, LDL, HDL, TG, BP. Measures recorded at baseline and 1 year.	Physical activity: 73% of the IG and 40% of the CG were exercising regularly at follow-up. Note: participants with low baseline exercise levels benefited disproportionally from intervention. Physiological: ↑in HRQL scores in both groups (higher in those who were exercising regularly). Physiological: Exercise capacity ↑ for both groups but no between group difference. IG showed improvements in TC, LDL and HDL whereas they remained unchanged or deteriorated in the CG.

Author,	Purpose	Population,	Intervention	Assessments /	Results /
Design,	_	Recruitment		Field Tests	Comments
Location					
Hughes et al.	To compare the	Graduates of a Phase	Intervention group:	Physical activity:	Physical activity:
	effects of an	III CRP ($N = 70; 56M,$	Received a 30-minute one-on-	Stages of Change	At 12 months more of the IG
2007	exercise	14F).	one exercise consultation at 0	Questionnaire, 7-day PA Recall,	were in the action or
	consultation plus	IG: n=35; 30M, 5F	and 6 months. Consultations	Accelerometer (7 days).	maintenance phase than CG
RCT	exercise information	CG: n=35; 26M, 9F	were adapted based on the		(borderline significant).
	against exercise	All recruited from the	individuals' stage of change	Psychological:	
Scotland	information only on	same hospital within 1	and included decisional	HRQOL (SF-36), Anxiety &	Sign. between group
	PA levels after	month of Phase III	balance, goal setting,	depression (HADS).	difference for total activity
European Journal of	Phase III CR.	completion.	preventing relapse, problem-		(7-day recall) from 0-12
Cardiovascular			solving barriers and social	Physiological:	mths in favour of the IG (IG
Prevention &			support. Supports phone calls	Motorized treadmill test using	stayed same, CG ↓).
Rehabilitation			were made at 3 & 9 months.	individual protocol (8-12 mins),	Changes in accelerometer
				TC, HDL, LDL, TG.	non-sign.
			Control Group:		
			Received an information		Psychological:
			leaflet at baseline outlining the	All measured at baseline, 6 and	No change in SF-36 or
			benefits of regular PA and	12 months.	HADS.
			advice and tips on becoming		
			more active. They received		Physiological:
			phone calls on topics		Sign. ↓ in peak VO₂ for both
			unrelated to exercise at 3 and		groups from 0-12 months.
			9 months.		Slight ↑ in HDL for
					intervention group from 0 –
					12 months.

Author, Design, Location	Purpose	Population, Recruitment	Intervention	Assessments / Field Tests	Results / Comments
Moore et al. 2006 RCT US Annals of Behavioural Medicine	To assess the effectiveness of a lifestyle modification intervention, CHANGE (Changing Habits by Applying New Goals and Experiences), on PA maintenance following Phase III CR.	Graduates of Phase III CRPs from 3 centres (N = 250; 155M, 95F)	Both Groups: At discharge of Phase III CR received an exercise prescription outlining THR and encouraged to exercise a minimum of 5 /wk for 30 min. Taught how to use exercise diaries and HRMs. HRMs and diaries replaced each month by mail for 12 months. Intervention group: In addition IG received counselling and behaviour modification sessions (self- efficacy enhancement, goal setting, problem solving skills & relapse prevention strategies). Four 1.5 hr sessions were delivered at 10 th and 12 th wk of Phase III CR and 1 and 2 mths post discharge in groups of 6-8 participants. Control group: Received usual care.	Physical activity: Exercise history (1 Q) Exercise frequency, amount and intensity (diaries & HRMs) Psychological: Exercise Health Beliefs, SE for Exercise Scale, Benefits/Barriers Scale Problem solving inventory, Motivation (Index of Self Regulation short version), Social support for exercise Scale, Mood (Depression/Dejection Scale of Profile mood states), Fears (1 Q). All outcomes measured at baseline, 2 & 12 months.	Physical Activity: CG were 76% more likely than IG to have ceased exercising at 12 mths although no sign. between group difference in frequency, amount or intensity were found. Neither group met recommended levels in any month with a gradual decline in both groups each month. Only 7.5% of IG and 8.1% of CG met PA recommendations at 12-months. Psychological: No sign. change in any psychological measure with exception of adherence SE which decreased over time for both groups. Baseline motivation was shown to be a significant predictor of exercise adherence.

Author, Design, Location	Purpose	Population, Recruitment	Intervention	Assessments / Field Tests	Results / Comments
Luszczynska 2006 RTC Poland Social Science & Medicine	To examine the relationship between an implementation intention intervention, the use of a planning diary an PA levels following Phase III CR.	Recruited 4-10 days following uncomplicated MI (N=114; 73M; 41F; aged 39-67) Note: The author states that although the first assessments were carried out at 4 to 10 days post MI, randomisation took place following Phase III CR. Participants who dropped out at 2 nd or 3 rd time of data collection and were not included in analysis.	Both groups: Recommended to perform 3-5 sessions (30 min excluding warm- up and cool down) of moderate intensity PA per week. Intervention Group: Instructed how to form a plan regarding PA participation to include precisely when, where and how they would exercise. 15- minute face-to-face feedback provided on plans and implementation intentions. Control Group: Usual care.	Physical activity: Exercise history (1 Q) - "Within the last 2 weeks how often did you engage in any kind of moderate PA for at least 30 min (e.g. walking, cycling on a level terrain, swimming)?" (1st assessment referred to PA levels 2 weeks prior to MI). Psychological: PA planning strategy (4-Items relating to PA plans made in previous 2 weeks). PA measured 4-10 days post MI (T1), 8 weeks post MI (2wks after Phase III CR (T2) and 8 mths post MI (T3). Planning measured at T2 and T3.	Physical activity: Both groups performed sign. more PA at T2 than T1. IG maintained PA levels at T3 but CG reverted to T1 levels. Only IG participants who frequently used the planning strategy met the PA guidelines with low frequency planners exercising only once a week. PA levels at T1 predicted PA levels at T3. Psychological: Both groups showed similar use of planning strategies at T2 but IG used planning more frequently than CG at T3.

Author,	Purpose	Population,	Intervention	Assessments /	Results /
Design,		Recruitment		Field Tests	Comments
Location					
Sniehotta et al.	To assess the	Graduates of three (3-4	All Participants:	Physical activity:	Physical activity:
	effectiveness of 2	week inpatient) Phase	Recommended to ↑ general PA,	Kaiser PA survey	Both IGs had greater general
2005	psychological	III CRPs ($N = 240$;	engage at intensity similar to	(structured exercise);	PA levels at T2 (sign. greater
	interventions in	gender unknown)	Phase III and participate in	Attendance at	in PG; non-sign. in PPPG) but
RCT (3-group	comparison with UC on		specialised cardiac exercise	specialised cardiac	no between group difference
experiment)	PA adherence		classes.	exercise classes.	at T3. Strenuous PA was
	following Phase III CR.				highest in PPDG at T2 & T3
Germany			Both Intervention Groups:	Psychological:	but non-sign.
	Intervention groups		Participated in an individual	Behavioural	
International Journal	included a planning		planning session during final week	Intentions (BIs), SE	Physiological:
of Behavioural	group (PG) and a		of Phase III CR.	Scale, Planning	Coping planning &action
Medicine	planning plus diary		Received a planning booklet	Control and Action	control were sign. higher in
	group (PPDG)		stating when, where, how and with	Control.	both IGs than CG with PPDG
			whom they planned to be	All PA and	showing highest levels of
			physically active. Also asked to	psychological	action control. CG showed ↓
			list potential obstacles and barriers	measures adapted for	in BIs at T2, both IGs
			to this plan.	use with cardiac	remained motivated. PG
				population.	showed ↓in BIs at T3, PPDG
			PPDG:		remained motivated.
			Mailed wkly for 6-wks post	Measures taken at 2 nd	SE was higher in PPDG at T2
			discharge outlining individual	wk of Phase III CR	in comparison with PG and
			plans and questioned if were plans	(T1), 2-mths post	CG but was unrelated to the
			adhered to (SAE included to post	discharge (T2) and 4-	amount of strenuous exercise
			back). Option available to modify	mths post discharge	performed at T3.
			plan.	(T3).	
				(Action Control not	
				measured at T1 as the	
				purpose of the scale	
				was to measure	
				control of action	
				during the	
				intervention).	

Author, Design, Location	Purpose	Population, Recruitment	Intervention	Assessments / Field Tests	Results / Comments
Yates et al. 2005 RTC US Applied Nursing Research	To determine the effects of 3 types of follow-up care (usual care or counselling /educational sessions by phone or in clinic) on PA and exercise capacity following Phase III CR.	Graduates of Phase III CRP (N=64; 44M, 20F) (Number and gender breakdown into groups not noted) Note: The authors highlight the low subject numbers and use both statistically significant results and effect size when interpreting the results.	All groups: One phone call 4-6 weeks post Phase III assessing programme satisfaction and behaviour change implementation to reduce CVD risk. Both Intervention groups: Self-efficacy based intervention delivered by trained nurse (by phone or in clinic) at 3 and 9 weeks post Phase III CR focusing on individual goals set during Phase III CR.	Physical Activity: Three PA adherence Qs incorporating FITT. Physiological: 10-min treadmill exercise capacity test. (HR and BP monitored at rest and at peak exercise). SF-36 (physical function scale). All measures completed at baseline, 3- and 6-months post Phase III CR (apart from treadmill test which was only tested at baseline and 6- months)	Physical Activity: Greater adherence to recommended PA by IGs but non-sign. compared to CG. Adherence levels slightly greater in phone group at 6- mths. Across all groups, average PA frequency fell from 5.5day/wk at baseline to 4.5 days/wk at 3-mths to 4.2 days/wk at 6-mths. Physiological: No sign. difference in any groups for treadmill test, HR or BP. Slight ↑in resting and ex systolic BP overtime for all groups. Clinic IG with low physical function at baseline showed greatest improvements at 3-mths. No difference in SF-36 physical function score at 6- mths.

Author,	Purpose	Population,	Intervention	Assessments /	Results /
Design,		Recruitment		Field Tests	Comments
Location	TD	G I C DI	T	D1 1 1 1 1 1	Di i i i i i i
Lear et al.	To assess the impact of	Graduates of two Phase	Intervention group:	Physical activity:	Physical Activity:
	a 12-month lifestyle	III CRP (n = 302;	Given log book to record PA, diet	4-wk modified	83% attendance at CR
2003	intervention versus	249M, 53F).	and medications Contacted at least	Minnesota LTPA.	sessions by IG. No sign.
	usual care on		once a month:		change or difference between
RCT	preventing deterioration	Participants balanced	Month 1: Four CR session;	Psychological:	groups for LTPA or ex
	of global CV risk	based on age (<63 or	Month 2 & 3: One CR session	General & exercise	capacity.
Canada	factors following Phase	\geq 63), gender and	each month;	specific SE, HRQOL	
	III CR.	adjustment in lipid-	Month 4, 5, 7, 8, 10 & 11:	(Perceived Stress	Psychological:
European Heart		lowering medications.	Telephone contact;	Scale & Illness	No sign. dif. between groups
Journal			Month 6 & 9 Lifestyle and risk	Intrusive Rating).	in any measure.
			counselling and assessment;		
			Month 12: Outcome assessment.	Physiological:	Physiological:
			(CR sessions were 75 min exercise	Symptom limited	Risk factor scores were
			classes supervised by case	treadmill exercise	slightly better for IG but
			manager and exercise leader).	stress test, 3-day food	results were non-sign. Sign. ↑
			,	diary, BMI, waist	in systolic BP and waist
			Control group:	circumference, BP,	circumference in CG but not
			Usual care.	smoking status, TC,	IG.
				HDL-C, TG and	
				glucose. (Global CV	Above measures based on
				risk assessed using	those with follow-up info
				Framingham and	(94% of IG and 90% of CG).
				Procam risk scores).	Those lost to follow-up had a
					sign. lower ex capacity & SE
				Measures taken at	at baseline.
				baseline and 12-mths.	
Nister A - in success I	_ 1 DMI _ 11			11 1 1. 11. 4 - 4	E' IIDI 1'.1

Notes: ↑ = increase; ↓ = decrease; BMI = body mass index; BP = blood pressure; CG = Control Group; CRP = cardiac rehabilitation programme; Ex = exercise; HDL = high density lipoproteins; HR = heart rate; HRM = heart rate monitors; IG = intervention group; LDL = low density lipoproteins; Q = questionnaire; SE = self-efficacy; SF = short form; SAE = stamped addressed envelope; Sign. = significant; TC = total cholesterol; TG = triglycerides).

Table 2.3 provides evidence that an intervention can positively influence long-term adherence to PA in cardiac patients following Phase III CR. Six of the nine studies clearly demonstrate an increase in PA levels in the intervention group(s) over the study period (Pinto et al., 2011; Butler et al., 2009; Hughes et al., 2007; Arrigo et al., 2008; Luszczynska et al., 2006; Sniehotta et al., 2005). The remaining three studies (Moore et a., 2006; Yates et al., 2005; Lear et al., 2003) reveal a gradual decline in PA levels in both the intervention and control groups from baseline to study end however, two of these studies (Moore et a., 2006; Yates et al., 2005) report that the intervention group were more likely than the control group to maintain some level of PA adherence.

The heterogeneity of measures used to assess PA poses a problem when attempting to pool data across trials. With the exception of the 7-day PA recall questionnaire, which was used in two studies (Hughes et al., 2007; Pinto et al., 2011), different measures were used in all trials. Objective measures of PA, which limit the bias of information received, were only used in one trial (Hughes et al., 2007). Hughes and colleagues (2007) used both 7-day accelerometer counts and 7day PA recall at each measuring point. Notably, changes in PA levels in Hughes' study were markedly different when comparing results of the 7-day PA recall and the accelerometers. PA levels of the control group significantly declined in comparison with the intervention group from baseline to 12-months according to the 7-day recall while accelerometer activity counts showed no significant change in either group. Hughes and colleagues (2007) suggest the discrepancy lies in the fact that the accelerometers used (uniaxial MTI accelerometer) cannot record certain activities such as swimming, predominately upper body activities such as washing windows or activities that increase energy expenditure without increasing acceleration e.g. uphill walking. It is also possible that intervention participants' desire to meet the recommended guidelines led to over reporting of activity levels on the PA recall questionnaire (Sallis & Saelens, 2000). Hughes' study expressed accelerometer results as total activity counts and did not attempt to use cut points to equate the results into different intensities of activity. However, as no change was reported, it is unlikely this would have added to the findings.

Six of the nine studies assessed the exercise capacity of participants (Arrigo et al., 2007; Butler et al., 2009; Hughes et al., 2007; Pinto et al., 2011; Lear et al., 2003; Yates et al., 2005). None of these six studies found a significant difference

between intervention and control groups at any assessment time for this measure. Two of the studies found no significant change at all in exercise capacity for either intervention or control groups at any assessment time during the study period (Lear et al., 2003; Yates et al., 2003). Butler and colleagues (2009) reported a significant increase in exercise capacity of intervention participants at 6-months whilst the control group showed a significant decrease. Hughes and colleagues (2007) reported a significant decrease in both groups at 12-months despite significant increases in PA levels of the intervention group. This suggests that the intervention group were not exercising at the required intensity to improve fitness. Arrigo and colleagues (2007) reported a significant improvement in exercise capacity for both groups however, there was no significant difference between groups. Excluding baseline and 12month outcome measurement periods, the control group in Arrigo's study received no contact from the researchers. It is therefore unlikely that the trial itself influenced the improvement in exercise capacity in the control group. The measure of PA used in this trial (one question asking if participants were exercising ≥ 3 times per week for at least 30 minutes) revealed that 73% of the intervention group and 40% of the control group were exercising regularly at follow-up. This measure was not sufficient to inform us of the level of PA either group were engaging in. It is possible the usual care provided was sufficient to produce the improvement in exercise capacity in the control group. Examination of these studies inform us that increases in PA, as demonstrated by used of PA recall questionnaires, generally were not sufficient to produce the increase in exercise capacity necessary to reduce the risk of future cardiac events.

The utilisation of multiple intervention components within and between the studies makes it difficult to pinpoint which components were responsible for reported behaviour changes in PA. Table 2.4 presents the intervention components mentioned in the nine studies reviewed (column 1), the first author of the study(s) using the specific intervention component (column 2) and the number of studies the intervention component was used in (column 3).

Table 2.4 Intervention Components used to Increase Physical Activity levels
Post Phase III CR

Intervention	Study(s)	No. of Studies
Components		used in
Goal Setting	Butler, Hughes, Luszczynska, Moore,	6
	Sniehotta, Yates	
PA Diaries plus	Arrigo, Butler, Moore, Pinto, Sniehotta	5
Feedback		
Problem Solving	Hughes, Moore, Sniehotta, Yates	4
Barriers		
Self Efficacy	Butler, Moore, Yates	3
Enhancement		
Relapse Prevention	Butler, Hughes, Moore	3
Structured Exercise	Arrigo, Lear	2
Classes		
Pedometer	Butler, Pinto	2
PA Planning	Luszczynska, Sniehotta	2
Social Support	Hughes	1
Decisional Balance	Hughes	1
Written PA Advice	Pinto	1
Outcome Expectancies	Butler	1
Motivational	Pinto	1
Interviewing		

Intervention components utilised in the nine studies reviewed were based on numerous theoretical models namely, the Social Cognitive Theory (Bandura, 1986), Transtheoretical Model (Prochaska & DiClementi, 1983), Goal Setting Theory (Locke, 1968), Social Problem-Solving Model (Ewart, 1989), Expectancy-Value Theory (Fishbein, 1963), Relapse Prevention Theory (Marlatt & Gordon, 1985) and the Health Action Process Approach (Schwartzer, 2008). Goal setting emerged as the most commonly used intervention component and was used in six of the nine studies. Three of these studies reported positive changes in PA as a result of goal setting through the use of planning diaries (Butler et al., 2009; Luszczynska et al.,

2006; Sniehotta et al., 2005). PA diaries plus feedback was the secondly most popular intervention component followed by problem solving barriers and self-efficacy enhancement.

Only two of the nine studies included structured exercise as part of the intervention, however, these were not offered on a regular basis (Arrigo et al., 2007; Lear et al., 2003). Lear and colleagues (2003) offered one structured exercise class a week for the first month followed by one a month for months 2 and 3 after which no classes were offered. As outcome measures were only recorded at baseline and 12-months, we do not know if there was a significant increase in PA levels or exercise capacity at 3-months following the period of structured exercise. Arrigo and colleagues (2007) engaged participants in one structured exercise class every three months. The literature is therefore lacking on the impact of regular structured exercises classes on PA levels and exercise capacity in cardiac patients following Phase III CR.

The importance of supervised group exercise classes for individuals with establish CVD was highlighted in a meta-analysis completed by Conn and colleagues (2009) who revealed long-term maintenance of PA was more prevalent amongst participants who engaged in an intervention incorporating structured classes in comparison with those that did not. Greater adherence to group-based versus home-based programmes has also been reported in non-clinical adult populations (van der Bij et al., 2002). The remaining six studies outlined in Table 2.3 did not include structured exercise sessions in their interventions. The sway towards homebased CR programmes has been influenced by barriers associated with attendance at structured exercise CR programmes for example distance to programme location (De Angelis et al., 2008; Thornhill & Stevens, 1998), conflicting responsibilities (De Angelis et at., 2008; Jackson et al, 2005, Wyer et al., 2001b), cost (Dolansky et al., 2006) and dislike of group activities (Clark et al., 2004; Tod et al., 2002). The review of literature in Table 2.3 reveals that while interventions with little or no structured exercise can positively increase PA levels, as assessed by self-report measures, this generally does not result in increases in exercise capacity. Participation in structured exercise may be required to maintain PA at appropriate intensities to positively influence exercise capacity (Woolf-May & Bird, 2005).

The studies in Table 2.3 show that PA levels can be improved as a result of interventions; however, due to lack of changes in psychological measures, the

reasons for improvements are unclear. Self-efficacy was measured in four of the studies reviewed (Butler et al., 2009; Lear et al., 2003; Moore et al., 2006; Sniehotta et al., 2005). Lear and colleagues (2003) showed no changes in either self-efficacy or PA following the intervention. Moore and colleagues (2006) found that exercise self-efficacy in both groups decreased over time in both groups coinciding with a gradual decrease in PA levels. Butler and colleagues (2009) showed no change in self-efficacy despite an increase in PA. Sniehotta and colleagues (2005) found that self-efficacy increased when a PA diary plus feedback was used in addition to PA planning but not planning alone. As Moore and colleagues also used PA diaries and feedback in their intervention, we cannot say for certain that the use of feedback will result in increased exercise self-efficacy.

Only three of the nine studies examined in Table 2.3 showed any change in a psychological measure. Butler and colleagues (2009) showed a significantly greater improvement in behavioural and cognitive self-management strategies at 6-months in the intervention group in comparison with the control group. Luszczynska and colleagues (2006) reported the intervention group had greater adherence to PA planning then the control group resulting in greater PA levels. Sniehotta and colleagues (2005) found more positive changes in the intervention groups in coping planning and action control. Sniehotta's study also revealed both intervention groups to have higher PA behavioural intentions over the control group. All these changes relate to self-management measures. However, as PA levels also increased in intervention participants in studies which did not include self-management outcomes, we do not know what caused the change in PA in these individuals.

Whist there is overlap on many of the behaviour change theories, the majority of the components used in studies reviewed in Table 2.3 are incorporated in the SCT. Within a structured Phase IV CBCR setting, the potential to receive self-efficacy enhancing assistance, which is key concept of the SCT, is heightened by increased exposure to peers (role models, verbal persuasion) and professional staff (performance mastery, verbal persuasion). Further research is needed to assess the impact of a SCT based intervention in a structured Phase IV CBCR setting.

Variance in intervention contact time and overall contact time (including assessment periods) and also hinder our understanding of how behaviour change was influenced. Table 2.5 provides a summary of intervention specific contact time and total contact time in each of the studies.

Table 2.5 Intervention Contact Time

Author	No. of intervention contacts (excluding mail) following baseline contact	Additional contacts for assessment purposes	Total contacts	Intervention contact period	Time of final outcome measure
Pinto	17 phone calls 17 Postal	1	18 (35 incl postal)	12 months	12 months
Butler	4 phone calls	2	6	18 weeks	6 months
Arrigo	3 face-to-face	1	4	9 months	12 months
Hughes	2 face-to-face 2 phone calls	2	6	9 months	12 months
Luszczynska	1 face-to-face	2	3	15-minutes	8 months
Moore	4 face-to-face	2	6	2 months	12 months
Sniehotta et	1 face-to-face	0	1	1 contact (time	4 months
	6 Postal (PPDG)		(7 incl postal)	not stated)	
Yates	2 face-to-face	2	4	9 weeks	6 months
Lear	8 face-to-face 6 phone calls	1	15	9 months	12 months

Table 2.5 informs us that outcome measures cannot be attributed to either intervention contact period or the number of intervention contacts. However, this breakdown allows the comparison of outcomes in studies with similar participant contact. For example, the three studies with the shortest intervention contact periods resulted in conflicting PA outcomes (Luszczynska et al., 2006; Moore et al., 2006; Sniehotta et al., 2005). Sniehotta and colleagues (2005) and Luszczynska and colleagues (2006), using similar interventions, reported positive changes in PA levels of intervention participants whilst Moore and colleagues (2006) did not. Participants in each of these three studies were required to keep a PA diary however, Sniehotta's study supplied participants with continuous feedback by mail regarding these diaries whereas Moore's study did not. This suggests ongoing feedback is important in this population to ensure continuous PA adherence.

We can also assess the efficacy of PA diaries and feedback in the two studies with the greatest number of intervention contacts (Lear et al., 2003; Pinto et al., 2011). Both studies used this strategy in their intervention but while Pinto's study reported increased PA levels in the intervention group, Lear's did not. One difference found between the two studies is the use of postal contacts by Pinto and colleagues (2011) in addition to verbal contacts however; these were concerned with PA and cardiovascular health tips rather than written feedback. Despite the conflicting evidence in Lear's study, this analysis provides some evidence that regular feedback is important in affecting PA adherence. Apart from this finding, examination of contact time in the reviewed studies leaves us unclear as to the impact of frequency or number of contacts on chosen outcome measures.

To understand behaviour change for this population, it is necessary to observe individuals who have successfully sustained behaviour change as a means to forming a theoretical understanding of factors which influence this maintenance as opposed to factors which influence initiation (Wing, 2000). Thow and colleagues (2008) addressed this research question in a CR setting through quantitative and qualitative measures with long-term adherers (>5 years) to a structured Phase IV CBCR programme. Fifty-five participants (30M, 25F, aged 69 ± 6.5 years) completed the Exercise Motivation Inventory questionnaire. This instrument consists of 51-items measuring 14 motives for exercise participation. These items are grouped into intrinsic, extrinsic and other motivating factors. Results revealed that an external motivation of ill health avoidance was the key motivator for continued adherence. However intrinsic motivators including nimbleness, enjoyment, revitalisation and affiliation were also rated highly. Two focus groups, one male (N=4, 65 ± 5.7 years) and one female (N=5, 68 ± 5.4 years), of sixty minute duration were also held to gain a more in-depth insight into factors that helped sustain adherence. The main themes from the focus group discussions, which influenced continued adherence, were good health, enjoyment of the class and social support provided within the class.

Thow's work highlights the fact that long-term adherence to structured Phase IV CBCR is predominantly motivated by a belief in the benefits of PA and a desire to improve health and avoid a secondary cardiac event. These findings complement those of Wyer and colleagues (2001a) which suggest CR adherers follow a psychological model and believe they have control over their health. Thow's results

also suggest that intrinsic motivation, provided by an enjoyment of the classes (which provided a feel good factor from physical exertion), encouragement and social interaction, are necessary for sustained adherence. This was the only study found addressing the question of motives of long-term adherers in this setting and whilst it provides interesting insight into the phenomenon of long-term adherence to structured exercise following a cardiac event, the small sample size in the qualitative section of the study reduces the impact of the results.

There is a need for a more in-depth understanding of the key factors that influence sustained adherence to structured Phase IV CBCR. This information will provide the basis for the development of interventions to increase adherence to PA within this specific setting (Study 1).

The second research question of this thesis was to establish if a peer mentoring intervention could successfully increase adherence of newcomers to a structured Phase IV CBCR programme. Findings from Study 1, highlighting the importance of social support offered by fellow participants, were used to influence intervention design. The remainder of this literature review focuses on the influence of social support in relation to adherence to PA and CR.

PART 3

The support of fellow participants in structured CR programmes has been previously reported as a factor that positively influences adherence (Clark et al., 2004; Dolansky et al., 2006; Jones et al., 2009; Thow et al., 2008; Woodgate et al., 2007). The positive relationship between social support and HRQL has also been established (Stewart, 1993). This support is provided on a voluntary basis by peers with a similar medical history striving to sustain adherence to PA following a cardiac event.

2.7 Social Support

'Social support is not a concrete concept...but a dynamic process that includes the interaction between the provider and the recipient, and varies by recipient and provider' (Hupsey, 1998, p. 1235). Whilst there is no one defining model of social support (Hupsey, 1998), a concept analysis by Langford and

colleagues (1997) identified the most frequently used theoretical foundations, antecedents and attributes. Theoretical foundations include social comparison theory, social exchange theory and social competence. Social comparison theory refers to an individuals' susceptibility to compare themselves to others in their chosen reference group; social exchange theory underlies human behaviour as the exchange of mutually rewarding support and suggests support is given in the expectation of receiving support in return; and social competence is described as the ability to effectively interact with those around us and to form and maintain relationships (Langford et al., 1997). Antecedents of social support are identified as social network, social embeddedness and social climate. Social networks being the interactive community of providers and recipients of social support; social embeddedness indicates the level of connection one has to others in their network; and social climate the level of helpfulness and protection within the social environment (Langford et al., 1997).

Under a positive social climate, it is suggested that four attributes of social support emerge. These are emotional, instrumental, informational and appraisal (Langford et al., 1997). Emotional support consists of the provision of caring, empathy, love and trust. It communicates a sense of belonging and acceptance onto the recipient. Instrumental support is concrete assistance or the provision of tangible goods or services. Informational support is the offering of information to an individual during a stressful period in order to assist problem solving and appraisal support involves the communication of relevant information to enable selfevaluation (Langford et al., 1997). Positive consequences of social support for the recipient include increased personal competence in times of stress, positive health maintenance behaviours, effective coping behaviours, perceived control, sense of stability, recognition of self-worth, psychological well-being and decreased anxiety and depression (Langford et al., 1997). However, social support is not always perceived as helpful despite good intensions and it has been suggested that much of the research surrounding social support does not consider the interaction between provider and recipient but rather assumes providers will know and provide the right kind and amount of support needed (Hupsey, 1998).

The importance of social support within structured exercise classes has previously been noted in studies focusing on non-clinical older adults (Stathi et al., 2010; Wendel-Vos et al., 2007) and participants of Phase III (Clark et al., 2004;

Dolansky et al., 2006; Jones et al., 2009) and Phase IV (Thow et al. 2008; Woodgate et al., 2007) CR. Fellow participants in CR programmes can help create camaraderie and belonging within the programme (Clark, 2004; Jones et al., 2009) and can provide a unique source of emotional social support due to their similar medical history (Clark et al., 2004; Dolansky et al., 2006; Jones et al., 2008). Stathi and colleagues (2010) specifically emphasised informational and instrumental social support as notable influences in initial stages of adherence to structured PA whilst emotional social support became more important as participants progressed. Adherers of CR programmes have cited an awareness of the need to personally provide social support to programme newcomers (Clark et al., 2004). The positive influence of social support provided through structured exercise classes is an important finding and emphasise the benefits of exercising in a structured environment.

Woodgate and colleagues (2007) took a more in-depth look at the importance of social support in a structured Phase IV CBCR. This study was specifically concerned with the relationship between social support, self-efficacy and HRQL. Sixty-four (92% male) long-term (≥ 6 months; mean = 3 years) participants from two structured Phase IV CBCR programmes completed questionnaires relating to the three concepts. The social support scale was adapted from the social provisions scale (Cutrona & Russell, 1987) for use with a cardiac population and then further examined to test the reliability of the items and relevance to long-term adherers of structured Phase IV CBCR. The final scale combined the three most significantly correlated subscales, guidance, reliable alliance and symptom-orientated integration, to make up a measure of total social support for this specific population. Exercise self-efficacy was measured by combining three existing scales (Dawson & Brawley, 2000; DuCharme & Brawley, 1995; Woodgate & Brawley, 2008) and adapting for use in a CR setting. The new measure included task (in-class, 7 items; independent walking, 6 items) and self-regulatory (scheduling exercise sessions, 6 items) selfefficacy and was rated on a scale of 0% (not at all confident) to 100% (completely confident). HRQOL was measured using the SF-36 scale (Ware & Sherbourne, 1992) to measure mental and physical function. Results revealed that participants with higher perceived social support from their CBCR programme reported higher rates on all self-efficacy measures and on the physical function scale of the SF-36 than those who perceived moderate social support. In particular, high perceptions of

guidance, reliable alliance and symptom-orientated integration were closely correlated with self-efficacy to perform in-class exercises. Higher perceived social support was also linked with greater energy, less pain, better health status and fewer physical limitations in comparison with those who perceived their social support to be moderate. Despite perceived social support, all participants were successfully adhering to PA and it is therefore important not to view long-term maintainers as a homogenous group.

Woodgate and colleagues (2007) suggest that a more individualised approach to social support within the CBCR setting may be required to increase self-efficacy and HRQOL. Formalising social support through the use of Peer Mentors (PMs) is an area that has received recent attention in health promotion research (Casiday et al., 2008).

2.8 Peer Mentoring

Peer mentoring is based on an idea that individuals who share similar problems have a unique resource to offer one another (Medvene, 1992 p. 49). Specific functions of PMs have been defined as, "... a guide and supporter, establishing trust and demonstrating empathic understanding while at the same time, introducing new and often contradictory ideas and helping the protégé develop a positive sense of the future" Pascarelli (1998, p. 234). PMs, also referred to as peer supporters, peer advisors, peer volunteers and lay mentors, are essentially volunteers who act in the mentor role to assist a peer develop in a particular area. Research concerning peer mentoring has historically focused on education and business professions, however, there is increasing interest on the impact of PMs in the health field in recent times (Casiday et al., 2008). A review of literature assessing outcomes of peer-based interventions aimed at influencing health behaviour of adults found significant positive findings in those aiming to increase PA (Webel et al., 2010). The use of PMs is growing in popularity particularly in the area of diabetes management with positive improvements in health, behavioural and psychosocial outcomes being reported (Norris et al., 2006).

A literature search to identify studies utilising PMs as a means to increase older adults' adherence to PA or CR was conducted by the researcher. Databases searched included Medline (OVID), ScienceDirect, and Wiley InterScience from the year 2000 to 2011. Peer mentors / advisors / volunteers / supports were the

dominant keywords used, alone and in combination with the following descriptive precursors: physical activity, long-term adherence, exercise and cardiac rehabilitation. To be considered for inclusion in the review, studies had to include a PM-led intervention to increase older adult PA levels or adherence to CR. References lists of the selected studies were then searched for additional studies that fit the inclusion criteria. Table 2.6 outlines the results of this review. Column one identifies the author, year the study was published, research design, location of the study and source of publication. Column two describes the purpose of the study. Column three identifies the study population and recruitment strategies. Column four outlines training received by Peer Mentors and other intervention implementation staff. Column five details the specific intervention/s applied. Column six lists the field tests and assessments completed and column seven gives an account of the key results. Due to limited studies available, inclusion criteria were not limited to RCTs. Studies are listed chronologically starting with the most recent. Unless otherwise stated, results related to Mentees rather than PMs. Abbreviations are expanded in notes below.

Table 2.6 Interventions Utilising Peer Mentors to Increase Older Adult Physical Activity Levels or Adherence to CR

Author, Design, Location	Purpose	Population, Recruitment	PM Training	Intervention	Assessments / Outcome Measures	Results / Comments
Buman et al. 2011 RCT USA Journal of Physical Activity & Health	To evaluate the effectiveness of a 16-week peer-led advice and support for PA (active adult mentoring programme; AAMP) in comparison with a peer-led health education INT (PHEI).	PMs: 7 Community Dwelling Older Adults (CDOA) aged 61-72yrs (gender not stated) recruited from registry of previous health promotion studies and a local health fair. IC: being regularly physically active (AAPM arm) or having a basic background in health education (PHEI arm). Participants: 81 (14M, 67F) inactive CDOA aged 50+. Recruitment through local papers, public flyers, university OA participant register.	4-hour training based on SCT and SDT. Received manual of weekly training activities including building rapport, giving encouragement and feedback, goal setting, building a PA social support system and problem solving exercises. Post training support: Weekly feedback and coaching for first 5 -weeks. Additional support and feedback supplied throughout INT.	Both Groups: Consisted of 1 PM and 3-7 participants. Allowed access to exercise facility and pedometer. AAMP: 16-wk social cognitive INT. Wks 1- 3: building rapport, and determining ex history; Wks 4-10: goal setting, building a PA social support system, mental imagery & problem solving. Participants encouraged to engage in a variety of PA. Feedback & encouragement provided; Wks 10-16: relapse prevention and planning future PA. PHEI: 16 Health Education sessions (2 PA specific). Assignments, discussion, praise and encouragement provided.	Physical Activity: Leisure Time Ex Q (LTEQ; 3- Item scale); (Accelerometers used in small sample to validate LTEQ). Psychosocial: Self-efficacy (general and barriers); Exercise Motivation Scale (EMS; 31-Items). Physiological: Modified Blake VO2 Peak exercise test. All measures taken at baseline & 16-wks LTEQ & EMS also assessed at 18-mths.	Uptake & Retention: 89% uptake; 85% of participants (85% in AAPM & 87% in PHEI) completed the 16-wk INT. Physical Activity: Both groups showed a sign. ↑ in PA from baseline to 16-wks. From 16-wks to 18-mths, the AAMP group increased further while the PHEI group decreased. At 18-mths AAMP group PA was sign. greater than PHEI group. (Accelerometer test validated these results). Psychosocial: No sign. difference between or within groups for either general of barrier SE. AAMP group scored sign. greater than PHEI group at 16- wks and 18-mths in EMS. Physiological: Sign. ↑ in fitness levels in both groups from baseline to 16-wks.

Author, Design, Location	Purpose	Population, Recruitment	PM Training	Intervention	Assessments / Outcome Measures	Results / Comments
Castro et al. 2011 RCT USA Health Psycholog y	Comparison of a 12-month telephone-delivered PA advice by paid professionals (PP) versus the same delivered by trained PMs versus a control arm (telephone-delivered nutritional advice by paid professionals).	PMs: N=9 (8F, 1M) physically active OAs, aged 64.5yrs (±5.8) IC: willing to commit to study for 1 year, written appl & interview. Recruitment: mails to previous research participants & local Active Age Groups). Participants: N=181 (62M, 119F) inactive CDOAs aged 59.1 yrs (±6.1) IC: stable on meds for ≥3 mths, without conditions requiring direct supervision whilst exercising, willing to be randomly assigned to a study arm. Recruitment: Mass mailings and ads.	Both PM's and Professional staff: 8-hour training: Roles & responsibilities of PMs, fundamentals of SCT and motivational readiness, counselling skills (active listening, creative problemsolving, asking open-ended Qs). Post-training practice sessions were observed and given feedback. Post training support: Biweekly supervision meetings. And weekly email and phone contact.	All Participants: Initial face-to-face meeting with PM or PP to discuss relevant health history, motivation for behaviour change, set initial goals and time for phone contact (calls delivered twice monthly for first 2-mths & monthly for remaining 10-mths). Both Intervention Groups: Evidence-based Active Choices Programme. Calls incorporated SCT and TTM to help participants learn, use and re-enforce self management skills to initiate and maintain PA. Control Group: Heart-healthy nutrition advice identical to INT groups in format and contact time.	Physical Activity: CHAMPS Q - completed at baseline, 6 & 12mths; PM's post training and post 12-mths INT. Note: Symptom-limited graded treadmill test used to establish baseline moderate intensity HR range. Accelerometers were worn during treadmill test to establish activity counts at moderate intensity PA. Accelerometers used in small sample (n=30) to validate CHAMPS at 6-months. Advisor Rating: 39-Item scale assessing participants trust, competence, communication, empowerment and connection to their advisor. Intervention fidelity: PPs and PMs recorded time and content of INT after each phone call. These were reviewed weekly by research co-ordinator.	Uptake & Retention: 64% uptake of Mentees. Retention: PMs - 83% at 12- mths. Mentees - 88% at 6 & 81% at 12-mths. Physical Activity: Sign. ↑ in PA from 0-6 and 0-12 mths for both IGs compared to CG. Average PA ↑ per wk: PM group, 216.2mins; PS group, 178min; CG, 71.5min. PMs remained physically active throughout the study. Advisor Rating: No sign difference in participants ratings of PM or PP advisors skills & competency. Intervention fidelity: Both PMs and PPs delivered equal amounts of the INT (average of 11 of 14 planned calls). Average length of calls was similar for PM and PP. PMs more frequently discussed pros & cons, perceived benefits, PA history, and self rewards. PP more frequently discussed self- efficacy.

Author, Design, Location	Purpose	Population, Recruitment	PM Training	Intervention	Assessments / Outcome Measures	Results / Comments
Clark et al. 2011 Longitudi nal pretest postest design Scotland European Journal of CV Nursing	To assess the effect of a Peer Support (PS) programme on PA levels of patients 12 months post Phase III CR. To compare the characteristics of those who joined to those who did not.	PMs: Individuals who had completed Phase III CR 1-2 year previously and were still participating in CBCRP. (No other info provided on PMs). Participants: 109 (75M, 34F) post Phase III CR patients who were suitable to join a PS programme and had a suitable community exercise facility or programme within 4k of their home. 79 (50M, 29F) participants joined the PS INT, 30 (25M, F) declined	One half day training provided by Phase III CR Team. Focused on mentor roles & responsibilities and highlighted key PA research-based principles & messages. Post training support: Not identified.	Intervention Group: Encouraged to attend structured exercise CBCRP. Participants were introduced to PM on 1st day of attendance at CBCRP who introduced them to rest of group. Control Group: Completed pre- and post-INT measurements. Measures taken at baseline and 12-months.	Physical Activity: 7-day PA recall Q, PA diary, PA Stage of Change. (Blacked out pedometers used in sub sample to validate PA recall Q). Psychosocial: Social Support in Exercise Survey Participant Characteristics: Postcode measure of neighbourhood deprivation. Measurements taken at baseline and 12-months.	Uptake & Retention: 73% uptake; 100% retention. Physical Activity: IG -slight ↑ in self-reported PA from baseline to 12-mths (average of 48.9 min per week). CG - sign. ↓ in PA (average ↓ of 112min per week). (Both groups showed non-sign. ↑ in step counts from BL to 12- mths). SOC remained same for both. Psychosocial: Social support levels similar between groups – no change. Participant Characteristics Those who didn't join the PS group had slightly higher (non sign) PA levels at baseline and 12-mths and were younger than those who joined. No sign. dif in socioeconomic status . A higher percentage of eligible females joined (85.3% versus
		(Control Group).				66.7%).

Author, Design, Location	Purpose	Population, Recruitment	PM Training	Intervention	Assessments / Outcome Measures	Results / Comments
Dorgo et al. 2009 RCT USA Journal of Aging & Physical Activity	Comparison of PM group versus student mentor (SM) 14-week older adult exercise programme on programme perception, retention and participation rates and function fitness.	PMs: N=30 (15M, 15F) OAs aged 60-79yrs. IC: good physical health, willing to commit to study, previous supervisory experience. Completed a personality survey Participants: N=60 (31M, 29F) OAs, aged 60-82 yrs. IC: 60+, GP consent, written statement of full commitment to regular participation, reliable personal transport.	30-wk training: 3x 75min weekly sessions supervised by kinesiology students. Wks 1-14: ↑ physical fitness (PF) training & ex techniques, improving image as role model. Wks 15-30: PF maintained; development & practice of mentoring skills. 30 monthly Ed lecturers to compliment training. Post training support: Programme staff present at all sessions to answer PM Qs.	PM & SM Groups: 14-week structured programme of set exercises. 3 x 75min classes per week. PM's and SM's role: Follow prescribed programme, guided Mentees through all exercises assisting with execution of movement, motivating them toward greater effort. Pairing not controlled but ensured that everyone was paired. Participants chose Mentors and allowed change each session. PMs and SMs had no choice in Mentee. Programme staff supervised sessions	Physical Activity: Participation and retention measured by class records. Physiological: Function Fitness Test (FFT; 30s chair stand, 30s arm curl, handgrip, chair sit & reach, back scratch, 6-min walk, 8ft up and go, forward reach) Participants measured at baseline and 14-weeks; PMs at baseline and after 30-wk training programme. Participant Programme Perception: Participants completed a 16-Item programme perception survey at completion of INT (likert scoring). PM Role Perception: PMs completed a 6-Item perception of PM role survey at completion of INT (Q items not stated).	Physical Activity - Participants: 83.3% retention rate (76.7% SM group, 90% PM group). 77.2% participation rate (82.3% SM, 72% PM). Follow up revealed drop outs due to situational circumstances, not INT. Physical Activity - PMs: 93% retention rate at 30 wks. Sign. ↑ in 6-min walk, 8ft up and go, 30s chair stand, 30s arm curl. Physiological - Participants: Both groups improved in FFT (except forward-reach in SM group). Sign. ↑ in 30-s chair-stand and 8-ft up & go tests at for SM group 14-wks. Physiological - PMs: Sign improved FFT scores in 6-min walk test, 30-s chair stand & 8-ft up and go test. Participant Programme Perception: No sign difference between groups (mean 89.7%). PM Role Perception: PM's rated role highly (90.5%).

Author, Design, Location	Purpose	Population, Recruitment	PM Training	Intervention	Assessments / Outcome Measures	Results / Comments
	To determine if a community-based collaborative practice nurse/peer advisor intervention increased participation in CR and reduced hospital readmissions in un-partnered older adults in comparison to UC. To establish if type of CV event influenced rehospitalisation .	PMs: N=45 (aged 60+, gender not stated) were recruited. IC: = history of MI or CABG (average of 4 yrs prior to programme), actively participating in a healthy lifestyle. (24 PMS remained active throughout). Participants: N=247 (121 IG, 126 UC) un- partnered OAs recruited from cardiac services of 5 medical centres.	4 hours training focusing on developing sensitivity, acting as a role model and building rapport. Strategies included verbal encouragement & support, active listening, sharing PM experiences, reinterpretation of symptoms, ex promotion, energy management, and teaching about cardiac disease process. Post training support: 24-hour contact available with practice nurse.	Intervention Group: 12-week intervention using social support and SE enhancement to improve physical and mental health. Practice Nurse made a home visit and contacted participants by phone at least 3 times over intervention period. PM made weekly calls for 12 weeks. Practice Nurse assigned PM's to participants based on age and gender. Control Group: Usual Care.	CRP Attendance Uptake of CR programmes. Rehospitalisation Number of rehospitalisation.	Uptake & Retention: 68% uptake; 81% retention CRP Attendance Sign. higher uptake of CR from IG in comparison with CG after 3-mths and this increase was seen up to 1 year. Rehospitalisation Fewer re-hospitalisations between 3- & 6-mths in IG (non-sign).

Author, Purpose Design, Location	Population, Recruitment	PM Training	Intervention	Assessments / Outcome Measures	Results / Comments
Coull et al. To examine effects and feasibility of education and empowering OA's with ischemic heart disease to change behaviour using trained senior health mentors versus UC.	Participants: N=289 (173M; 116F) IC: 60+ yrs, attending secondary care for angina or AMI, ability to complete 3+ min Bruce protocol exercise test. Entry to study did not occur until completion of extended CR. PMs: PMs aged 54-74 yrs (number not specified) recruited from the local community.	30 hours training provided by CR specialist nurse, dietician, hospital physician and project coordinator. Focus of training was based on personcentred approach by psychologist, Carl Rogers that reinforced self-help principles and enabled group facilitation. Coordinator provided inservice training and ongoing support for mentors. Post training support: Not identified.	Intervention Group: Monthly 2-hr PM-led (2 PMs) group meetings for 1 year. Average 10 participants per group led by 2 PM's. Topics included lifestyle risk factors of smoking, diet & exercise, BP & cholesterol, understanding and ability to cope with IHD, drug concordance. Control Group: Usual care	Physical Activity: 7-day PA recall Q. Physiology: Bruce protocol Ex tolerance test. Psychosocial: HRQOL (SF-36) Anxiety & depression (HADS) CVD Risk Factors: Changes in CHD risk factors, medication usage, and actual use of secondary care health services. CV events, changes in medication compliance, non-medical support requirement, health status, psychological functioning, social inclusion. Diet: 3-day recall via Q at personal interview. All measurements taken at baseline and 12-months.	Uptake and Retention: 88% uptake; 84% retention i.e. attended at least 1 meeting (No other info. was reported). Physical Activity: IG showed greater improvements in general PA and time spent walking than CG and at 12-months walked an additional 1 hour per week than CG. Physiology: No change in either group. Other measures: IG had sign. lower CV outpatient attendance and showed sign. beneficial changes in diet, drug concordance and SF-36 physical functioning score (this declined in CG). No sign. difference or changes in other measures. Note: Travel expenses were offered for attendance at meetings.

Author, Design, Location	Purpose	Population, Recruitment	PM Training	Intervention	Assessments / Outcome Measures	Results / Comments
Parent &	T o determine	PMs:	6-hours training	Both Groups:	Physical Activity:	Uptake and Retention:
Fortin	whether	N=3, IC: former	with RC on	Routine information on	Jenkins Activity Checklist –	96% uptake; 86% retention.
	vicarious	CABS patients,	interaction skills	surgery and recovery by	24 hour recall of 3 types of	Physical Activity:
2000	experience	aged 40-69.	(empathetic	health professionals.	PA: ADL (17-items), walking	IG had sign. greater ADL &
	(where former	Recruited by	listening,		(14-items) & stair climbing (7	walking than CG at discharge.
RTC	patients	research co-	reflection of	Intervention Group:	items).	↑ for both groups in all activities
	exemplify their	ordinator (RC) as	patients' feelings,	3 visits from PM; 24 hrs		from discharge to 4-wks. IG
Canada	active lives)	they were deemed	responding to	before surgery, 5 days	Psychosocial:	sign. greater ADL & stair
	reduces anxiety	to have the skills to	concerns,	and 4 weeks post	Jenkins SE Expectations Scale	climbing at 4-wks.
Issues in	and increases	express enthusiasm	affirmation,	surgery.	 Confidence in ability to 	Psychosocial:
Cardiovas	SE expectation	and motivation	feedback, social		perform above mentioned PA	SE: IG had sign. higher levels of
cular Care	and self-	regarding recovery.	comparisons),		rated on scale of 0-10.	SE for all activities at discharge.
	reported PA in		CVD and			↑ in both groups SE from
	patients	Participants:	treatment. Skills		State-Trait Anxiety Inventory	discharge to 4 wks. No sign. dif
	following	N=56 (all male)	practiced in role		- Participants rate present	between groups at 4-wks.
	cardiac surgery in comparison	aged 40-69 yrs. First time patients	play plus sessions with a patient		anxiety on 20-Item Q.	Anxiety: IG had sign. higher levels than CG 48 hrs pre-
	with UC.	undergoing CABG	with RC		PA and SE measured at 5-days	surgery but sign. lower levels
		surgery without	supervision.		& 4-wks post surgery	than UC 24 hours pre surgery,
		complications.	Post training			5-days & 4-wks post surgery.
			support: Not		Anxiety measured 48 & 24 hrs	Sign↓ anxiety levels of IG from
			identified.		before surgery, 5-days & 4-	48 to 24 hrs pre surgery. CG
					wks post surgery.	only showed sign ↓in anxiety
						from 5-days to 4-wks post
NI. 4 A.T.	N. A. C. C.	vil I i i co CDCDD C		-1' - D -1 -1 '1' - 1' D	CC Control Control CV	surgery.

Notes: = ADL = Activities of Daily Living; CBCRP: Community-Based Cardiac Rehabiliation Programme; CG: Control Group; CV = Cardiovascular; DNA = did not attend; FGs = Focus Group; HRM = Heart Rate Max; IC = Inclusion Criteria; IG = Intervention Group; INT = Intervention; MVPA = Moderate or Vigorous Physical Activity; PM = Peer Mentor; PS = Peer Support; Q = Questionnaire; RPE = Rate of Perceived Exertion; SCT = Social Cognitive Theory; SDT = Self-Determination Theory; SE = Self-Efficacy; SM = Student Mentor; SOC = Stage of Change; TTM = Transtheoretical Model.

Table 2.6 provides evidence that interventions using PMs can be successful in increasing PA levels of older adults and/or adherence to CR programmes. Five of the seven studies included a measure of PA for the Mentees and despite the use of multiple PA assessment instruments, all reported increased levels in the PM intervention groups at final outcome measure (Buman et al., 2011; Castro et al., 2011; Clark et al., 2011; Coull et al., 2004; Parent & Fortin, 2000). These results compare well with those of the studies reviewed in Table 2.3. Uptake of eligible participants to engage in the studies was high ranging from 73 to 96% (Buman et al., 2011; Carroll et al., Castro et al., 2011; Clark et al., 2011; Coull et al., Dorgo et al., 2009; Parent & Fortune, 2000). Retention of participants was recorded in all studies and ranged from 81 to 100%.

Only three studies included a measure of exercise capacity and two of these reported positive results (Buman et al., 2011; Dorgo et al., 2009) whilst the third found no significant change (Coull et al., 2004). This compliments the findings of Table 2.3 where only two studies reported increases in exercise capacity (Arrigo et al., 200; Butler et al., 2009). The lack of increase in exercise capacity despite an increase in PA levels, as measured by the 7-day PA recall questionnaire, reported by Coull and colleagues (2004) were also reported by Hughes and colleagues (2007). This suggests the need to use more than one method of assessing PA levels. It is possible that the advancing years of these participants may affect positive changes in exercise capacity as exercise capacity naturally decreases with age (Ades & Toth, 2005). However, as the time between measurement periods was relatively short, this is unlikely to be the cause of negative or lack of change in this measure. Future research is needed to track PA behaviour alongside exercise capacity in this population.

Two of the seven studies assessed exercise self-efficacy (Buman et al., 2011; Parent & Fortune, 2000). Buman and colleagues (2011) reported no significant difference within or between groups for either general of barrier self-efficacy despite higher levels of exercise motivation in the active adult mentoring group. Parent and Fortune (2000) showed the intervention group to have significantly greater levels of exercise self-efficacy at hospital discharge as a result of the interaction with a PM. The intervention group in this study also reported significantly lower levels of anxiety 24 hours pre- and 5-days and 4-weeks post surgery. It is likely these changes in exercise self-efficacy and anxiety led to the significantly greater levels of PA

reported at discharge and 4-weeks post discharge. The one studies assessing HRQOL reported an increase in this measure (Coull et al., 2004).

Clark and colleagues (2011) was the only study to include a measure of social support with results revealing no change in this measure despite the interactions with a PM and participation in a structured Phase IV CBCR programme (Clark et al., 2011). A possible reason for this is the measure used, the Social Support and Exercise Survey (Sallis et al., 1987), focuses on support received from family and friends and the participants in this study may not have interpreted the PMs of other participants in the CBCR programme as friends.

Whilst key outcomes in all studies were predominately concerned with the participants rather than the PMs, one study did look at PM outcomes (Dorgo et al., 2009). Dorgo and colleagues (2009) showed a significant increase in PMs functional fitness test scores following the 30-week training programme. This is unsurprising considering the extensive physical component of the training programme. The 93% PM retention rate was perhaps a more significant outcome considering the prolonged training programme (30-weeks) followed by a 14-week intervention period (Dorgo et al., 2009). This retention rate is somewhat explained by the high rating reported in the role perception survey. Castro and colleagues (2011) was the only other study to record retention of PMs and reported an 83% retention rate.

The intervention designs of the seven studies vary considerably. Four studies utilised PMs as a means of extending existing services and compared the PM intervention group with a control group (Carroll et al., 2007; Clark et al., 2011; Coull et al., 2004; Parent & Fortune, 2000). Results of these studies reveal better outcomes for the PM intervention group participants in comparison with the control groups. These studies are limited by the lack of inclusion of additional participant groups subjected to the extended services without the PM contact. This would have provided useful information concerning the influence of the PMs rather than the intervention itself. The study by Buman and colleagues (2011) compared two peerled interventions, one focused on PA and the other on general health education. Again, this restricts our ability to assess the impact of the PMs. The studies by Castro and colleagues (2011) and Dorgo and colleagues (2009) perhaps provide the best indication of the influence of the PMs. Both studies compared outcomes of interventions delivered by PMs versus the same intervention delivered by professional staff. Results of both studies revealed the PM intervention groups

performed as well if not better in the majority of chosen outcome measures than participants in the professional staff interventions.

The length of the PM training varied according to the purpose of the intervention. The range of duration was from 4 hours to 30 weeks with the majority of studies within the 4 to 16 hours range (Buman et al., 2011; Castro et al., 2011; Clark et al., 2011; Caroll et al., 2007; Parent & Fortin, 2000). Dorgo and Colleagues (2009) required PMs to perform a specialised role (fitness instructor); hence a more intensive (30-weeks) training programme was delivered. Coull and colleagues (2004) provided 30-hours training as their PMs were required to deliver a group facilitation intervention.

Castro and colleagues (2011) and Buman and colleagues (2011) identify the SCT, in particular SE enhancement, as the basis for the design of their PM training programme and subsequent intervention delivery. In the case of two of these studies, SCT was used in combination with another behaviour change theory; SDT (Buman et al., 2011) and TTM (Castro et al., 2011). Similar to the studies reviewed in Table 2.3, little emphasis was placed on structured exercise with only one study focusing specifically on this setting (Clark et al., 2010). Clark and colleagues (2010) delivered a short training programme (one half day) to long-term adherers of a community based PA programme which focused solely on the role and responsibilities of the PM (details of which were not outlined) and key PA health promotion messages. Although the training programme was short and does not appear to have a strong theoretical base, results were favourable with the intervention group demonstrating slight increases in PA levels at 12-months whilst the control group showed a decline.

Generally the training programmes incorporated the specific role and responsibilities of the PM, communication skills training e.g. developing active listening, fundamentals of a particular behaviour change theory; for example, the SCT (in particular self-efficacy through verbal encouragement and regular feedback), TTM and SDT; overcoming barriers and benefits of a physically active lifestyle. As the PM role in the study by Dorgo and colleagues (2009) was more focused on providing assistance with exercise mastery, training had a strong focus on physical fitness components although this was complemented with motivation theory and mentoring skills. Choice of PM training components and subsequent use of these in practice are similar to interventions provided by professional staff in studies

aiming to increase adherence to PA following Phase III CR (Table 2.3).

The development of a training programme for PMs in a diabetes management setting has been described in detail by Tang and colleagues (2011). An interdisciplinary group consisting of a principal investigator, nurse–certified diabetes educators, dietician–certified diabetes educators, nutritionist, physician, and 3 community members was formed to guide programme development. The agreed training programme utilised Kolb's theory of experiential learning as the method of delivery. Kolb's theory recognises learning to occur in a -stage process namely, concrete experience, observation and reflection, abstract conceptualisation and active experimentation (Kolb, 1984). The devised training programme incorporated opportunities to engage in this cycle whilst completing three key training components i.e. building the knowledge base, skill development (communication, facilitation and behaviour change), and experiential learning.

Further research is needed to assess the advantages and challenges of utilising PMs to deliver an intervention to increase adherence of newcomers to structured Phase IV CBCR. The development of any PM training programme must take into account the specific setting where the intervention will be implemented, the challenges Mentees will be facing and the motivations and experiences of the PMs. Training delivery must incorporate key message of andragogy. It is essential that evaluation of the intervention is preformed from the perspectives of both the PMs and the Mentees.

2.9 Study Rationale

Social support has been highlighted as an important component in the maintenance of PA following a cardiac event. The use of PMs to increase adherence to structured Phase IV CBCR is an area that requires further investigation. The specific training and support required by PMs to undertake this role is unknown. The optimum level of social support and assistance necessary to positively influence adherence to Phase IV structured exercise CBCR programme is also unknown. The aim of this study is to devise a training programme for long-term adherers of a specific structured Phase IV CBCR programme, HeartSmart, to act as PMs to newcomers of the programme and assess the effects of this intervention on both the PMs and the programme newcomers (Mentees). In order to achieve this, three distinct studies will be carried out:

- 1. A qualitative analysis of factors that sustain long term adherence to structured Phase IV CBCR (HeartSmart). Results from this study were used to inform the key components of the PM training programme.
- 2. Development and delivery of a PM training programme for long-term adherers of HeartSmart followed by subsequent implementation and qualitative evaluation. Quantitative measures were used to measure changes in PMs PA levels.
- 3. Qualitative evaluation of Mentees perception of a PM intervention in HeartSmart. Changes in adherence rates of newcomers to HeartSmart and PA levels and psychosocial components of Mentees were also measured via quantitative measures.

These three studies are described in full in Chapters three, four and five.

<u>Chapter 3: Study 1 - What Sustains Long-Term Adherence to Structured</u> <u>Physical Activity Following a Cardiac Event?</u>

3.0 Introduction

Cardiovascular disease is the most common cause of mortality and morbidity in the world, accounting for 30% of all causes of deaths (Yusuf et al, 2001). In the case of individuals with existing CHD, evidence suggests that exercise capacity is the strongest predictor of mortality in comparison with other known cardiovascular risk factors (Myers et al., 2002). Individuals who have suffered a cardiac event are encouraged to attend CR, the purpose of which is to educate the patient on the meaning of heart disease and associated risk factors and assist them to implement the necessary changes to reduce these risk factors and prevent secondary occurrence. CR consists of four phases of which PA is a key component. The aim is to gradually build up the patients exercise capacity by educating them on the importance of PA (Phase I & II), encouraging them to attend supervised (generally hospital based) exercise classes, (Phase III) and assisting them to maintain the recommended PA levels long-term (Phase IV) (Scottish Intercollegiate Guidelines Network, 2002).

Compared with usual care, individuals who participate in exercise-based CR programmes have been shown to significantly increase their PA levels (Oliveira et al., 2008). However, research has revealed only 12.2% of individuals who have suffered a cardiac event actually partake in Phase III CR (Suaya et al., 2009). Referral by a medically trained individual (nurse, consultant or General Practitioner) has been reported as the strongest predictor of attendance (Barber et al., 2001; Dolansky et al., 2006; Jackson et al., 2005), however, as few as 20% of those eligible for CR are actually referred (Brown et al., 2009). Factors affecting the decision to refer include the patients' age, gender, race (Barber et al, 2001), specific cardiac event suffered, and health insurance status (Jackson et al., 2005). Research consistently highlights lower uptake and adherence of women in CR programmes (Suaya et al., 2009; Jackson et al., 2005; Barber et al., 2001; Thornhill & Stevens, 1998). Factors affecting individuals' decision to attend CR include distance to programme venue (De Angelis et al., 2008; Thornhill & Stevens, 1998), social support, (Barber et al., 2001; De Angelis et al., 2008; Dolansky et al., 2006; Jackson et at, 2005) other commitments, lack of interest (De Angelis et al., 2008), dislike of group activities (Clark et al., 2004; Tod et al., 2002) cost, plus a lack of

understanding of what CR entails and a lack of belief in the benefits (Dolansky et al., 2006).

For those who do attend Phase III CR, evidence suggests PA levels gradually decline post programme completion (Bethell et al., 1999; Bock et al., 2003; Hughes et al., 2007; Moore et al., 2006), with as few as 28% achieving recommended levels of PA at twelve months (Moore, et al., 2006). These statistics on decline and dropout are higher than for normal populations (Dishman, 1994) and limited information on long-term adherence to exercise programmes among older adult groups (Conn et al., 2002) restrict further comparison.

Research addressing adherence to PA following Phase III CR has revealed engaging in one-on-one exercise consultations (decisional balance, goal setting, relapse prevention, problem-solving barriers, exploration of activity options and social support; Hughes et al., 2007), group counselling and behaviour modification sessions (self-efficacy enhancement, problem solving skills & relapse prevention strategies; Moore et al, 2006), use of PA diaries (Arrigo et al., 2008) and devising an action plan for PA performance (Sniehotta et al., 2005) positively affect levels of PA, in comparison with individuals receiving usual care over a 6- to 12- month period after Phase III CR.

A key concept in these interventions is self-efficacy. Self-efficacy is part of the Social Cognitive Theory (SCT; Bandura, 1986) and suggests social, cognitive and behavioural factors play an important part in an individual's choice to adhere to, or to avoid exercise situations. Within SCT, self-efficacy can be described as an individual's belief in his or her ability to perform a particular behaviour in a variety of circumstances (Bandura, 1997). Self-efficacy beliefs are highly correlated with PA participation (Focht et al., 2007), with positive affect post exercise when a state of flow (challenge matching ability) is achieved (McAuley et al., 2003) and with positive psychological well being in older adults (Netz et al., 2005).

Bandura believed that in order to understand the evolving nature of behaviour change the individual had to master a number of different tasks requiring different types of self efficacy (Bandura, 1997) i.e. whilst high self-efficacy in relation to exercise performance may motivate an individual to commence a PA programme, it may not result in them adhering to the programme. Hence, more recent studies have examined specific types of exercise self-efficacy and support the necessity for the presence of multiple types to achieve sustained adherence (Rodgers et al., 2009;

Rodgers & Sullivan, 2001). Scholz and colleagues (2005), studied stage-specific self-efficacy beliefs in a sample of individuals during and at 2- and 4-months post Phase III CR. The study found task self-efficacy was initially needed to form an intention to act or commence the new behaviour, but maintenance self-efficacy, also referred to as self-regulatory (Bandura, 1997; Woodgate et al., 2005) or barrier selfefficacy (Blanchard et al., 2007), was required to continue to perform the behaviour under challenging conditions and finally recovery self-efficacy was needed to enable the individual to resume the behaviour should the maintenance of the behaviour change or be interrupted. This requirement of different types of self-efficacy for successful adherence to PA is supported in both the cardiac (Blanchard et al., 2007; Luszczynska & Sutton, 2006) and general older adult population (Rodgers et al., 2009; Stigglebout et al., 2006). Similarly, Umstaddt and Hallam (2007) found barrier self-efficacy was useful only when explaining neophyte exercise experiences in an older adult population; it had limited predictive effect on explaining exercise maintenance. Thow and colleagues (2008) interviewed long-term adherers (>5 years) to a structured Phase IV CBCR programme to gain insight into factors that helped sustain their adherence. Both quantitative (EMI-2) and qualitative (focus groups) methods were used, and results revealed ill health avoidance, positive health outcomes, enjoyment and social factors were key motivations for continued participation. A limitation to this study was the small sample size in the qualitative sample (two focus groups with five men in one and four women in the other), also self-efficacy was not mentioned as an influential factor. The purpose of the current study was to build on Thow's work by developing a more in-depth understanding of the key correlates that explain medium to long-term adherence to CBCR post cardiac event. This information is important as it will help advise strategies to increase the number of people with established CHD who engage in regular health enhancing PA.

3.1 Methodology

A structured Phase IV CBCR programme running since 2006 and with a weekly attendance of approximately eighty adults (aged 50 to 85; 70% male) with established CHD was the setting for this study. All participants were referred from one of three local Phase III hospital-based CR programmes. The programme is predominately exercise-based and is run by sport science and health professionals in a community setting. Classes are 1 hour, 15 minutes and run five times per week.

3.1.1 Research Design

Qualitative methodology was the predominant method used as it allows us to describe and understand the meaning of personal experiences concerning a particular phenomenon (or topic). Focus groups were the qualitative method chosen as they generate rich data by capitalising on inter-participant communication (Kitzinger, 1995). Five focus group sessions were held, three male, two female; with four to seven participants in each. The review of literature provided the researcher with some insight into themes that would potentially emerge from the focus group discussions. For example, as the study participants had similar characteristics as those in Thow's study, themes such as social support, enjoyment of the structured class and a belief in the health benefits of exercise adherence were expected (Thow et al., 2008). However, these insights were set aside prior to moderating the focus groups to allow an unbiased understanding of the phenomenon the participants were experiencing.

The moderator introduced each session and led the participants through a series of ten questions developed using guidelines by Krueger (1998). A sample of three participants was selected to take part in a pilot focus group session. The purpose of this pilot session was to give the researcher the opportunity to assess the effectiveness of the proposed questions on the sample population and also to test the researchers' ability to facilitate the group. This pilot study revealed that the wording of one question needed to be changed as it proved to be interpreted too literally. With exception of this small change, the set of questions remained the same for the remaining groups. Due to the success of the pilot focus group, data collected from it is included in the analysis.

Focus group questions are outlined in Appendix 5 and include, "what influenced you to join the programme"; "list 5 positive things about the programme in order of importance" (participants were given the chance to write these down and then discuss as a group). The use of a written question followed by individual participants reading out their answers ensured all group participants contributed verbally. Further efforts to involve all group participants included limiting the conversation of more dominant participants and gently coaxing quieter participants to contribute. Although each focus group followed through the same set of questions, to ensure that the conversation flowed, participants were given the opportunity to stray from the particular question being asked as long as the conversation remained

within the remit of the topic of the research. This was to ensure the participants were given the opportunity to explore their opinions and ideas.

Notes from the focus groups sessions were recorded manually by an assistant on a pre-designed data recording sheet (Appendix 6) and via an audio tape recorder. Participant verification was checked by providing a summary of each group's discussion at the end of the focus group and establishing if the researcher was providing a correct summary of the discussion, according to the participants.

3.1.2 Ethical Considerations

All eligible participants of a structured Phase IV CBCR programme were given a plain language statement outlining the study, the requirements for inclusion and expectations of them should they opt to participate (Appendix 1). Once selected for inclusion, individuals completed an informed consent form (Appendix 2), allowing the research team to access their demographic and medical data (age, marital status, medical history) held by the programme staff. All focus group sessions were taped and transcribed. To protect confidentiality and encourage participants to be frank and critical in their comments, no individual identifiers were included in the transcripts; each participant was allocated a code and referred to as such in the transcriptions. Focus group tapes and transcriptions were stored securely, and accessed only by the researcher team. The study protocol was approved by the research ethics committee of Dublin City University (Appendix 3).

3.1.2 Participant Selection

Inclusion criteria dictated regular attendance (averaging two sessions per week) at the programme for the previous six-months or longer with a lapse no greater than one month within that period. Six months was chosen as minimum adherence as is accepted as the time-frame for behaviour change to be regulated (Prochaska & DiClementi, 1983). A recruitment letter (Appendix 4) and plain language statement (Appendix 1) was sent to all potential participants explaining the purpose of the research study and the set dates for five focus group sessions. An opportunity was provided to ask questions, and indicate interest. Once ethical procedures –informed consent – were completed, participants were allocated to one of five scheduled focus group sessions based on their availability and gender. At least four participants were allocated per group based on the recommendations of

Kitzinger (1995). Groups were gender specific i) to minimise the potential for sensitivities and therefore a reluctance to share experiences and opinions and ii) due to the large differential in the numbers in the full class (it is mainly made up of men) it was felt necessary to specifically target women for recruitment purposes. No other randomisation method was deemed necessary as all eligible and willing participants were allocated to a group.

3.1.4 Data Analysis

The Moderator (researcher) and assistant moderator met directly after each focus group session to debrief and discuss and capture initial thoughts. Each focus group was transcribed verbatim before the next one commenced. Analysis of the transcription was conducted manually, first by comparing it with assistant moderator's notes to fill in inaudible phrases or gaps in the tapes, followed by the constant comparative method to analyse the data. This involved finding, highlighting and comparing emerging themes from focus groups.

For theme identification, the researcher looked for patterns, themes, concerns or suggestions which were posed repeatedly by the focus-group participants. Data for each theme were then grouped together read repeatedly, re-analysed and if necessary broken down into subordinate themes to better reflect the insight derived from the data provided by the participants. These themes included sought or expected information as well as emergent themes which were unexpected and revealed insights. All transcripts plus the complete list of themes and sub-themes were then passed to a colleague to assess and provide feedback on analysis. Discussion took place to ensure that all data were linked to the appropriate theme and new themes were developed where necessary. When all data had been coded and themed, the researcher chose key quotations (denoted by gender and length of adherence in the results section) from each theme and linked it with an explanatory narrative to describe key findings.

3.2 Results

3.2.1 Participant Details

Twenty-four participants consisting of 15 men (mean age 65.1 ± 14 years) and 9 women (mean age 72 ± 9 years), all Caucasian, took part in the study. The average programme adherence was 20 months (\pm 10 months) and distance from the

venue ranged from 2.4 to 31.2 kilometres. Twenty of the participants were married, one was separated, two were single and one was widowed. All were retired apart from one male. All had experienced a range of single to multiple cardiac events.

3.2.2 Themes

Data from the focus groups was filed under two headings: a) Factors influencing uptake and adherence (Table 3.1) and b) Strategies to increase future uptake and adherence (Table 3.2).

Table 3.1 Factors influencing uptake and adherence

Key themes	Subordinate themes	
Social Support	Instrumental (Health professionals) / Emotional	
	(Family & friends, Fellow participants, CBCR staff)	
Structured class	Novel exercises / Specialist staff / Routine / Purpose	
Health	Belief in health benefits	
Self-efficacy	Task / Barrier / Recovery	

Social support

Instrumental and emotional social support proved to be influential in both uptake and adherence. This support was provided by health professionals, family and friends, fellow participants and programme staff.

The majority of participants stated that they had been encouraged to progress to the Phase IV CBCR programme by Phase III health professionals. This support was instrumental in nature, by outlining CBCR location, time and enrolment procedures, 'In [the hospital] they had a poster up stating that [CBCR] was commencing at that time...they encouraged us to come and also to feed back to them' (M3, 18 months).

Both emotional and instrumental support from family and friends was an important factor for many participants. Whilst some were made aware of the programme by those closest to them, for others it was the extra encouragement that spurred them on. One woman revealed how a family member was of paramount importance to her attendance, 'My son had heard about it before I did and he said

when you come out, you should look it up. And I've no excuse, he drops me over' (F7, 10 months).

Emotional support received from fellow participants and programme staff was strongly emphasized. Whilst participants referred to the company and fun aspect they provided, it is clear the support goes beyond what one might experience from an exercise class open to the whole public. They specified the class provides an opportunity to exercise with people who 'are in the same boat' (F2, 19 months) and this provided an additional support, '....their eyes don't glaze over if you talk about your problems because they've had the same problems' (F4, 16 months). Another female explained how the programme staff made her feel at ease, 'I found the team was so nice and they made you so welcome' (F7, 10 months).

Structured Class

The various aspects and components of the CBCR class emerged as a theme that positively affected adherence. Participants revealed the exercises carried out in the class were novel and not ones they would independently perform, 'you do exercises that you wouldn't do if you weren't in the class scenario' (M12, 19 months) which provided a new dimension to their PA,' I walk a lot but I find these exercises stimulating' (M3, 18 months). They also referred to the safety benefits of exercising in the presence of specialist staff, 'You feel safe, particularly at the beginning...you could take it a bit further because you knew there were people there who knew what they were doing' (M9, 13 months).

Participants explained how CBCR had become a part of their routine and they were committed to attending, 'Sets target to keep fit at set hours...on Tuesday and Thursday I never make any other commitments' (M3, 18 months). It also provided a sense of purpose as one male participant explained, 'I think in a curious way, [it gives] a certain sense of identity...sometimes, whatever we work at can identify us, give us a sort of a place in society. [Going to CBCR], I had a purpose and I think psychologically it was good for me' (M15, 19 months). This sentiment was backed up by a female participant who stated, 'I love getting up in the morning and knowing where I'm going and that it's here' (F9, 26 months).

Health

An understanding of the health benefits of continuing to adhere to PA was apparent. Participants viewed their continued participation as 'an insurance policy to make sure we're not back in the stage that we just left... and a very important safeguard to keep us on the straight and narrow' (M14, 16 months). The concept of their health being in their own hands was evident, 'I wanted to do it myself...it's terrible saying "Cardiac Cripple" but not to become one. You needed to get out there and start your life again' (F1, 30 months).

Self-efficacy

Three distinct types of self-efficacy were prominent in assisting the participants sustain their exercise programme. Firstly, task self-efficacy or the participant's ability to successfully perform the exercises had a very positive effect, 'It shows you the possibilities of what you can do after a heart attack you know, it builds up your confidence' (M11, 10 months). Secondly, barrier self-efficacy was demonstrated. Distance from the programme venue and high traffic volumes were expressed as inconveniences and whilst impacted on the number of classes attended, did not lead to non-participation, for example, 'I've often come when I've had to go somewhere. I just go home and get ready and get cleaned up and then go' (M8, 22 months). Thirdly, participants presented recovery self-efficacy. The majority had experienced lapses in adherence predominately due to holidays, illness and injury, however, once the reason for the lapse seized, they immediately returned to the programme.

Table 3.2 Strategies to increase future uptake and adherence

Key themes	Subordinate themes	
Recruitment methods	Existing participants / Health professionals /	
	Programme staff / Quick transfer from Phase III	
Support	Staff-participant ratio / Group meetings	
Motivation	Challenge & variety / Goal setting, fitness testing &	
	feedback / Gender divide / Reinforce health benefits	

Recruitment methods

The need to address recruitment methods to the Phase IV CBCR programme the participants were engaged in was strongly conveyed as a method to increase uptake. It was suggested existing participants could be utilised to encourage new people to join the programme as they were in the best position to convey the reality of the classes, '[It would help if they had the opportunity] to interact with us after we finished [exercising], to get feedback from ourselves who are doing it' (M13, 30 months).

Health professionals were also suggested as a means to increase awareness of the programme, 'I'll tell you frankly, too many people don't know these things are available.... maybe doing circulars to doctors or GP's, telling them what you're doing and I think you'd get an awful lot more people to come' (M3, 18 months). Other suggestions included CBCR staff visiting Phase III CR classes or incorporating a visit to a Phase IV CBCR class into the Phase III CR programme as it was believed that this may assist with reducing some initial anxiety, '...it was very difficult to assimilate in my own mind, what the hell we were going to do... you went away and you were a bit worried because you thought, I might not be able to do this' (M3, 18 months). The need to transfer quickly from Phase III to Phase IV was also highlighted, 'they're after doing their 10 weeks [in Phase III CR] and they are in their stride a little bit and if they came in then...but if they come in raw...' (F3, 30 months).

Support

The importance of maintaining and increasing the initial support to newcomers was highlighted. It was felt that due to the increased participant numbers the initial support had declined, 'There was a time when people would come in and you'd be grouped together for the first week, to be encouraged and that. And they would have lots of students around them showing them what to do... that's not necessarily the case now' (F2, 19 months). Another suggestion was to hold regular group meetings for newcomers, 'I say every month or something like that there should be a meeting whereby they should be spoken to, asked how they feel' (M8, 22 months).

Motivation

Participants were strong in the opinion that more could be done to improve the motivation of participants and in particular they wanted to see an increase in the challenge and variety of the exercises, 'I find that the stuff we're doing every week, it's all repetition really... you could lose motivation doing it' (M8, 22 months). In addition to changes in the exercises performed, goal-setting, fitness tests and feedback were stated as motivational tools that could be better utilised for newcomers, 'I would certainly for beginners after a month or so I would put in a fitness assessment' (M8, 22 months), and long-term adherers, 'It would be a good check wouldn't it [fitness test], once a year even, or 6 months' (M6, 18 months), to inform them of their progress, 'You know you're doing what you're doing but are you getting any better?' (F2, 19 months). Another concept that came through solely by male participants was that of a gender division in the class, 'Well I noticed with the advanced class, you never get any women in it because I think women are intimidated' (M7, 22 months). The reinforcement on the benefits of maintaining PA was also noted as a strategy to maintain or increase motivation.

3.3 Discussion

Consistent with research focusing on Phase III CR, this study found a number of similar factors influencing uptake and long-term adherence to structured Phase IV CBCR. The predominant factor influencing uptake was referral to the programme by a health professional; this is similar to Phase III and supports previous research (Barber et al., 2001; Dolansky et al., 2006; Jackson et al., 2005). It also stresses the importance of good links between community and hospital settings to ensure speedy and smooth transition from Phase III to Phase IV.

Similar to Phase III, social support in terms of support from family and friends was perceived as a key motivator both in terms of uptake and adherence (Barber et al., 2001; De Angelis et al., 2008; Dolansky et al., 2006; Jackson et at., 2005) and the support of fellow participants with a common medical history was paramount to their continued adherence (Clark et al., 2004; Jones et al., 2009; Thow et al., 2008). Additionally, both Phase III and Phase IV participants demonstrated knowledge of the benefits of remaining physically active (Dolansky et al., 2006; Thow et al., 2008; Wyer et al., 2001a), and viewed their participation as a method of

controlling their health and avoiding the pitfalls that lead to their cardiac event in the first place (Clark et al., 2004; Thow et al., 2008; Wyer et al., 2001a).

The current study develops our knowledge of adherence further by highlighting the importance of having a 'structured class' and enhancing 'self efficacy' as essential to long-term adherence to structured Phase IV CBCR. Supporting findings from Phase III (Thornhill & Stevens, 1998), elements of the structured class, including the range of exercises taught and the presence of specialised staff, were important for sustaining adherence. Many viewed the classes as part of their weekly routine and were committed to attending each week as it provided them with a sense of purpose. This was particularly evident among the retired individuals, as some stated, it gave them a sense of identity. This is a novel finding, one that highlights the role of habit or routine, as an important factor in assisting individuals adhere to a structured exercise programme long-term, by making it a component part of their everyday lives.

The current study also revealed the presence of task-, barrier- and recovery self-efficacy as essential to sustained adherence. This is an important finding as it enforces the need for multiple types of self-efficacy to sustain behaviour change. Task self-efficacy has been shown to be positively associated with uptake and short-term adherence to PA post cardiac event (Scholz et al, 2005), providing the programme does not progress too quickly (Rogers et al., 2009). However, Rodgers and Sullivan (2001) found that the presence of high task self-efficacy did not relate to long-term adherence and indeed its presence was reported in non-exercisers. Task self-efficacy was reported as important by the adherers in the current study. They felt it provided them with the necessary belief in their ability to carry out the prescribed exercises of the programme, particularly when the exercises were new or challenging.

The case for barrier (or maintenance) self-efficacy is less clear and while strong links with PA have been reported in the short-term i.e. up to two months post CR (Blanchard 2007, 2002; Luszczynska & Sutton, 2006), results for long-term adherence are conflicted. Blanchard and colleagues (2007, 2002) reported a significant decline in the relationship from two to twelve months post CR, whereas other studies have revealed strong correlations up to eight months post CR (Scholz et al., 2005; Luszczynska & Sutton, 2006). In a non-clinical population of older adults, a multivariate analysis revealed no relationship between barrier self-efficacy and

exercise maintenance (Umstaddt et al., 2007). The present study supports the necessity of barrier self-efficacy for long-term adherence and the importance of having coping strategies in place to deal with barriers as, and when, they arise.

More united support appears to be available for recovery self-efficacy which has been linked to adherence in both the cardiac (Luszczynska & Sutton, 2006; Scholz et al., 2005) and general older adult population (Stigglebout et al., 2005). It must be expected that lapses will occur in long-term adherence to PA for a variety of reasons (e.g. illness, injury) and therefore the importance of recovery self-efficacy is paramount.

The inconsistency of instruments used to measure self-efficacy, plus the multi-conceptualisation of the construct itself make it difficult to ascertain a definitive view of its true relationship to long-term adherence to PA post cardiac event. The present findings inform us that all types of self-efficacy must be present at all times during the behaviour change continuum, to allow specific types to be utilised to their full potential when the need arises. Future research must evaluate this further, particularly the notion of a temporal concept, i.e. that some forms of self-efficacy are more important than others at different times depending on one's location on the behaviour change continuum.

Strategies to increase future uptake and adherence to structured Phase IV CBCR focused on recruitment methods, support and motivation. Complimenting previous findings (Clark et al., 2004; Thornhill & Stevens, 1998) suggestions included better marketing of the programme and a more in-depth introduction to Phase IV CBCR during the Phase III programme. The use of current class members to assist with the recruitment of new participants has also been previously suggested (Clark et al., 2004; De Angelis et al., 2008). Peer support was recommended and as a concept deriving from the participants, who would fulfil this role, suggests that they would be willing to co-operate, although the level of commitment required would need to be addressed. This is a novel idea and future research needs to explore the impact of a peer-led intervention on adherence to structured Phase IV CBCR. It may also be a possibility to incorporate this into the monthly group support meetings that were also suggested.

A desire to increase motivation by methods including more challenging exercises and feedback strengthen the finding that these individuals are motivated by a desire to improve their physical health. However, feedback concerning support

and motivation reveal that the focus group participants perceive inadequacies in the HeartSmart programme. As these perceptions have not resulted in dropout for these participants, it must be expected that the factors positively influencing HeartSmart adherence outweigh the negative.

3.4 Conclusion

It is apparent that long-term adherers of a CBCR programme share the following characteristics: appreciation of the various aspects of a Phase IV CBCR programme, awareness of their medical condition and the benefits of maintaining PA, establishing a routine and also strong task-, barrier- and recovery self-efficacy. To increase the number of people successfully sustaining PA levels following a cardiac event, we need to work to with them to develop these attributes. In an effort to achieve this, the following is recommended:

- Development of task-, barrier- and recovery exercise self-efficacy in individuals post cardiac event;
- Introduction of educational components into Phase IV CBCR
 programmes to increase awareness of the importance of maintaining PA
 following a cardiac event;
- Phase IV CBCR providers to establish a closer working relationship with Phase III CR providers to ease the transition from one to the other;
- Develop a routine, a purpose among participants as this helps them get into the habit of attending the class and building exercise into their daily lives.
- Training of current long-term adherers to become Peer Mentors in the programme.

3.5 Limitations

All participants were from the same Phase IV CBCR programme and therefore only one programme was assessed. Strategies for increasing uptake and adherence are from the perspective of existing long-term adherers who may not understand the barriers faced by those who do not attend. Further research is required to assess the experience of structured Phase IV CBCR programmes from the perspective of those who have dropped out. Finally, participants were aware that results of the study would be seen by the programme organisers and this may have

inhibited responses (even though they were notified that all data would be kept anonymous).

Chapter 4: Study 2 - Development, Delivery, Implementation and Evaluation of a Peer Mentor Training Programme for Long-Term Adherers of a Phase IV Structured Exercise Community Based Cardiac Rehabilitation Programme.

4.0 Introduction

Maintenance of PA post Phase III CR remains uncommon (Bethell et al., 1999; Bock et al., 2003; Hughes et al., 2007; Moore et al., 2006). Whilst recent studies have focused on interventions to increase PA post Phase III CR, the use of structured exercise sessions within these interventions is minimal (Table 2.3). A meta-analysis of interventions to increase PA levels of individuals with CVD revealed that long-term maintenance of PA was more prevalent amongst participants who engaged in an intervention incorporating supervised exercise (Conn et al., 2009). Structured exercise classes can assist individuals adhere to exercise as they offer support from specialised staff, encourage individuals to engage in exercises that they would not otherwise perform and provide the opportunity for social interactions with fellow participants (Martin & Woods, 2012; Thow et al., 2008).

Social support provided by fellow participants in CR programmes has been shown to positively influence PA adherence levels in both Phase III (Clark, 2004; Dolansky et al., 2006; Jones et al., 2009) and structured Phase IV (Martin & Woods, 2012; Thow et al., 2008; Woodgate et al., 2007) CR. The importance of social support in a CR setting is increased by a shared medical history (Clark et al., 2004; Dolansky et al., 2006; Martin & Woods, 2012).

PA interventions which formalise social support through the use of Peer Mentors (PMs) have reported positive results in both general (Buman et a., 2011; Castro et al., 2011; Dorgo et al., 2009; Webel et al., 2010) and cardiac (Clark et al., 2001; Coull et al., 2004; Parent & Fortin, 2000) populations. Adherers of CR programmes have cited an awareness of the need to personally provide social support to programme newcomers (Clark et al., 2004; Martin & Woods, 2012). A review of literature by the researcher highlighted nine interventions utilising PMs in an attempt to increase either PA levels or CR adherence in older adults (Table 2.6). Whilst this review provides concrete evidence that PMs are a valuable resource that can be engaged to positively affect PA behaviour change, it highlights a number of shortcomings in the research. Specifically, information on the development of PM

training programmes is limited and minimal evaluation has been carried out assessing the effect of the interventions on the PMs themselves.

The purpose of this study was to develop a PM training programme for long-term adherers to a structured Phase IV CBCR programme – HeartSmart. The efficacy of the training programme to provide the PMs with the knowledge and confidence to carry out the role was evaluated through a mixed methods approach. The secondary purpose of this study was to assess changes in PA levels of the trained PMs as a result of taking on the PM role.

4.1 Methodology

4.1.1 Research Design

Mixed methods were used to gain an insight into the PMs experiences of the intervention (qualitative) and to establish if there were changes to PA levels of PMs as a result of participation in the intervention (quantitative). Qualitative methodology, in the form of focus group interviews, was the predominant method used as they generate rich data by capitalising on inter-participant communication (Kitzinger, 1995).

4.1.2 Ethical Considerations

All potential participants were given a verbal description in addition to a plain language statement outlining the purpose of the study, inclusion criteria and commitment required should they choose to participate (Appendix 7). Once selected for inclusion, individuals completed an informed consent form (Appendix 8) and were provided with dates for initial testing and training. To protect confidentiality of all participants, no individual identifiers were included on questionnaire results or qualitative transcripts; each participant was allocated a code and referred to as such. Questionnaire results and qualitative transcripts were stored securely, and accessed only by the researchers. The study protocol was approved by the research ethics committee of Dublin City University (Appendix 9).

4.1.3 Recruitment and Selection of Peer Mentors

Long term adherers of HeartSmart were targeted for recruitment. Flyers were disseminated to attract participants (Appendix 10) and information meetings were

held at the end of two HeartSmart classes to verbally inform participants of the purpose of the study, commitment required if recruited and to answer any questions.

PM inclusion criteria dictated those recruited:

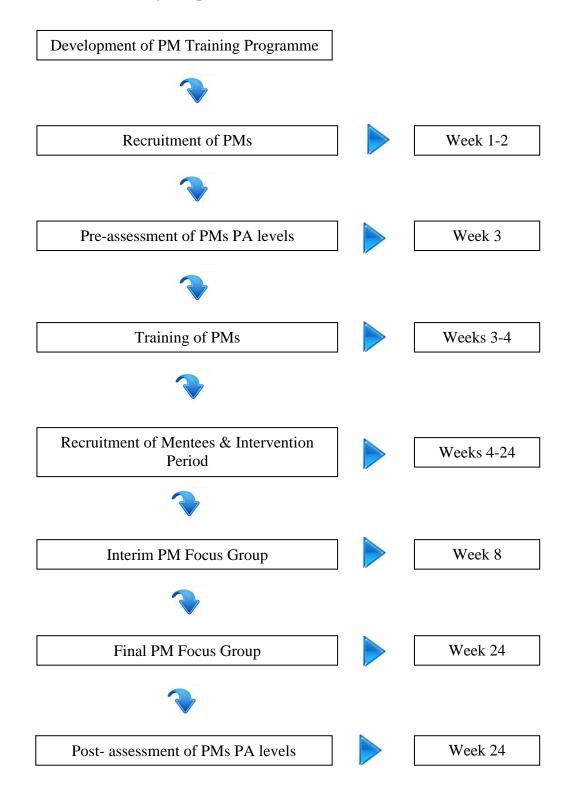
- Had regular attendance at HeartSmart for the previous 6 months (assessed by programme attendance sheets);
- Held a belief in a psychological model of health as outlined by Wyer & colleagues (2001a) i.e. a belief that they have control over their health (assessed through individual discussions during recruitment drive potential PMs were engaged in conversation about their experience in HeartSmart and their continued commitment to the programme plus a short application form; Appendix 11);
- Possessed good communication skills (assessed through informal discussions with potential PMs and with programme staff);
- Were willing to attended PM training sessions, act as a PM to newcomers to HeartSmart and complete outcome measures (assessed through discussions during recruitment drive).

All PMs were recruited by the researcher via advertising within HeartSmart followed by a recruitment application form (Appendix 11) and informal discussions with HeartSmart staff regarding their potential competence in the PM role. Chosen PMs were informed of times, dates and venue of training.

4.1.4 Procedure

The stages and timeline of the PM study are outlined in Flow Chart 4.1 followed by a comprehensive description of each stage.

Flow Chart 4.1 Study components and timeline



Peer Mentor Training

PM training was eight hours in total and was delivered by the researcher and a supervisor over two days in a room close to the Dublin City University's School of Health and Human Performance. Training was scheduled immediately following the HeartSmart class to reduce inconvenience to participants i.e. they did not have to make additional journeys.

Development of Training Components

The PM training programme was predominately based on the Social Cognitive Theory (SCT) which posits that behaviour is learned by observing others particularly if the learner closely identifies with the those they are observing (Bandura, 1986). The SCT states that environmental influences (physical and social), personal factors and attributes of the behaviour itself continuously influence each other to affect behaviour change (Bandura, 1986). Self-efficacy is a key concept with the SCT and can be described as an individual's belief in his or her ability to perform a particular behaviour in a variety of circumstances (Bandura, 1997). Multiple types of self-efficacy are required to successfully maintain behaviour change (Bandura, 1997). For example, task self-efficacy is required to master exercise performance whereas barrier self-efficacy is needed to continue to adhere to an exercise class despite the presence of barriers (Martin & Woods, 2012).

Specific training components were chosen based on findings from Study 1 which informed the researcher as to the personal, environmental and behavioural factors which influence sustained adherence to the HeartSmart programme. In addition, key findings from the two reviews of literature undertaken by the researcher (Tables 2.3 and 2.6) further influenced chosen training elements. Lengthy discussion took place between the researcher and supervisor regarding training content and appropriate delivery. The final components chosen were as follows:

- Role and responsibilities of PMs;
- Benefits of PA following a cardiac event;
- Barriers to participating in PA following a cardiac event;
- Recommended levels of PA following a cardiac event;
- Exercise Self-Efficacy;
- Goal Setting;

- Exercise Mastery;
- Communication Skills.

Training Delivery

A training schedule (Appendix 12) was devised to ensure all topics received appropriate time and to assist manage the schedule and minimise time commitment of the PMs. This schedule included the training topic, trainer input, learner activities, assessment of learning and resources required. The training was delivered in a facilitation style to make PMs feel comfortable and allow ample opportunity for PMs to input their ideas and ask questions. This is in line with the theory of Malcolm Knowles (1975) who identified that adult learners want to be involved in their learning and understand how it will be of practical use to them. The training plan followed the learning cycle as outlined by Kolb (1984) meaning the knowledge imparted to the participants enhanced what they already knew e.g. PMs were encouraged to reflect on their own experience of commencing the HeartSmart programme in order to enhance understanding of the process they went through. They were then assisted to conceptualise, through discussion, how they could use this knowledge to assist newcomers to the programme (Mentees). Finally, PMs were given the opportunity to put the learning into practice by engaging in role plays with their fellow learners. Each training component was initially introduced to PMs via PowerPoint presentation (Appendix 13) after which they were encouraged to consider the topic and relate it to their personal experiences. Training was delivered as follows:

Ice breaker

The training session commenced with an ice-breaker designed to get PMs talking, relaxed and thinking back to when they first commenced HeartSmart. PMs were put into pairs and asked to find out their partners name and the date they commenced HeartSmart. Each PM provided feedback to the group about the information they had learned from their partner.

Aims and Objectives of the PM Training Programme

The researcher displayed and verbalised the aim and objectives of the study. The overall aim of the PM training programme was to provide long-term adherers of HeartSmart with the knowledge, skills and confidence to act as PMs to newcomers to the programme. The knowledge and skills required to act in the PM role were broken down and highlighted in the following objectives:

By the end of the training, PMs will:

- Understand the purpose of the PM training programme and the key concepts of mentoring;
- Agree on the role & responsibilities of the PM and commit to adhering to these in their PM capacity;
- Understand the benefits of being physically active following a cardiac event;
- Be aware of the common barriers to participating in and sustaining PA following a cardiac event and strategies to overcome these barriers;
- Be aware of the recommended levels at which PA should be performed following a cardiac event including a clear understanding of Rate of Perceived Exertion (RPE) scale;
- Understand exercise self-efficacy and be aware of how to enhance this in their Mentee/s in their role as a PM;
- Understand the concept of SMART goals and the benefits of setting goals;
- Demonstrate correct technique and teaching points of a number of exercises performed in the HeartSmart Class;
- Reveal confidence in their ability to commence their role as PMs.

PMs were given the opportunity to ask questions regarding the aim and objectives of the training programme and the researcher emphasised that these would be revisited at the end of the training programme to ensure that all PMs were satisfied that these objectives had been met.

What is a Peer Mentor?

The researcher introduced the concept of Peer Mentoring by displaying and verbalising the following definition: "Peer Mentoring is based on an idea that

individuals who share similar problems have a unique resource to offer one another" (Medvene, 1992, p.49). The importance of offering social support was emphasised as the primary purpose of the PM as social support has been highlighted as a major determinant of long-term adherence to PA in Phase IV SECBCR settings (Martin & Woods, 2012; Thow et al., 2008; Woodgate et al., 2007).

Role & responsibilities of Peer Mentors

PMs were invited to brainstorm their ideas and opinions of what their role and responsibilities would entail. All responses were written on a flip chart and compared with the researchers' preselected role and responsibilities as follows:

- Build rapport;
- Assist with facility and programme familiarity;
- Reinforce benefits of adherence to PA;
- Offer assistance to overcoming barriers to participation;
- Encourage performance at appropriate intensity;
- Encourage realistic goal setting;
- Assist with exercise familiarity;
- Provide encouragement and support;
- Set a good example;
- Report back to the research team.

Any discrepancies between the two lists were discussed and PMs were informed that changes could be made to ensure they were comfortable with what their role and responsibilities should be. Due to very few discrepancies and PM acceptance of the preselected list, it was agreed that this would be adhered to providing they were confident of all components at the end of the training programme.

Benefits of physical activity following a cardiac event

The importance of knowing and accepting the benefits of PA participation as a motivation to sustain long-term adherence to structured exercise Phase IV CBCR were highlighted in Study 1 and additional studies focusing on cardiac populations (Dolansky et al., 2006; Wyer et al., 2001a). The purpose of including this in the training programme was to re-enforce these benefits and to highlight the importance

of belief in these as a motivating factor for long-term adherence. PMs were encouraged to brainstorm the benefits and responses were noted on a flipchart. The following list was then displayed and compared against the brainstorm list.

- Decreased risk of mortality;
- Decreased risk of secondary coronary events;
- Increased aerobic capacity;
- Improved quality of life;
- Improved blood lipid levels;
- Reduced risk of depression.

(Leon et al., 2005)

Factors influencing long-term adherence to HeartSmart

Quotes from Study 1 citing influences for long-term adherence to the HeartSmart programme were displayed via PowerPoint. These quotes highlighted health, fellow participants and sense of wellbeing post class as reasons individuals continue to adhere. PMs were given time to reflect on and discuss their own motivations for continued adherence. The researcher stressed that motivations of the Mentees would likely be different to their own and it was important for the PMs to gage Mentees motivations and work with them to develop these.

Barriers to participating in physical activity following a cardiac event
Barriers faced by individuals attempting to sustain adherence to PA/exercisebased CR have been well documented (Barber et al., 2001; Clark, et al., 2004; De
Angelis, et al., 2008; Dolansky et al., 2006; Jackson et at., 2005; Thornhill &
Stevens, 1998; Tod, et al., 2002). The importance of having strong barrier selfefficacy in order to maintain adherence has also been established (Luszczynska &
Sutton, 2006; Martin & Woods, 2012; Scholz, et al., 2005). The researcher felt it
was necessary for PMs to reminisce and acknowledge the barriers they faced when
they initially commenced HeartSmart so they could better empathise with their
Mentees and provide advice and support to assist them to overcome them. The word
"Barriers" was displayed on the PowerPoint and participants were asked for
feedback on what they felt were the key barriers to participation in PA following a
cardiac event. Responses were noted on a flip chart and discussion was encouraged.
Quotes from Study 1 were shown to display previously stated barriers. PMs were

then asked as a group to consider and discuss possible solutions for each of the barriers and in particular think of strategies they used overcome to their own barriers to participation.

Recommended levels of physical activity following a cardiac event
In order for individuals to adhere to recommended levels of PA, it is
imperative they are aware of the guidelines. The training programme included these
guidelines as a reminder to PMs of what their own participation levels should be and
also as to ensure they were giving their Mentees the correct information. The
researcher displayed the FITT principle via PowerPoint presentation as follows:

Frequency - Daily

Intensity - Moderate

Time - 30 minutes (minimum)

Type - Walking, swimming, cycling etc.

The researcher gave a more detailed explanation on the principle to ensure it was understood and to reinforce the need for individuals who have recently suffered a coronary event to slowly build up PA particularly if they were not physically active prior to their cardiac event. Additional time was spent explaining rate of perceived exertion (RPE) as monitoring PA exertion is paramount in building physical capacity following a cardiac event (BACR, 1999). RPE is a subjective measure and a favourable choice in Phase III and Phase IV CR programmes over objective measures such as heart rate monitors as it is inexpensive, non-invasive (Borg, 1998) and is not influenced by heart-altering medications (Nobel & Robertson, 1996). Allowing CR participants to self-select exertion level has been shown to increase exercise enjoyment (BACR, 1999). Borg's 15-graded rating RPE scale has demonstrated content, construct, concurrent and predictive validity (Borg, 1998) and excellent test-retest reliability (Nobel & Robertson, 1996).

Copies of the 15-Item Borg RPE scale (Appendix 14) were distributed to PMs with the researcher reminding PMs that they would have been exposed to these during Phase III CR. The researcher then introduced the incremental shuttle walk test (ISWT) which was developed to assess the functional capacity of individuals. The ISWT requires participants to walk up and down a 10 meter course at a speed

dictated by an audio signal (Singh et al, 1992). Participants are required to reach the end of the 10m course before the signal beeps. The speed of the beeps is gradually increased every minute for a period of 12- minutes. The end of the test is determined by one of the following occurrences: (a) the participant; when he or she is too breathless to maintain the required speed or (b) the operator; if the participant fails to complete a shuttle in the time allowed (that is, was more than 0.5 m away from the cone when the bleep sounds) (Singh et al, 1992). The researcher emphasised that the purpose of performing the ISWT in the PM training programme was to heighten PMs awareness of RPE during exercise rather than testing fitness levels. PMs were informed they would be required to indicate their RPE at regular intervals throughout the test. The test area was marked out according to test protocol (Appendix 15) and PMs blood pressure was checked prior to commencing the test to ensure it was at a safe level for them to exercise. PMs were positioned on the start line ensuring they were safe distance apart to avoid collision. Test procedures were further explained as was the importance of assessing their RPE throughout. The ISWT CD was started which led participants through the test. The researcher plus two assistants tracked participants RPE throughout the test and indicated when they had completed. Water was available for participants following the test and they were encouraged to actively cool down and stretch on completion.

Exercise Self-Efficacy

Self-efficacy is part of the SCT and refers to an individual's belief in his or her ability to perform a particular behaviour in a variety of circumstances (Bandura, 1997). Self-efficacy beliefs are highly correlated with PA participation (Focht et al., 2007) and with positive psychological well being in older adults (Netz et al., 2005). Individuals must master a number of different tasks requiring different types of self efficacy in order to sustain behaviour change (Bandura, 1997). The importance of multiple types of self-efficacy in achieving long-term adherence to PA post cardiac event was highlighted in Study 1 and numerous other studies (Blanchard et al., 2007; Luszczynska & Sutton, 2006; Rodgers et al., 2009; Rodgers & Sullivan, 2001; Scholz et al., 2005). The information and feedback an individual obtains from the performance of a task are referred to as sources of self-efficacy. Four key information sources influence an individual's self-efficacy: performance mastery,

role-modelling, verbal encouragement and physiological & affective states (Bandura, 1997).

The following definition of self-efficacy was displayed "a person's belief in his or her capability to successfully perform a particular task and influence events that affect their life" (Bandura, 1997). The researcher further explained the concept to the PMs and introduced task-, barrier- and recovery self-efficacy as described in Study 1. PMs were encouraged to consider their individual self-efficacy in relation to their PA adherence. The four sources of self-efficacy - performance mastery, verbal persuasion, role modelling and physiological and affective states - were displayed and methods in which the PMs could help increase self-efficacy of Mentees were explored. The researcher focused discussion on the various tasks Mentees would have to master e.g. venue familiarity, session format and exercise performance. Debate took place as to what was essential learning for the Mentees and how the PMs could breakdown this learning into achievable tasks. Barrier selfefficacy was linked to the barriers that had been discussed previously and researcher highlighted the need to possess recovery self-efficacy in order to overcome lapses in PA adherence. The importance of offering praise and encouragement to Mentees was emphasised as was the importance of acknowledging the effort required to participate and adhere to HeartSmart. PMs were asked to act as role models not by their ability to perform all exercises perfectly but by their commitment to the programme and efforts in overcoming barriers to adherence. PMs were encouraged to share these experiences with their Mentees.

Goal Setting

Goal setting theory states that the setting of SMART goals in combination with appropriate feedback motivates superior task performance (Locke, 1968). A review of studies incorporating behavioural interventions to increase PA in cardiac patients revealed the setting of specific goals as an effective method to increase adherence levels in both home-based Phase III and post Phase III centre-based settings (Ferrier et al., 2011). Goals must address the objectives of the participant and should focus on the journey towards the long term goal rather than attainment of it (Muse, 2005). The topic of goal setting was introduced with the following definition "Setting goals is a process that allows people to specify then work towards their own objectives" (Locke, 1968). The researcher stressed that goals should be

SMART i.e. Specific, Measurable, Attainable, Relevant and Time-bound (Locke, 1968). The researcher highlighted the importance of setting SMART goals and also to alert the PMs to the fact that Mentee PA and fitness goals would be very different to their own i.e. Mentee goals were likely to include exercise mastery and short-term adherence to HeartSmart whilst PM goals would be for continued adherence and increased fitness and competence. PMs were asked to fill in their short-, medium-and long-term goals on handouts provided (Appendix 16). These goals were then discussed and PMs were asked to consider the differences between their own goals and likely goals of Mentees.

Demonstration of HeartSmart exercises

As performance mastery increases exercise self-efficacy and is positively correlated with adherence (Frocht et al., 2007), it was imperative that PMs were confident and competent in assisting their Mentees master the core exercises of the HeartSmart class. A circuit of the most common exercises performed in HeartSmart (Appendix 17) was laid out and PM's were led around the circuit with each PM given the opportunity to provide a demonstration and teaching points of a particular exercise. The purpose of this was to ensure the PMs knew the correct technique and key teaching and safety points of each exercises. The researcher emphasised the importance encouraging correct posture, breathing and performance at an appropriate level on the RPE scale. The researcher stressed the fact that the HeartSmart instructors had overall responsible for exercise instruction but as PMs they could give tips and enforces key teaching and safety points if and when appropriate.

Communication Skills

In order to develop communication skills and link the training components to practical implementation, PMs were paired up and given a number of scenarios covering a range of situations that they may have to address in their role as PM. Nine different scenarios were played out, for example, irregular Mentee attendance and Mentee frustration at slow fitness progress (Appendix 18). PMs were instructed to act in either the PM or Mentee role to play out the scenarios. Group discussion took place to assess the pros and cons of different approaches taken and to ensure all PMs were aware or their responsibilities in varying situations. The communication

skills PMs were specifically encouraged to utilise were empathy, active listening, provision of feedback, sharing of HeartSmart experience and responding to concerns.

Recap and Questions & Answers

The researcher recapped on all topics covered in the training and re-displayed the training aim and objectives to ensure they had been achieved. Roles and responsibilities of PMs as outlined at the beginning of training were revisited to assess if all PMs were confident in their ability to fulfil these. All PMs stated satisfaction with these roles and responsibilities and confidence in their ability to adhere to them. The researcher then outlined how the study would progress and the level of contact the PMs could expect from the research team.

PM Resources

On completion of training, PMs were given a booklet detailing all components covered in training with additional in-depth information on these components in case of personal interest (Appendix 19). PMs were also given a small cue card (measuring 9cm x 7cm and designed to be clipped onto clothing) which listed all components covered in the training (Appendix 20). The purpose of the cue card was to prompt PMs to use the various training components during the PM/Mentee contact period.

Mentee Recruitment

Full details of Mentee recruitment and outcome measures are described in Chapter 5 but for clarity of this chapter, all newcomers to HeartSmart were informed of the opportunity to avail of a PM and asked if they would be interested in participating in the study. The researcher met with all interested participants at the end of their HeartSmart induction to further explain the study and obtain consent. Those who consented completed pre-intervention outcome measures and were informed of their official start date at HeartSmart.

PM/Mentee Match

PM/Mentee matches were based on PM availability to complete the 6-week mentoring period. The researcher informed each PM as to the day their Mentee/s would be starting and requested the PM arrive 30 minutes before the start of class for

the initial meeting with their Mentee. The researcher was present on the first day of all new Mentees to introduce them to their PM. Each PM was matched with 1 to 2 Mentees and requested to mentor them for a 6-week period. As all Mentees were not recruited at the same time, the length of the intervention for the PMs was 3-months.

Support for Peer Mentors during Intervention Period

During the 6-week match period, the researcher met with PMs individually before or after the class or contacted them by phone at least once. The purpose of this was to check on progress and ensure the PM was not experiencing any major problems and to ascertain that the Mentee was still attending HeartSmart.

4.1.5 Outcome Measures

A combination of qualitative and quantitative measures was used so that the limitations of one method could be offset against the strengths of the other (Creswell & Plank Clark, 2007). The outcome measures were selected to evaluate the PMs perceptions of the PM training programme (qualitative), to evaluate their experience of acting as a PM in the HeartSmart programme (qualitative), to assess the intervention fidelity (quantitative) and to determine how their PA levels changed as a result of participation in the intervention (quantitative). Specifically, the following measures were used:

Qualitative Measures

Field notes & Focus Groups

Field notes were written into a reflective journal throughout the study period noting personal experiences, ideas, mistakes, confusions and opinions. While these field notes are the researchers own interpretation they proved to be a useful secondary source of data and were valuable in supporting and explaining the primary qualitative data collected through the focus groups.

Field notes were taken during and after the PM training programme and with all additional contacts with PMs. The researcher met all PMs on at least one occasion during their 6-week mentoring period either face-to-face before or after HeartSmart classes or by phone or email to check their progress and provide support.

An interim focus group was held mid-way though the intervention to discuss progress and to gain initial feedback, allowing PMs the opportunity to discuss any

challenges they may have encountered so far and provide an opportunity for PMs to receive support from the researcher and their fellow PMs. Three questions were put to the group, "How are you finding the role of Peer Mentor?"; "Do you feel that the Peer Mentor programme is working to an extent that it is helping newcomers stick with the programme" and "Do you feel supported in your role as a Peer Mentor" (Appendix 21). The questions were kept to a minimum to leave the discussion open to discuss any issues that should arise. The interim focus group was taped and transcribed.

Following the intervention period, i.e. when all Mentees had completed the 6-week intervention, a focus group session was held to gage PMs perception of the training programme and to establish their experience, duties performed and challenges encountered within the PM role. A series of 11 questions were developed to guide the session (Appendix 22). These consisted of introductory, transition, key and ending questions as recommended by Krueger (1998), for example, "Think back to the peer mentor training programme, what were the positive and negative aspects?; "Do you think there are any changes that could be made to the peer mentor training programme to better prepare you for the role as PM"; "Can you give me examples of support (if any) that was provided to you by the HeartSmart staff and research team that you found particularly useful in helping you to conduct your Peer Mentoring role; "What challenges did you face in your role as Peer Mentor". To ensure conversation flowed and to enable PMs to ground their opinions and ideas, opportunity was afforded to stray from the particular question being asked as long as the conversation remained within the remit of the topic of the research.

Quantitative Measures

Intervention Fidelity Questionnaire

Immediately following the final focus group, PMs were given an intervention fidelity questionnaire (IFQ) to complete in order to gage their use of training components in the PM role. The IFQ is an 8-item questionnaire developed by the researcher. Its purpose was to assess the fidelity of the PM training programme in achieving its desired objectives. The questionnaire first asked how many Mentees each PM had mentored to ensure they had acted in the role. The second question was open-ended, it assessed the duration they had mentored each Mentee and the number of interactions engaged in. This was to evaluate if the PMs had stuck to the agreed

6-week intervention period and if they interacted with their Mentee at each session. Questions three and four asked the PMs to rate their overall confidence in the role plus their confidence in use of each specific training component on a 10-point Likert scale (a score of 1 meaning they had no confidence at all and a score of 10 meaning they were 100% confident). The fifth question was again open-ended and asked PMs to state what they thought was their main contribution to their Mentee. This question sought to gage variation in PM perspective on the role. Questions six and seven assessed use of the two training resources i.e. the training booklet and cue card. The final questions asked if there was any additional training the PMs felt would have assisted them in the role (Appendix 23).

Physical Activity Measures

Due to limitations associated with both methods, objective (Actigraph Accelerometer) and subjective (International Physical Activity Questionnaire; IPAQ) measures of PA were used. These were completed by PMs the week immediately prior to PM training and immediately following the final focus group session. At both time periods, PMs were requested to complete the IPAQ on the final day of accelerometer testing so that the data received from both measures was for the same time period.

Actigraph Accelerometer

The Actigraph GT3X accelerometer is a small motion sensor, approximately the size of a match box (27g; 1.5" x 1.44" x 0.70"), which measures motion on three axes. The device is attached to an elasticised belt and is worn just above the right hip. PMs were shown the correct placement of the accelerometer and requested to wear the device for 7 days (protocol for using the Actigraph accelerometer is outlined in Appendix 24). In addition, PMs were given a record sheet to note any times during the day that the device was taken off and the reason why (Appendix 25). This allows the researcher to explain periods of null activity in the dataset. Actigraph software was used to initialise the device and set dates and times for beginning and end of data collection. Based on recommendations from research in the field, for the data to be included in the analyses, participants were required to wear the accelerometer for at least 10 hours per day on at least 5 of the 7 days (Copeland & Esliger, 2009; Trost, et al., 2005). As all PMs were retired, no

distinction was made between weekdays and weekend days. Cut points (described in counts per minute) to distinguish light (<1565 counts), moderate (1566-6139 counts) and vigorous (>6140 counts) activity were used as recommended for use with older adults (Miller et al., 2010). A cut point of <50 counts was used for to distinguish sedentary time as is the suggested sedentary cut point for use with older adults (Esliger et al., 2005; Gardiner et al., 2011). The time sampling interval or epoch historically used with adults is 60-seconds due to limited storage capabilities in original accelerometers (Ward et al., 2005). A 30-second epoch was chosen for this study as lower epochs have been shown to be more sensitive to vigorous PA (Rowlands et al., 2006).

International Physical Activity Questionnaire

The IPAQ was developed by a consensus group in Geneva in 1998 as an international measure of PA to enable comparison of health related PA around the world. The IPAQ consists of twenty-seven questions within five activity domains:

1) job related, 2) transportation, 3) housework, house maintenance and caring for the family, 4) recreation, sport and leisure time PA and 5) time spent sitting. Time spent sedentary is also assessed (Appendix 26). The participant must recall all PA in each domain performed in the previous seven days. Extensive reliability and validity testing carried out in 14 centres across 12 different countries reported acceptable measurement properties especially in urban samples (Craig et al, 2003). Although the IPAQ compares less favourably with the 7-day PA recall questionnaire (a semi-structured interview calculating weekly minutes of at least moderate intensity PA) in terms of validity and measurement bias, it includes a measure of sedentary behaviour and also can be self-administered reducing the time input of the research (Johnson-Kozlow et al., 2006).

4.1.6 Data Analysis

Qualitative

The moderator and assistant met directly after each focus group session to debrief and discuss and capture initial thoughts. The interim and final focus group discussions were transcribed verbatim immediately following the sessions. Analysis of the transcription was conducted manually, first by comparing it with assistant moderator's notes to fill in inaudible phrases or gaps in the tapes, followed by the

constant comparative method to analyze the data. This involved finding, highlighting and comparing themes emerging from the two focus groups.

For theme identification, the researcher looked for patterns, themes, concerns or suggestions which were posed repeatedly by the PMs. Data for each theme were then grouped together read repeatedly, re-analysed and if necessary broken down into subordinate themes to better reflect the insight derived from the data provided. These themes included sought or expected information as well as emergent themes which were unexpected and revealed insights. All transcripts plus the complete list of themes and sub-themes were then passed to a colleague to assess and provide feedback on analysis. Discussion took place to ensure that all data was linked to the appropriate theme and new themes were developed where necessary. When all data (including field notes) had been coded and themed, the researcher chose key quotations from each theme and linked it with an explanatory narrative to describe key findings.

Trustworthiness of data

In order for the findings of the research to be considered believable, the onus is on the researcher to make each stage of the research process visible (Maykut & Morehouse, 1994), for example, detailing the purpose of the study, how the participants became part of the study, the specific setting and participants, the data collection and analysis procedures used and the findings and outcomes arrived at. One way of increasing trustworthiness is to utilize multiple methods of data collection so that the limitations of one method can be offset against the strengths of another (Creswell & Plank Clark, 2007). Observations, recorded as field notes, backed up by findings from interviews and finally participant checks with PMs during the focus group discussions allowed emerging themes to be supported or refuted.

Quantitative

Continuous data from questionnaire results (IFQ and IPAQ) were analysed using SPSS version 18. All data were checked for normality using the Kolmogorov-Smirnov test, and descriptive statistics such as means, standard deviation and medians were calculated. For the IPAQ, pre versus post group differences were evaluated via either a paired t-test or a Wilcoxin-Signed Rank test. Responses from

the open-ended questions on the IFQ were grouped together and compared for similarities and differences.

ActiLife software was used to download, process and calculate accelerometer variables. In order for individual data to be deemed valid, decisions on inclusion criteria were inputted. These included minimum of 5 days wear and minimum daily wear of 10 hours. Eighty percent reliability has been reported for moderate and vigorous PA in 3-4 days of monitoring (Matthews et al., 2002). Cut points were inputted into the software programme. Output from the ActiLife software was recorded in an excel spreadsheet and transferred to a statistical analysis programme (SPSS, version 18). Where results were normally distributed, a t-test was performed to determine changes in pre- and post activity. A non-parametric equivalent test was performed if results were abnormally distributed.

4.2 Results

4.2.1 Peer Mentor Details

Nine participants consented to train as PMs. One of the nine arrived one and a half hours late on the first training day and was unavailable for the second training day and so was omitted from the study. The remaining eight PMs completed training, pre- and post-outcome measures and mentored at least one Mentee resulting in a 100% retention rate. Table 4.1 presents the age, distance from programme venue and duration of adherence to HeartSmart of these eight PMs.

Table 4.1 Peer Mentor Details

Participant	Age	Distance to	Duration of adherence to
		venue (KMs)	HeartSmart (years)
PM1	69	14.3	2.5
PM2	75	4.0	4
PM3	67	14.2	3
PM4	69	4.0	4
PM5	67	10.3	3
PM6	64	5.5	3
PM7	77	2.8	1
PM8	63	2.7	3

All eight PMs were male and were aged between 64 - 77 years (mean age 69). No females put their name forward after the initial recruitment drive so the researcher obtained a list of potential female PMs from the HeartSmart staff and these women were approached individually by the researcher in an attempt to recruit. However, this additional recruitment drive was unsuccessful with these female participants stating that they could either not commit to the two half day training days or would not be available to mentor for a 6-week period.

4.2.2 Qualitative results

Data from the two focus groups and field notes were combined and analysed. The transcription from the final focus group consisted of 6,002 words whilst that of the interim focus group was 4,644 words. Field notes taken during PM training and informal one-on-one conversations consisted of a further 1,552 words. Eight themes emerged from the grouped qualitative analysis. Themes plus their sub-themes are categorised under three headings; Input to PM intervention (Table 4.2); Outcomes of PM intervention (Table 4.3); and Future recommendations (Table 4.4).

Table 4.2 Input to PM intervention

Key themes	Subordinate themes		
PM Motivation	Perceived need		
PM Training Programme	Thought provoking / Provided structure / Discrepancy		
	in training exercises and class exercises / On-the-job		
	experience		
Support for PMs	HeartSmart staff / Fellow PMs / Research co-ordinator		

Peer Mentor Motivation

Motivation to sign up to become a PM arose from a perceived need to do something to assist newcomers to the HeartSmart programme. PMs observed that newcomers 'didn't know what to do' (PM2) and 'were a bit lost looking' (PM3). Prior to the introduction of the PM intervention, the PMs had been discussing the need to intervene as one PM recalled '[PM2] and I were thinking about it before and

we were thinking "what can be done for new people coming in?" and it's high time that someone got their heads together and got someone in to look after that because an awful lot of people were just left standing in a corner' (PM4).

PM Training Programme

PMs were asked for positive and negative feedback on the PM training programme. One PM described how it was thought provoking, 'I thought the training was effective and the fact that we discussed things was good because it brought up issues that made us think about things' (PM3). Another PM, whilst dubious at first, thought the training provided structure for the intervention, 'When I heard first you were going to do training with us I thought "why in the name of God are we having a meeting about mentoring? It's just common sense; we do what we would normally do if we see someone in a corner", but in fairness when I went I could see that it needs structure' (PM1). One PM highlighted the fact that the exercises performed in the training programme were no longer those performed in the HeartSmart class, 'The actual exercise circuit that you showed us [in training] is not the same down here' (PM2). It was also suggested that it would be more appropriate to include training on the weights machines rather than the floor exercises, 'If you were running the training again, you would be better off delivering the training upstairs, showing the weights and how to do that... it's when [Mentees are] lifting weights when they don't know how to set their weight and breath properly' (PM2). However, it was noted that the real learning came during the actual mentoring, 'No matter how well prepared you are for this venture it is only by "Doing it" that you get to know how it effects both you and your Mentee' (PM1).

Support for Peer Mentors

PMs were asked if they had received any support in their role. In general, PMs felt they were well supported, 'I must say that on any occasion I asked for advice, it was given to me' (PM4) and did not feel they needed any additional support, 'I can't think of anything else that could have been done to make it better' (PM3). Support was received from three sources - the HeartSmart staff, the researcher and their fellow PMs. Three PMs specifically noted occasions that they had asked the HeartSmart staff to assist when they felt their Mentee needed more support mastering the exercises, 'Well I for one feel like I can go to any of them

[HeartSmart staff] '(PM4) and there was agreement from the other PMs that this support was available to them. Three PMs remarked that they felt they could contact the researcher at anytime if the need arose, 'If anything arises we know you're [researcher] at the end of the phone' (PM3). PMs also stated that they acted as a support to each other by taking over mentoring responsibilities if another PM was unavailable, 'Between ourselves, I mean if somebody's going on holidays, they come to one of us and say I'm going away for a couple of weeks, can you keep an eye on so and so'(PM6).

Table 4.3 Outcomes of PM Intervention

Key themes	Subordinate themes
Effective PM Strategies	Social support (Emotional,
	Informational) / Self-efficacy
	(Performance Mastery, Encouragement,
	Role Modelling)
Negative Mentoring	Poor communication skills
PM Challenges	Gauging level of support required / Lack
	of exercise mastery / Conflicting input
	from HeartSmart staff
Personal outcomes for PMs	Pressure / Increased responsibility /
	Enjoyment

Effective PM Strategies

Social support was one strategy that although not presented as a single entity in the training programme, was an essential component, particularly through self-efficacy development. Data analysis revealed unanimous agreement amongst PMs that provision of social support to Mentees was paramount. PMs predominately cited emotional support as a means of assisting Mentees. Three PMs were strong in the opinion that emotional social support was the primary resource they had to offer as one PM surmised, 'The most important thing is to try and get people involved in the group and try and introduce them to people. The other stuff, we're all struggling with that, you just get on with that and you do it to the best of your ability. It's just to feel part of the group and having a PM is a start' (PM3). This comment

highlights the unique connection the PMs felt they had with their Mentee through a shared medical history. The importance of feeling a part of something was also highlighted, 'He got to know loads of my friends and I feel now at the end of the 6 weeks having stayed with him for the 6 weeks and to use a phrase, "he's a member of HeartSmart" (PM1). One PM reported using informational social support by sharing knowledge with his Mentee, 'I feel, when I get someone [a Mentee], well all we can do is pass on what we know' (PM4).

In addition to assisting Mentees within the HeartSmart class, PMs also reported they had maintained contact with Mentees who had dropped out of the programme. This level of social support offered was in excess to the remit of their role but appears to have served to maintain a link with those who dropped out and kept the door open should they wish to return. The following quote describes one PMs interaction with a Mentee who had dropped out: '[Mentee] just came to one [class] and I don't know what I said to him, I wish I could remember but he has rung me every night before a Tuesday or Thursday class and says that he can't come the next day because he hasn't seen his consultant and he's on holidays now and I said to him, "when you come back from holidays and you get sorted and are ready to come back I said ring me the night before". I've established a friendship from meeting the chap once despite the fact that I know he bloody well suffered in here that day' (PM1). However, not all PMs were willing to give support outside of the class setting and the issue of swapping phone numbers was debated with some thinking it was a good idea, 'It's a voluntary thing yes, but you'd prefer to say "look there's my number if there's any problem you haev..." and you feel that you've given them a lifeline and it's up to them if they use it' (PM3) whilst others felt that the HeartSmart staff should have the responsibility of liaising with those who dropped out 'Not everybody likes to give out their phone numbers. There's enough liaison with the likes of yourself [researcher] and the rest of the staff here. [Mentees] could get in touch with [HeartSmart staff], and then they could let us [PMs] know' (PM4).

PMs reported that they had attempted to increase their Mentees task self-efficacy through encouragement, assistance with exercise mastery and role modelling. Three PMs described how they had assisted with exercise mastery by advising their Mentees to work at their own pace, 'I reminded him that he was new to the programme and it would take time to master the exercises and increase fitness' whilst encouraging them to push themselves, 'Any of the Mentees I had when

they started off I told them to take it easy until you get used to it but I said you have to up your effort every day' (PM4). One PM noted that he spent a lot of time assisting his Mentees with their exercise technique, 'I spent quite a bit of time with [Mentee] trying to show him the right co-ordination and breathing...One exercise he can't do it correctly and I try to get him to do it properly' (PM2). The same PM brought up the topic of exercise technique on several occasions during both interim and final focus group discussions and also during informal conversations with the researcher. The other PMs did not appear to give the same priority to their role of assistance with exercise technique mastery. PMs were informed in training that they were there to offer simple advice to their Mentees in relation to exercise mastery if needed but the overall responsibility was with the HeartSmart staff. One PM stated how he utilised the staff, 'As far as [exercise] training went, I would mainly tell them to take it easy first, I wouldn't worry too much and if there was an issue, I would get a member of staff' (PM6). Another PM debated that it was the social support rather than assistance with exercise technique that should be their primary focus, 'I think the most important thing is that they make contacts with other people and once they've done that and they feel comfortable that's the most important thing. I mean there's only so much you can do about their exercise technique' (PM3).

Modelling was another source of self-efficacy enhancement that PMs offered their Mentees. PMs viewed the fact that they had experienced similar health problems as their Mentees as important as it allowed them to empathise with their Mentees efforts, 'For me the important thing [for Mentees] is ... coming and meeting people struggling with what they're trying to do, that there are people with you who know what you're going through' (PM8). One PM described the importance of highlighting their shared medical history with their Mentees, 'What's the most important thing we have to give to people and it's the fact that we're people who have a heart condition like them and it's about that relationship. It's a little bit like people in the AA or something like that, there's no judgement, we don't know that much more than they do but we're on the same journey with them and that we can kind of support each other and from that they'll find their way. They move on, they may not want to be close to us or whatever but at least, I think that's what we have to offer, the fact that I have so many stents, we're one of them' (PM5).

Negative Mentoring

In one case, the inability of a Mentee to master the exercises following advice and instruction lead to frustration for the PM, 'You'll find some [Mentees] have the where with all to pick things up and some haven't and it's as if you were talking over their head rather than at them or to them. You think they listen to you but they still do what they're doing. What do you do with these people?' (PM4). This suggests that the PM was lacking appropriate communication skills to effectively interact with his Mentee and placed excessive priority on exercise mastery. This had a negative impact on the PM and most likely the Mentee.

Peer Mentor Challenges

Whilst it was agreed that social support was the primary resource they had to offer their Mentees, interpretation of how much social support was appropriate or needed varied greatly. One PM viewed the close contact he maintained with his Mentee with the utmost importance, 'The relationship I built up with [Mentee] during those 6-weeks would have been enough to make him come, not because he was going to let me down but because he was part of something... you don't get that if you just stay with somebody for 2 weeks' (PM1). However, not all PMs were convinced of the benefits of remaining in such close proximity to their Mentees, 'There's some people might not want to [have PM at their side], when something arises they might go along and ask you but they might not want you with them all the time and that's something we need to think about with the people we are mentoring – to what extent should we be looking over their shoulder?' (PM3). In one case, the Mentees' past exercise experience dictated the intensity of the PMs support, '[Mentee] appears very independent; he is already a member of a gym and does not appear to require much support... I check in with him each session but let him do his own thing as he appears more comfortable this way' (PM5). It was suggested that more clarity was needed on the level of social support PMs should provide.

Despite the majority of PMs believing it was the social support rather than assistance with exercise mastery that was the best resource they had to offer, they acknowledged that they found it challenging when their Mentees struggled with the exercises. Whilst it was appreciated that Mentees who had previous exercise experience had no problems performing the exercises, '[Mentee] was very familiar with Gyms, he knew more about the equipment that I do myself' (PM5), it was

generally felt that the progression from Phase III to Phase IV CR was too steep leading to negative experiences for Mentees. One PM attempted to explain the difference between the two Phases, 'I felt that somebody coming in here who'd never been to a gym before apart from in the hospital, it's like saying if somebody's good at snap and then they go to a poker game... It will destroy their enthusiasm' (PM1). This PM further explained this concept in relation to one of his Mentees, '[Mentee] hadn't a clue and I felt so sorry for him... for him to come in and for people who didn't know him looking at him thinking he hadn't a clue and he didn't have a clue...that first session would have destroyed a lot who thought I want to be part of this HeartSmart' (PM1). Another PM suggested that having a PM was only helpful if the Mentee had some level of exercise mastery, '[The PM programme is] 100% helping the person who's has a little bit of experience but for a person who has never actually stood in a gym, I think it would actually run them out of the place' (PM2). This PM felt that a newcomer (Mentee) exercising beside a significantly more competent participant (PM) would hamper confidence 'If you come in and you're training with people who are moving at a fast pace, it's very difficult for a person coming in, the first thing they'll say is "this is not for me" (PM2).

Another challenge cited by the PMs was when HeartSmart staff contradicted their advice to their Mentees. This was mentioned by three PMs who stated that a member of staff increased the intensity their Mentee was working at to a level they felt was too difficult. This had a detrimental effect in one case and the PM felt it caused the Mentee to drop out of the programme, 'The only thing I found...when you had a new person on the treadmill and you have them on level 3, and you'd ask them if they want to go any higher and they say no. The next minute [HeartSmart staff] member] comes up and he had them up at 10 and the guy is struggling then and he says "he told me to go up" and I say "take it at your own pace". I had one guy who literally walked off because of it. He walked out of the class, he said "that's too much for me" and we never saw him again' (PM6). Whilst two other PMs experienced a similar occurrence, they were capable of challenging the staff member and successfully arguing their point, 'I found the same with [HeartSmart staff member] and in fairness he came up when I was with [Mentee] and he felt that [Mentee] could go harder and he pushed him up and I said "[HeartSmart staff member], it's too high" and I pushed him back down and '[HeartSmart staff member] said "alright, ok" (PM2).

Outcomes for PMs

Due to absenteeism of a number of PMs at certain stages of the intervention, those available felt under pressure to take on more Mentees than they were comfortable with, 'When we started there weren't that many of us because people were out, [PM8] with his knee, [PM5] was away and others were [engaged in another research project] so although we had seven or eight PMs, there were only three or four of us available so there was a little bit of pressure' (PM1).

PMs also stated that the role lead to increased responsibility, 'There's more responsibility when you're doing it alright to make sure you're in at a certain time' (PM3). This new responsibility led to feelings of guilt in one case of one PM as he would not be present for the full 6-weeks, 'I am possibly going to America mid September and I feel guilty if I cannot complete the 6-weeks with the Mentee' (PM5). However, for one PM this sense of responsibility resulted in a positive outcome as it encouraged him to increase his own attendance to ensure he was available for this Mentee, 'I usually only attend on Thursdays but I came on the Tuesday as well as I was her Mentor' (PM7).

PMs acknowledged that they had enjoyed mentoring with one stating, 'I enjoy the role' (PM1) and another telling how the Mentees contributed to this enjoyment, 'I found they were all easy people to get on with' (PM3). All PMs stated that they would be willing to continue in the role.

Table 4.4 Future Recommendations

Key themes	Subordinate themes
Recommendations for PM programme	More PMs / Female PMs / Spread
	responsibility to all HeartSmart members
	/ Swapping Mentees / Flexible match
	period / PM - Mentee ratio / Time off /
	Change initial contact / All newcomers
	given a PM / PM role expansion.
General recommendations	Beginners class / Standardised aerobic
	routine / Acknowledge absenteeism /
	Create opportunities to reconnect with
	drop outs / Establish additional social
	opportunities / Increase designated
	contact staff / Reintroduce name badges.

Recommendations for Peer Mentor Programme

PMs offered advice on the future of the PM programme, specifically how it could be improved and sustained. The primary suggestion was to increase the number of PMs to ensure that there was always a PM available if needed, 'I actually think you'd be better off training up a number of PM's, having a number on hand so no matter who comes in there's always someone available' (PM2). This was deemed particularly necessary during certain periods when PM availability was more likely to be limited, 'You're going to have a lot of us away at certain times during the holidays so you would need to have more [PMs]' (PM4). It was also suggested that other HeartSmart participants may have witnessed the PMs in action and like the opportunity to do the same, 'Well I think that anybody who wants to be a PM should have the opportunity, it should be shared around. There are people there who might see ourselves doing it and might like to do it' (PM3). It was also suggested that Mentees who had gone through the process may be good candidates to act as PMs, 'they'd know the experience so that might be good' (PM8).

The need for female PMs was stressed as it was believed female newcomers would feel more comfortable with a female PM. There was some debate as to whether lack of female PMs impacted negatively on female Mentee adherence.

Whilst one PM suggested it did, 'You need female PM's, like that woman [dropout Mentee], she's not here anymore' (PM1), the PM who had mentored that particular female did not believe that the gender difference was an issue, 'She seemed quite happy; she was having a great time. She had personality; she had no problem saying "I'm going to go over to the other women" (PM3).

Developing a general supportive environment amongst all HeartSmart participants was also suggested, 'It might also be an idea as well to get the word out to other [HeartSmart] members to have an attitude of befriending people, not just us' (PM3) even though it was felt that this was already happening to some extent, 'You see new women coming in and the women will go over and introduce them to some of the other women and it's encouraging to see that' (PM6).

During the 6-week intervention period, PMs passed their Mentee to another PM if they knew they were unavailable for any sessions. It was recommended by a number of PMs that it be compulsory to swap Mentees during the 6-week intervention period as this would increase the Mentees' socialisation into HeartSmart, 'One proposition may be...say after 2 weeks or 3 weeks that they go to a second PM and I get someone else's so they get to know more people and more names and it gets sociable then' (PM2) and increase the opportunity for bonding, 'they might get along better with a different PM' (PM5).

When questioned about the length of the intervention, PMs revealed that the greatest input occurred in the first two to three weeks, 'Well the two I had were fantastic, just 2 weeks and they could almost tell me what to do, you know that kind of way' (PM4). It was mentioned that even though contact and support may have reduced after this period, they still ensured they were available if needed, 'In my case I'd say about 3 weeks was sufficient as long as they know you're available if they need you, they don't need much more after that really' (PM3). The fact that some Mentees could not master the exercises pushed some PMs to continue to maintain close contact, 'Some [Mentees], they don't have a clue [how to perform exercises] and you have to keep with them' (PM4) whilst others felt that this was something that was beyond their control where as helping them socialise into the programme was their primary goal, 'I think the most important thing is that they make contacts with other people and once they've done that and they feel comfortable that's the most important thing. I mean there's only so much you can do about their exercise

technique' (PM3). These comments reflect back to the debate about how much support and contact is necessary.

With regards to the number of Mentees the PMs were comfortable with mentoring at any one time, the majority said they would not like more than one at a time. However, they collectively stated they would be willing to take a second Mentee after the initial more intense 2-4 week period, 'I think towards the end of the 6-weeks you might be able to take another one, after 4 weeks maybe' (PM6) although it was agreed that it depended on the Mentee, '3 weeks maybe if they were doing ok you could take another person' (PM3).

All PMs stated that they would be happy to continue to mentor although they agreed that they would like some time to concentrate on themselves, 'We'd need a bit of time to ourselves, yes' (PM1). However, the general consensus was they would like a flexible arrangement whereby they could take time off if and when they need it, 'There's nothing stopping us from saying to you "no I wouldn't like to take anybody for a month" (PM5).

Other suggested changes to the PM programme included changing the initial PM/Mentee meeting, 'If there was some way that we could meet them before their first class, maybe and have a chat with them, that might be helpful but I'm not really sure... If they came in, if they were starting on a Thursday and they came in on a Tuesday after or before or even during the class to get a look at it' (PM3).

It was recommended that the co-ordination and awareness of the PM programme be improved to ensure that all newcomers, even if they are transferring from the evening to daytime HeartSmart classes, are offered a PM, 'I would suggest to you that all newcomers coming in should be advised that there are mentors here if they need them' (PM2) as it was felt that, 'some people are missed' (PM2).

Finally, PMs suggested that their role be expanded. One PM in particular was interested in visiting participants in the Phase III hospital CR to inform them of the HeartSmart programme. He suggested that this coincide with a new DVD being developed to promote HeartSmart, 'when this DVD comes out, it wouldn't be a bad idea during the hospital rehab that on the day that they're going to show the video that one of us goes in if we were available and talks about {HeartSmart}, as someone who's been through it' (PM1). When the other PMs were asked if they would be happy to do this, they all said they would, although perhaps on a trial basis, 'It would be worth trying anyway' (PM4).

General recommendations for HeartSmart

Although the researcher primarily sought information specific to the Peer Mentoring programme, a large proportion of feedback was related to the HeartSmart programme in general rather than focusing on the PM aspect.

Firstly, PMs felt that something needed to be done to assist newcomers with exercise mastery. It was widely agreed that newcomers should attend a beginners class to learn the key movements before joining the main class, 'I would still feel that new members coming in should still have a bit of training before they start because it would give them an idea' (PM2). It was felt that this would reduce embarrassment that newcomers may feel as a result of not being competent at performing the exercises, 'I think it's the embarrassment. No matter how shrewd or quick minded you are when you come in here and you see everybody and you don't know how to do the moves and you're trying to work out what are they doing? It's a double whammy' (PM1). This suggestion was reinforced on numerous occasions as the PMs felt passionately that lack of exercise mastery was a cause of dropout, 'One man [not in PM study] dropped out and I met him after and he found this was too hard for him' (PM2).

Standardising the aerobic movements in the class was another suggestion put forward as a means of assisting exercise mastery. PMs explained that staff turnover plus the multiple staff working on the programme meant they did not perform the same routine at all classes and this made exercise mastery difficult, 'The variety the instructors use... you might think you have it one week and the next week, they change it. The girl we had this morning, she did totally different moves...there should be some sort of a structure where over a period of time, you build up' (PM1). Whilst one PM said he himself 'liked the variety' (PM3), it was felt that it may be detrimental to some participants, 'If you've struggled through five weeks and got your confidence up and then the routine changes all of a sudden, you're back to square one' (PM1).

PMs felt that the issue of absenteeism and drop out needed to be addressed. It was advised that effort be made to let people know their absence had been noticed as this would demonstrate concern and therefore provide social support, 'I know everybody's different but there should be something like if somebody's out sick and they come back they should be made to feel welcome without going overboard on it but rather than leaving it because she could go home today and say "no one knew

where I was" (PM1). It was also proposed that all participants registered with HeartSmart be invited to any organised social or educational event as this may encourage them to return, 'If there was something a couple of times a year where people were brought back for something like today [HeartSmart 5 year anniversary] it would make people think, "it's still there, there's still a place for me there"... they will know they are remembered. It would help get people back in' (PM5). This was followed with suggestions to establish additional social events for all HeartSmart participants to encourage additional interaction, 'It would be good to have something else socially, even if it's only a sing song. Get everyone together... it inter mingles people' (PM2). Another suggestion to increase interaction between programme participants was to supply name badges. These were used in the past but their use fizzled out as time progressed and participants lost them. It was proposed to reintroduce them to assist participants remembers follow participants names, 'One of my big problems is I forget names' (PM3).

One issue noted by the PMs was in relation to a specific barrier they were aware of in relation to programme uptake. Two PMs noted that they had been notified of problems potential new participants had with getting in touch with the HeartSmart co-ordinator. This was highlighted to one PM by a friend who had been trying to arrange an induction, 'I have a friend who told me trying to get [HeartSmart co-ordinator] on the phone is almost impossible and on one occasion he even called in but he wasn't here' (PM1).

4.2.3 Quantitative results

Intervention Fidelity Questionnaire

PMs mentored an average of 2-3 Mentees each. Three of the PMs reported that they remained with their Mentees full time during their matched period whilst the other five indicated that contact was more intense for the first one or two weeks with it gradually tapering off after that. Their reported confidence in the role and in offering supportive strategies can be viewed in table 4.5.

Table 4.5 Intervention Fidelity Questionnaire Results

	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	Total	Mean	Median
										(SD)	
PM Confidence in role	9	9	8	9	6	8	9	9	67	8.4(2.4)	9
Training components											
used:											
Building Rapport	8	9	9	9	4	6	7.5	10	62.5	7.8(3.8)	8.5
Facility familiarity	9	9	8	9	6	8	9	10	68	8.5(2.5)	9
Class familiarity	9	10	8	9	X	9	9	10	64	9.1(1.1)	9
Demonstration of exercises	4	10	7	9	X	5	9	9	53	7.6(2.6)	9
Re-enforcing benefits of PA	6	10	9	9	7	6	4.5	10	61.5	7.7(3.2)	8
Barriers to PA adherence	7	X	8	6	6	X	X	8	35	7(1)	7
Recommended levels of PA											
Frequency	7	8	8	7	6	8	X	10	54	7(3)	8
Intensity	9	10	8	X	X	X	7	10	44	8.8(1.8)	9
Time	X	10	8	X	6	X	X	10	34	8.5(2.5)	9
Type	6	10	8	X	6	7	X	8	45	7.5(2.5)	7.5
Exercise self-efficacy	X	10	9	X	X	8	X	8	35	8.8(1.2)	8.5
Goal Setting	X	8	8	X	X	X	X	10	26	8.7 (1.3)	8

Note: All components were scored on a scale of 0-10; If PMs stated that they did not use a particular component or if they did not score it, i.e. left it blank; it is marked with an X. Scores were summed together to give an accumulative (total) score for each component. The mean score was calculated by dividing the total score by the number of PMs who rated that particular component.

PMs reported an accumulated confidence level of 84% in their overall role as PM with a mean rating of 8.4 out of 10 (ranging from 6-10). Calculation of the mean scores of those who did score the specific training components reveals $\geq 70\%$ confidence at delivering these strategies. However, Table 4.2 reveals that not all PMs gave all strategies a confidence rating. It is not possible to conclude if PMs did not use the particular strategy/s they did not rate at all or if they accidently omitted a rating.

Strategies with the highest accumulated scores included assistance with facility and class familiarity, offering social support, re-enforcing the benefits of PA and frequency it should be performed and demonstration of exercises. Lowest accumulated scores were found for goal setting, barriers to PA adherence, self-efficacy and recommended time per PA session. Only three of the PMs gave a rating for goal setting and only four rated exercise self-efficacy and recommended time spent performing PA. Results from the qualitative analysis reveal that little time was spent on goal setting. One PM rated his confidence at building rapport with his Mentee at 4 which was the lowest score given for any component. Two PMs rated their confidence at demonstrating the exercises low (4 and 5 out of 10) but apart from these three relatively low scores, all other rating were above 5.

The open-ended question regarding PM perception of their main contribution to their Mentee received a variety of responses. Being present and available, offering encouragement, listening, re-enforcing health benefits and programme familiarity were all cited. Two of the PMs listed 'offering encouragement' as one of their key contributions despite not rating their use of exercise self-efficacy in the previous question.

In response to the question regarding use of the training handbook, all bar two stated they had used it. One of the two who did not has limited visibility so this may explain his non-use. Only one of the eight PMs stated they had used the cue card. There were no suggestions on any additional training they could have provided that would have been useful.

Accelerometer

Accelerometer data were normally disturbed, therefore paired sample t-tests were performed to assess changes in PM accelerometer counts pre and post intervention. Cut points devised for older adults were used to distinguish between

sedentary, light, moderate and vigorous intensity PA (Miller et al., 2010). Minutes of sedentary, light, moderate and vigorous activity per week are reported in Tables 4.6 (pre-intervention) and 4.7 (post-intervention). MVPA are also shown in combination as this informs us if Mentees were meeting the recommended levels of PA.

Results reveal that all PMs were meeting the national PA recommendations for health at both time points (150 minutes MVPA/week). The number of minutes engaged in moderate, in light and in MVPA were higher post intervention in comparison to the recorded pre intervention scores (Tables 4.6 and 4.7). Similarly, the minutes recorded for sedentary behaviour increased over the duration of the study. However, these differences were modest and none achieved significance.

 Table 4.6
 PM Pre-Intervention Accelerometer Results (Mins/wk)

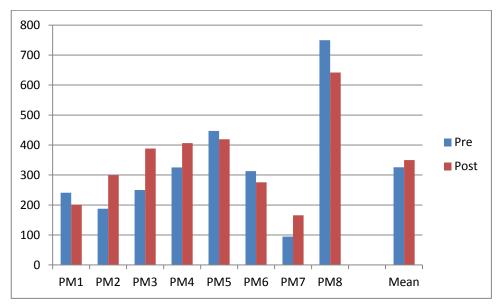
	Median	Mean	SD	Range
Sedentary	7544	7534	319	1027
Light	1586	1650	276	934
Moderate	279	322	197	645
Vigorous	3	4	3	11
MVPA	282	326	200	655

Table 4.7 PM Post-Intervention Accelerometer Results (Mins/wk)

	Median	Mean	SD	Range
Sedentary	7707	7621	242	739
Light	1584	1682	182	426
Moderate	337	343	149	475
Vigorous	2	6	10	27
MVPA	344	350	151	477

Changes in MVPA levels in accelerometer scores for individual PMs preand post-intervention can be viewed in Figure 4.1.

Figure 4.1 Individual PM Pre- and Post-Intervention Accelerometer Counts in for MVPA (Mins/week)



IPAQ

Pre- and post-intervention IPAQ results can be viewed in tables 4.8 and 4.9 respectively. Results revealed abnormal distribution and therefore a non-parametric Wilcoxon Signed Ranks test was performed to assess changes in PM IPAQ scores pre-and post-intervention. The figures in these tables represent minutes engaged in sedentary, walking, moderate and vigorous activity per week. Moderate and vigorous activities are also shown in combination as this informs us if Mentees were meeting the recommended levels of PA. The results show that although all self-reported intensities of activity decrease for PMs post intervention, they were exceeding the recommended levels of PA at both measurement periods.

Table 4.8 PM Pre-Intervention IPAQ Results (Mins/week)

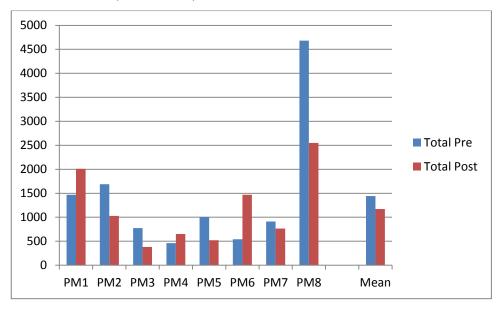
	Median	Mean	SD	Range
Sedentary	2460	2446	560	1880
Walk	325	490	490	1470
Moderate	563	786	698	2100
Vigorous	90	165	226	680
MVPA	958	1441	1376	4220
(incl Walk)				

Table 4.9 PM Post-Intervention IPAQ Results (Mins/wk)

	Median	Mean	SD	Range
Sedentary	2333	2294	809	2400
Walk	270	382	350	1050
Moderate	423	445	355	1040
Vigorous	138	346	385	900
MVPA	898	1172	774	2170
(incl Walk)				

Changes in MVPA levels in IPAQ scores for individual PMs pre- and post-intervention can be viewed in Figure 4.2.

Figure 4.2 Individual PM Pre- and Post-Intervention IPAQ Scores for MVPA (Mins/week)



Comparing results from the IPAQ and accelerometer counts reveals a substantial difference with the IPAQ results showing greater PA levels.

4.3 Discussion

The aim of the PM training programme was to provide long-term adherers of HeartSmart with the knowledge, skills and confidence to act as PMs to newcomers to the programme. The content of the PM training programme was based on the SCT and included the provision of social support, self- efficacy enhancement

strategies, barriers to participation, goal setting and benefits and recommended levels of PA following a cardiac event.

The provision of emotional social support was the predominant resource PMs felt they had to give their Mentees. Support was provided by staying in close proximity to Mentees during the class, introducing them to other participants and forming friendships. This is an important finding as social support has been found to impact positively on adherence to both Phase III (Jones, Greenfield, & Jolly, 2009; Clark et al., 2008) and Phase IV (Martin & Woods, 2012; Thow et al., 2008; Woodgate et al., 2007) CR. PMs referred to helping Mentees "feel part of the group" and become "members of HeartSmart". This marries well with the social embeddedness concept as the PMs were attempting to increase the level of connection the Mentees had with other HeartSmart participants (Langford et al., 1997).

The level of social support supplied varied greatly amongst PMs and it appears this was influenced by both the personality of the individual PM and what support they were comfortable providing and also their perception of the support required and desired by their Mentee(s). This finding is not unexpected given the individuality and the autonomy afforded to the PMs to carry out their role. The lack of stringent regulation on the PM role was considered necessary by the researcher to enable the PM/Mentee relationship to develop organically and also due to the exploratory nature of this pilot research study. However, the appropriate level of support and contact PMs should provide was a source of discussion in both the interim and final focus groups and posed a challenge for some PMs. The fact that in some cases overall support was reduced as a result of Mentees competence in exercise performance, "he is already a member of a gym and does not appear to require much support" suggests a lack of understanding on the part of PMs as to the importance of social support and different types they can provide. Hupsey (1998) highlighted a gap in the research concerning interaction between Mentors and Mentees and suggested there is an assumption by researchers that Mentors will know and provide the right kind and amount of support. Results from the current study emphasise the necessity to regulate both contact time and specific PM strategies provided to each Mentee as the PM decision on how much support a Mentee needs is based on an individual assumption rather than an exact understanding. Standardising the amount and content of support offered, as was incorporated in the PM study by

Castro and colleagues (2011), would provide structure for the PMs and consistency for the Mentees. Castro's study required PMs to record the time and content of each interaction with Mentees. This was intentionally omitted from the PM duties in the current study as it was felt that this additional task may prove too time-consuming and cumbersome for the PMs and reduce the number of participants willing to act in the PM role. However, the results reveal that some measure of quantifying the support provided by PMs is necessary for both consistency in support given to Mentees and clarity of duties for PMs.

The PMs recommendation of swapping Mentees following the initial more intense 2-3 week mentoring period may serve to increase the social support the Mentee receives as it would guarantee they get to know at least one more person in the class i.e. the new PM. This would also help reduce the concerns some PMs had that they their continuous close proximity may not be desired and the Mentee might relate better to a different PM. Another suggestion of changing the initial PM/Mentee meeting to a time prior to the Mentees first class is also worth consideration. As the Mentee was required to absorb vast quantities of information at their first class, introducing them to their PM prior to this would allow more time for the two parties to talk and build a relationship. It would also provide the opportunity for the Mentees to express their concerns and potential barriers without the added stress of simultaneously attempting to learn and perform new exercises.

The use of social support by one PM with a Mentee following drop out proved valuable. This PM explained how regular telephone contact following drop out served to maintain the link between the drop out and the HeartSmart programme and provided knowledge to the Mentee that support would be available when he returned. Contact with Mentees outside of the HeartSmart programme was not part of the PM duties. Whilst not all PMs were happy to have contact with their Mentees outside the class, additional measures to address drop out and absenteeism were suggested. In the case of prolonged absenteeism from HeartSmart, PMs recommended that absence should be noted on return to inform the absentee that their absence had been noticed and hence provide a feeling of belonging. With regards to drop outs, organisation of celebratory or social events were suggested to which all past participants be invited. PMs believed this would provide a welcome reminder and motivation for past participants to return and in a sense keep the door open. All these suggestions would enhance the antecedents of social support, i.e.

social network, social embeddedness and social climate, allowing the four attributes of social support – emotional, instrumental, informational and appraisal – to thrive (Langford et al., 2007).

The self-efficacy enhancement strategies incorporated by the PMs mainly relate to task self-efficacy particularly in relation to exercise mastery. Results from Study 1 revealed that task-, barrier- and recovery self-efficacy are necessary to sustain adherence to HeartSmart (Martin & Woods, 2012). However, as the PM intervention period was relatively short (6-weeks), it is likely that task self-efficacy was the most appropriate form to concentrate on as this has been found to be essential in the initial stages of PA initiation (Scholz et al, 2005). The main perceived Mentee barrier cited by PMs was the lack of skill to perform the HeartSmart exercises. Although PMs attempted to assist Mentees to master the exercises, they felt that programme organisers were responsible for reducing this barrier by incorporating a beginners class into the HeartSmart programme. The capability of PMs to increase exercise self-efficacy in individuals immediately following cardiac surgery has been previously established (Parent & Fortune, 2000). However, in the current study, the increased difficulty of the HeartSmart exercises in comparison to Phase III CR exercises may have restricted PMs effectiveness in this regard.

PMs were aware that the common medical history they shared with their Mentees and their success in maintaining adherence to HeartSmart set them up as role models to their Mentees. However, this proved to be a negative aspect for two Mentees who dropped out. In these cases, the PM's experience and competence in exercise mastery served to reduce self-efficacy in Mentees as the gap between their skills and their PMs was too vast. These findings compliment the literature which states that ability level must match the challenge in order for PA to be positively influenced (McAuley et. al, 2003).

Little information was provided by PMs on assistance provided to their Mentees in relation to non-exercise performance related barriers. There appears to be two components which influenced this outcome. Firstly, the PMs identified the main Mentee barrier as lack of exercise mastery. Action to assist them overcome this barrier took precedence over other barriers that may have been encountered. The introduction of a beginners class would reduce the need of PMs to allocate so much time to this aspect of their role. Secondly, the removal of the exercise

demonstration component of the PM training and PM duties plus more emphasis during training on other barriers that Mentees may face would allow PMs the time and confidence to focus their attention on assisting their Mentees with these.

The use of goal setting was one component of the PM training that did not feature in the focus group discussions. Qualitative analysis suggests that the PMs perceived the Mentee goals to be adherence to HeartSmart and accomplishment of proficient exercise mastery. Provision of social support and self-efficacy enhancement strategies were the predominant methods incorporated by PMs to assist Mentees achieve these goals. It is possible that the PMs did not see the need or did not have sufficient time to discuss goal setting with their Mentees. Goal setting was included in the PM training programme as the setting of specific goals has been reported as an effective method to increase adherence levels in CR settings (Ferrier et al., 2011). In addition, goal setting was used in two of the PM studies reviewed in Table 2.5, both of which recorded positive changes in PA levels (Buman et al., 2001; Castro et al., 2011). It is not possible to know the influence of goal setting by participants in these two studies as no specific measure was included (Buman et al., 2001; Castro et al., 2011). It may be more appropriate for HeartSmart staff to assist newcomers determine their individual goals during induction. These goals could then be shared with the PMs hence providing them with foresight into what their Mentees specifically wish to achieve. Provision of a hard-copy of Mentee goals may also prompt PMs to open the goal setting discussion.

The intervention fidelity questionnaire (IFQ) revealed a mean PM role confidence rating of 8.4 out of 10 which informs us that the majority of PMs felt confident acting in their role. None of the studies reviewed in Table 2.6 included a PM role confidence rating. Results from the IFQ showed highest PM confidence levels for the specific duties of providing assistance with facility and class familiarity, re-enforcing the benefits of PA, building rapport and demonstration of HeartSmart exercises. There were some discrepancies in the results of the IFQ and the focus groups. One discrepancy was in the case of instrumental social support. A key role of the PMs was provision of instrumental social support through guiding Mentees around the HeartSmart facility, i.e. showing them where the toilets, water station etc could be found and assisting them to navigate around the class circuit. Whilst confidence in providing assistance with facility and class familiarity were rated highly in the IFQ, none of the PMs mentioned offering instrumental social

support in the focus group discussions. It is possible that PMs did provide instrumental social support but as this would have been imparted predominately in the early stages of the intervention, may not have been in the forefront of the PMs minds during focus group discussions. It is necessary to assess results from the Mentee interviews to confirm if instrumental social support was provided especially as this type of support has been emphasised as influencing initial stages of adherence to structured PA (Stathi et al., 2010). It must be highlighted that the IFQ is a self-report measure as is data from the focus group discussions. Whilst this reduces the impact of the findings, the use of objective measures such as video tapping or direct supervision were deemed inappropriate as it was believed they would impact negatively on the PMs ability to build rapport with their Mentee/s.

Self-efficacy enhancement was another strategy that gave conflicting results in the IFQ and focus groups. Whilst only half of the PMs gave self-efficacy any confidence rating on the IFQ, offering advice and encouragement on exercise technique and appropriate effort level and acting as role models were highlighted in the focus group discussions. These would have served as a source of self-efficacy enhancement for the Mentees and lack of rating on the IFQ suggests that PMs did not marry the word 'self-efficacy' with the sources of it. Despite this lack of understanding regarding the terminology, qualitative analysis showed that PMs did gain an understanding of the sources of self-efficacy as outlined in the training programme and endeavoured to develop it in their Mentees.

The use of goal setting did not feature in the qualitative data and was not rated by five PMs in the IFQ. This suggests that goal setting was poorly utilised in the intervention.

A success of the current study was the 100% retention of all PMs for the intervention period with all eight PMs still active in the role at the end of the study. Complementing the findings of Joseph & colleagues (2001), a desire to help others was the predominant motivation for PMs to undergo training and act in the role. All PMs were long-term adherers of HeartSmart and communicated commitment to the HeartSmart programme during recruitment. In addition, they had firsthand experience of seeing newcomers struggle in the initial weeks of joining the programme and wanted to do something to help. With regards to the continuation and development of the PM programme, all stated they would be happy to continue although introduction of more PMs plus female PMs were recommended to assist

them in the future. This strong commitment of the PMs to HeartSmart led to unsought yet valuable feedback in relation to the HeartSmart programme in general in addition to the specific PM aspect. The researcher afforded the PMs flexibility to deviate from the pre-selected questions as the PMs were concerned with the holistic experience of the Mentees and felt that other aspects of HeartSmart, aside from the PM programme, needed to be adapted to increase adherence rates of newcomers. This suggests there is a need for a platform for long-term adherers of HeartSmart to input their views and ideas on how the programme can be improved.

A secondary objective of the study was to assess changes in PA levels following PM training and performance in the role. Quantitative analysis revealed an insignificant difference between both self-reported and accelerometer PA scores pre- and post-intervention for PMs. Whilst this concedes that the PMs did not increase their PA levels as a result of participating in a mentoring training programme on PA, it is a positive result as it shows that the responsibility and time required to act as a PM did not impact negatively on their own PA. Dorgo and colleagues (2009) was the only PM study reviewed that carried out any kind of PA measure with their PMs and they reported a significant increase in the functional fitness of PMs post intervention (Table 2.6). However, as the PMs in Dorgo's study undertook extensive physical exercise as part of their PM training, as they were required to act as fitness instructors, this finding is not surprising. PMs in the current study were already long-term adherers to structured PA and as the primary focus of their role was to act as a support to the qualified instructors, further physical training was not deemed necessary. It must also be noted that PA was substantially overreported in the IPAQ rendering the results somewhat redundant as accelerometers were used. However, in contrast with accelerometer data, the use of the IPAQ allows the researcher some insight as to the different types of physical activities the PMs were engaged in.

4.4 Conclusion

This study provides evidence (via self-report) that a short training programme can successfully provide long-term adherers of a structured exercise Phase IV CBCR programme with the confidence and skills to act as PMs to programme newcomers. The key resources offered by the PMs were highlighted as:

- Emotional social support and
- Self-efficacy enhancement.

These were supplied through assistance with exercise mastery, offering encouragement and role modelling. However, concerns about the level of social support required were also highlighted by the PMs. The complexity of social support makes it difficult to formalise an appropriate amount and type that should be provided by PMs. Results suggest that while it is important to allow PMs to work within their comfort zones and ensure their duties take into account the voluntary nature of the role, it is also necessary to add some structure to the quantity and quality of social support they provide. In addition the inclusion of exercise demonstration during PM training and to their duties resulted in over-emphasis on this component during the 6-week intervention period. Inclusion of a beginners class in the HeartSmart programme would provide Mentees with a basic level of exercise competence prior to interaction with their PM and thus enable this component be omitted from the PM training and duties. This would also allow PMs time to support Mentees in additional ways hence capitalising on the unique resource they can offer as peers.

It is likely that the PM training programme included excessive content for the time period allocated (i.e. 8 hours training). This may have contributed to some unease about the level of social support required, over-emphasis on exercise demonstration and an apparent lack of assistance with goal setting.

A secondary outcome of the PM intervention was it provided long-term adherers of HeartSmart with a platform to discuss and voice their opinion on all aspects of the programme. Their motivation to do this reveals their commitment to HeartSmart and personal investment in it. It is imperative that programme organisers endeavour to take this feedback on board.

In conclusion, in order to capitalise on the results of this study, the following is recommended:

- Focus PM training specifically on social support, self-efficacy enhancement strategies and communication skills;
- Clarify the quantity and quality of social support PMs should provide;
- Introduction of an objective non-intrusive measure to assess PM input;

- Establish a beginners class as a transition between Phase III CR and HeartSmart so those entering HeartSmart will have a basic level of exercise competence;
- HeartSmart staff to assist newcomers devise short-, medium- and long-term goals during their induction;
- Introduce PM to their Mentee prior to their first HeartSmart class to allow PM to build rapport;
- Build on the current number of PMs by recruiting and training more longterm adherers to act in the role;
- Focus on methods to recruit and train female PMs;
- Work with the HeartSmart team to create a forum for PMs to feedback.

4.5 Limitations

Whilst the qualitative analysis and IFQ provide insight into how the PMs performed in the role, the PMs were not required to record the duties they performed at each meeting with their Mentees. Therefore, we cannot accurately state how often each training strategy was used. Requesting PMs to record the type of support provided, as was done in the study by Castro and colleagues (2011), would have provided more concrete results in terms exactly what strategies PMs utilised.

Attempts by the researcher to recruit female PMs were unsuccessful with many citing other commitments and irregular attendance at HeartSmart as reasons not to sign up. These have also been cited as reasons for lack of attendance at CR by females (Jackson et al, 2005, Wyer et al., 2001a). A more targeted strategy is required to recruit female PMs.

Both the PM training and the focus group sessions were facilitated by the same individual (the researcher). This may have reduced negative feedback given by the PMs with regards to the training delivery and support provided.

Finally, the IPAQ demonstrated substantial over-reporting and may not be an appropriate instrument to utilise in interventions assessing changes in PA over time.

<u>Chapter 5: Study 3 - Evaluation of the introduction of Peer Mentors into HeartSmart from a Mentee Perspective</u>

5.0 Introduction

With regards to behaviour change, it is generally accepted that regular adherence for six-months substantially increases likelihood of long-term maintenance (Marcus et al., 2000; Prochaska & DiClementi, 1983). This presents a challenge within the CR structure as following a 6-12 week highly supervised exercise programme (Phase III CR), individuals are forced to find alternative means of maintaining this behaviour change. Phase IV CR exists to assist individuals maintain recommended levels of PA long-term and sustain the fitness levels gained during 6-12 week Phase III CR (SIGN, 2002). However, contact time and level of support in Phase IV programmes are significantly lower than Phase III (IACR, www.iacr.info). In Ireland, Phase IV programmes are offered in both hospital and community settings although provision of such programmes is low and content greatly varied (IACR, www.iacr.info).

A review of literature on interventions to increase long-term PA adherence in cardiac populations revealed participants exposed to an intervention have more favourable PA outcomes than control group participants at study end point (Table 2.3). However, the scale of PA improvement between studies varies greatly as do the type and quantity of intervention components, contact time with researcher or intervention specialist and outcome measures used. These factors make it difficult to ascertain the most effective method to positively influence long-term PA adherence in this population. Only two of the eight studies reviewed in Table 2.3 included structured classes in their intervention and these classes were not intended as an environment for participants to exercise in on an ongoing basis (Arrigo et al., 2007; Lear et al., 2003). Arrigo and colleagues (2007) provided structured exercise classes once every 3 months for 9 months whilst Lear and colleagues (2003) provided 6 sessions over a 4-month period.

Observation of individuals who have successfully maintained behaviour change is necessary to form a theoretical understanding of what enables this success (Wing, 2000). As the current study was concerned with adherence to a specific structured Phase IV CBCR programme - HeartSmart, qualitative research was carried out to establish the key correlates influencing maintained adherence in this

specific setting (Study 1). In summary, 5 focus groups were held with long-term adherers of HeartSmart (N = 24; 15M, 9F). Constant comparative analysis revealed four key themes influencing uptake and adherence - social support, structured class, self-efficacy and health benefits. Additionally, focus group participants provided suggestions on possible methods to increase the likelihood of new participants' adhering to HeartSmart. These included increasing support for newcomers possibly through peer support and developing motivation through reinforcing the health benefits of PA and setting goals.

A belief in the health benefits of PA as an influencing factor in continued adherence to CR compliments the psychological model outlined by Wyer and colleagues (2001a). This model states that CR adherers who believe they have control over their recovery have better motivation to engage in behaviours that positively influence their health. The structured exercise class including the range of exercises taught and the presence of specialised staff were also revealed in Study 1 as factors which influenced sustained adherence. Participating in a structured class has been cited previously as providing motivation to continued adherence to PA following a cardiac event (Thornhill & Stevens, 1998; Thow et al., 2008).

The availability of social support as a factor influencing long-term adherence to HeartSmart was prevalent in Study 1 (Martin & Woods, 2012). This social support was provided by health professionals, HeartSmart staff, family and friends and fellow participants and was in the form of both instrumental and emotional support. Social support provided by fellow participants within structured exercise Phase IV CBCR programmes has been previously highlighted as a positive influencing factor on adherence in both Phase III (Clark, 2004; Dolansky et al., 2006; Jones et al., 2009) and Phase IV (Thow et al., 2008; Woodgate et al., 2007) CR. Evidence suggests that formalising social support through peer mentoring can positively affect PA levels in both non-clinical (Buman et a., 2011; Castro et al., 2011; Dorgo et al., 2009; Webel et al., 2010) and cardiac (Clark et al., 2001; Coull et al., 2004; Parent & Fortin, 2000) older adult populations. Nine interventions utilising Peer Mentors (PMs) in an attempt to increase either PA levels or CR adherence in older adults were reviewed (Table 2.6). The conclusion was that older adults, acting as PMs, are a valuable resource that can be engaged to positively affect behaviour change in their peers.

Long-term adherers of HeartSmart were recruited and trained to act as PMs to newcomers of the programme (Study 2). The training programme was informed by the findings from Study 1, a review of interventions to increase PA levels post Phase III CR (Table 2.3) and a review of interventions utilising PMs to increase PA levels or CR adherence in older adults (Table 2.6).

The primary purpose of this pilot study (Study 3) was to explore the impact, from a Mentees perspective, of exposure to a PM in a structured exercise Phase IV CBCR programme. Specifically, the study sought to assess if the additional social support provided to newcomers to HeartSmart would result in a positive experience. A secondary outcome measure was to assess changes in adherence rates of newcomers to HeartSmart as a result of the introduction of PMs to the programme.

5.1 Methodology

5.1.1 Research Design

This study uses a quasi-experimental one-group pre test-post test design. The nature of the study rendered it inappropriate to include a control group as it would not have been possible to restrict contact between the control group participants and the PMs.

A mixed methods approach consisting primarily of qualitative research methods was incorporated. The predominant use of qualitative methods through one-on-one interviews was deemed most appropriate for the majority of data collection as the researcher sought to gain insight into Mentees' experience of the intervention. In addition, quantitative methods were used to establish if there were changes to Mentee PA levels or psychosocial variables as a result of participation in the intervention.

5.1.2 Ethical Considerations

All potential participants were given a verbal description in addition to a plain language statement outlining the purpose of the study and commitment required should they choose to participate (Appendix 27). Interested participants signed an informed consent form (Appendix 28). To protect confidentiality of all participants, no individual identifiers were included on questionnaire results or qualitative transcripts; each participant was allocated a code and referred to as such. Questionnaire results and qualitative transcripts were stored securely, and accessed

only by the researchers. The study protocol was approved by the research ethics committee of Dublin City University (Appendix 9).

5.1.3 Recruitment of Mentees

Two local hospitals referred individuals to the HeartSmart programme. Referred individuals had established heart disease and had successfully completed Phase III hospital-based CR programme and achieved ≥ 5 METS on their final exercise stress test. All individuals who opted to join HeartSmart were informed of the PM study during their induction. Those interested met with a member of the research team who verbally explained the aims and objectives of the study and commitment required of them should they decide to participate as Mentees. Those interested signed a consent form and proceeded to complete outcome measures. New Mentees were given a time and date to meet their PM and commence HeartSmart.

5.1.4 Outcome Measures

As the aim of the study was to explore the impact, from a Mentees perspective, of exposure to a PM in a structured Phase IV CBCR programme, all Mentees, including those who dropped out prior to study end, completed an exit interview with the researcher to gage their perception of the PM programme. To assess the impact of the study on HeartSmart adherence rates, attendance for all Mentees was recorded throughout the 6-week intervention. In addition, a combination of self-report, behavioural and qualitative data was collected from each Mentee pre-and post 6-week intervention. The Actigraph Accelerometer and IPAQ were used to establish PA levels. A range of psycho-social measures were chosen as all have been previously shown to be positively correlated with PA adherence. The Self-Regulation Questionnaire – Exercise was used to determine motivation for exercise; the Exercise Enjoyment Scale to assess Mentees enjoyment during exercise; an Exercise Self-Efficacy Questionnaire was developed by the researcher to assess task-, barrier- and recovery self-efficacy within the HeartSmart setting; Health Related Quality of Life was measured using the SF-12; Expectations Regarding Aging was established using the ERA-12. All stated outcome measures are described in detail below.

Qualitative Measurements

Post Intervention Mentee Exit Interview

Following the completion of the 6-week intervention, Mentees completed a one-to-one interview with the researcher to gain an insight into their perception of the PM programme. A rapport style interview was used as this is suggested for research interviews concerning personal experiences (Massarik, 1981). This style interview incorporates clearly defined questions and high levels of positive interaction between interviewer and interviewee (Massarik, 1981). Verbal skills such as reflection, amplifying and non-committal agreement were used in addition to non-verbal skills including relaxed posture, appropriate eye contact, gestures and tone of voice (Hayes, 2000). These skills were practiced by the researcher with a partner prior to use within this research study. Six questions were developed to guide the interview and gain an in-depth understanding of their experience of the HeartSmart programme in general and specifically the PM component. Questions consisted of introductory, key and ending questions as recommended by Krueger (1998), for example, "Tell me about your experience of the HeartSmart Programme", "Did your Peer Mentor provide any assistance?", and "Was there any additional support you did not receive that would have been helpful?". Followup questions and prompts were also prepared in an effort to limit misunderstanding and keep participants focused Creswell's (2007). Interviews were held in a quiet room at the HeartSmart venue, were recorded via a dictaphone and transcribed on the same day. Due to inability to schedule one interview in this manner, the interview took place by phone call and notes were taken during the call and were typed up immediately afterwards. (A copy of the exit interview questions is in Appendix 29). Quantitative measures of social support were deemed inappropriate as those available are primarily concerned with support from family and friends (Cutrona & Russell, 1987; Prochaska et al., 2002) whereas the study was concerned with the social support offered by PMs and not that of other HeartSmart participants, staff or outside influences. As the researcher maintained limited contact with Mentees during the 6-week intervention period (as this would have been an additional source of support), no field notes were taken.

Dropout Mentee Interview

Once Mentees had been absent from the class for 3 weeks in succession, they were classified as dropouts and were telephoned by the researcher to complete an exit interview. The researcher led the dropout Mentees through a series of six key questions designed with the primary aim of gauging the reason for dropout, their opinion of their PM and of the HeartSmart programme in general. Notes were taken during the call, were typed up and analysed (A copy of the dropout interview questions can be viewed in Appendix 30).

Quantitative Measurements

Quantitative measures were completed to assess changes in physical and psychological status as a result of the PM intervention. PA levels were measured using both subjective (IPAQ) and objective (Actigraph accelerometer) instruments. Five variables were hypothesised as psychosocial components which would change as a result of the PM intervention and in turn result in greater adherence to the HeartSmart programme. These variables were exercise self-regulation, exercise enjoyment, exercise self-efficacy, health-related quality of life and expectations regarding aging. All measures were assessed pre- and post the 6-week PM intervention period.

Adherence Rates

A copy of each Mentees attendance for the 6-week intervention period was collated by the HeartSmart staff and passed on to the researcher. Attendance for each Mentee was calculated by dividing the number of HeartSmart classes attended by the number of scheduled sessions (i.e. 12 sessions in the 6-week intervention period) and multiplied by 100, for example, if a Mentee attended 8 out of 12 sessions, their attendance score was 66.7%. As recording of attendance rates is the norm for all participants of the HeartSmart programme, comparison was possible with all participants who commenced HeartSmart in the same 3-month period in the previous year. The same 3-month period was chosen to reduce likelihood of changes in attendance rates due to seasonality. Whilst this comparison does not classify as a control group, as the key HeartSmart staff plus programme content had received minimal change in the previous 12-months, it was deemed the most appropriate method of gauging the impact of the PMs on adherence rates in HeartSmart.

Actigraph Accelerometer

As described in Chapter 4 – Study 2.

International Physical Activity Questionnaire (IPAQ)

As described in Chapter 4 – Study 2.

Self-Regulation Questionnaire - Exercise

This questionnaire is concerned with what motivates individuals to partake in PA and in particular if this motivation is autonomous or controlled. The questionnaire was derived from the theory of self-determination and asks why the individual exercises on a regular basis. It also provides possible reasons preselected to represent different types of motivation. The questionnaire consists of 16 items (adapted from self-regulation questionnaires introduced by Ryan & Connell, 1989) which are categorised as external regulation (controlled), introjected regulation (controlled), identified regulation (self-determined) and intrinsic motivation (self-determined) (Appendix 31). Responses are scored on a 7-point likert scale, ranging from 1 (not at all true) to 7 (completely true). The controlled and self-determined subscales of the questionnaire have shown excellent internal consistency of .85 and .91 respectively (Russell & Bray, 2010). Similar to other scales of exercise self-regulation (e.g. the behavioural regulation in exercise questionnaire-2; Markland & Tobin, 2004), the scale does not measure integrated regulation due to the difficulty in distinguishing it from identified and intrinsic motivation.

Exercise Enjoyment Questionnaire

This 5-Item questionnaire measures participants' enjoyment during exercise (Appendix 32). The 5-items were derived from the 18-Item PA enjoyment scale (PACES; Kendzierski & DeCarlo, 1991) to form the enjoyment section of the Project Walk (home-based walking intervention) Exercise and Health assessment survey (Castro et al., 1999). Participants are required to rate their feelings towards physical activity when they are engaging in it on a 5-point Likert scale. Validation of the original PACES scale revealed an internal consistency of 0.93 whilst Cronbach's Alpha for the shorter 5-item scale showed a validation of 0.74 (Castro et al., 1999)

Exercise Self-Efficacy

This 32-Item questionnaire was adapted from current instruments by the researcher in order to specifically address self-efficacy types identified in Study 1 within the HeartSmart context (Appendix 33). It incorporates questions from a number of exercise self-efficacy scales in circulation (Blanchard et al; 2007; Luszczynska & Gregajtys, 2005; Moore et al., 2006; Scholz et al., 2005) and includes task-(5-Items), barrier- (23-Items) and recovery- (4-Items) self-efficacy (Appendix 12). An example of pretext to questions included, "I am sure I can start attending HeartSmart immediately, even if.... Participants were then required to rate statements such as "I initially have to re-consider my views on physical activity" and "...The planning for this is vary laborious" on a four point likert scale ranging from not true at all to exactly true. The reliability of the questionnaire was tested with a sample of 20 participants of the HeartSmart class. Participants completed the questionnaire twice (with a one week interval) and results revealed excellent internal consistency (total scale 0.98; task self-efficacy, 0.90; barrier self-efficacy 0.98 and recovery self-efficacy 0.98).

Short Form 12-Item Health Survey

The Short-Form 12-Item Health Survey (SF-12) is a measure of health related quality of life and was developed by Ware in 1998 as a shorter version to the popular SF-36 form (Appendix 34). It was designed to reproduce the Physical and Mental Component Summaries of the SF-36. The SF-12 consists of 12 questions: 2 questions concerning physical functioning; 2 questions on role limitations because of physical health problems; 1 question on bodily pain; 1 question on general health perceptions; 1 question on vitality (energy/fatigue); 1 question on social functioning; 2 questions on role limitations because of emotional problems; and 2 questions on general mental health (psychological distress and psychological well-being). Testretest (2-week) correlations of the instrument revealed acceptable scores of 0.89 and 0.76 for the physical and mental components respectively (Ware, 1996). Administration of the SF-12 takes just 2 minutes and has been proven to show similar responsiveness to change as the SF-36 in patients with coronary heart disease (Muller-Nordhorn & Willich, 2004).

Expectations Regarding Aging (ERA-12) Survey

The ERA-12 is a 12-item instrument measuring expectations regarding aging in older adults (Appendix 35). Individuals with more positive expectations about aging have been shown to engage in greater levels of PA (Sarkisian et al., 2005). The scale, which is a shortened version of the original 38-item scale, consists of four items in three scales, namely, physical health, mental health and cognitive function. The ERA-12 showed excellent test-retest reliability (0.94) in a sample of 118 randomly selected participants (Sarkisian et al., 2005).

4.1.5 Procedure

Pre-Intervention Assessments

Once a participant signed a consent form to become a Mentee, the researcher answered any further questions they had on the details of the study. Once clear the researcher explained how to complete the study questionnaires, taking time to clarify the different instruments and their related scales. Mentees were asked to complete the questionnaires at home and return at their first HeartSmart class. The correct positioning of the accelerometer was demonstrated and they were advised how to complete the accompanying record sheet. Mentees were informed they would be required to wear the accelerometer for a period of 6-8 days and that they would receive a text message or phone call every day to reminding them to wear it. Additional written instructions were provided for both questionnaires completion and accelerometer use and Mentees were encouraged to contact the researcher should they have any problems or queries regarding completion any of the outcome measures.

6-Week Intervention

The researcher met with each Mentee approximately 30 minutes before their first HeartSmart class to collect the accelerometer and questionnaires and introduce them to their PM. Following the introduction, the researcher allowed the PM/Mentee relationship to develop organically. PMs had received training to provide support and encouragement to their Mentees to assist their efforts to adhere to the HeartSmart programme for their initial 6-weeks (Study 2). Specifically, the role of the PM was to:

Build rapport;

- Assist with facility and programme familiarity;
- Reinforce benefits of adherence to physical activity;
- Offer assistance to overcoming barriers to participation;
- Encourage performance at appropriate intensity;
- Encourage realistic goal setting;
- Assist with exercise familiarity;
- Provide encouragement and support;
- Set a good example;
- Report back to the research team.

In order to preserve the PM/Mentee relationship and to ensure that the process replicated the normal induction into the HeartSmart programme the researcher deliberately did not contact the Mentees during the intervention period. This was to ensure that the social support provided to the Mentees during the 6-week intervention period was from the PMs and not the researcher. All Mentees were made aware that they could ring a member of the research team or university ethics committee if they had a problem at any time during the intervention.

Dropout Interviews

Mentees who dropped out prior to completion of the 6-week intervention period were contacted via telephone to conduct post drop out interview.

Post-Intervention Assessment

At the end of the 6-week intervention period, Mentees who were still adhering to HeartSmart were contacted and a date and time was organised to repeat all outcome measures i.e. the study questionnaires and accelerometer. At this point the exit interview was also conducted to establish overall experience of the PM intervention.

5.1.6 Data Analysis

Qualitative

Data from the transcribed Mentee exit interviews were coded according to content and compiled into groups or themes of information (Creswell, 2007). This process was repeated for the data from the Dropout interviews. All themes were

then re-analysed and broken down into subordinate themes. Transcriptions were reread to ensure accuracy of coding and theme development. All transcripts plus themes and sub-theme categorisation were then passed to a supervisor to assess and provide feedback. Discussion took place to clarify and agree coding and theme description. Key quotations for each theme were chosen and linked with an explanatory narrative to describe the findings.

Quantitative

Attendance rates, i.e. number of classes attended within the 6-week study period, for two consecutive years –i.e. study year and previous year- were inputted into a statistical analysis programme (SPSS, version 18). All questionnaire data were checked for normality using the Kolmogorov-Smirnov test, and descriptive statistics such as means, standard deviation and medians were calculated.

Accelerometer and IPAQ results were analysed as per Chapter 4 – Study 2.

Due to the low number of participants, statistical analysis of psycho-social measures was compromised. However, in order to determine if and when changes occurred at the individual level, and to determine if any trend is noticeable, actual score pre and post intervention are presented in Table 5.3.

5.2 Results

5.2.1 Mentee Details

Over a 3-month period, all eligible newcomers were recruited. Fifteen Mentees (12 men, 3 women) completed the HeartSmart induction and signed up to complete the study. Of these, eight were still attending at the end of their 6-week intervention period, five had dropped out and two commenced initial outcome measures but did not attend any HeartSmart sessions. Characteristics of the thirteen who commenced the programme are outlined in Table 5.1 under the headings gender, age when they commenced HeartSmart, distance from HeartSmart, particular cardiac event suffered and number of classes attended during the 6-week intervention period.

Table 5.1 Mentee Characteristics

Participant	Gender	Age	Distance	Cardiac Event	Classes
			To Venue		Attended
C1	M	67	2.6km	MV Repair, CABG x4	9
C2	M	50	3.2km	MI, stent	4
C3	M	71	18.8km	MI, stent	9
C4	F	61	4.0km	Valve reconstruction	4
C5	M	72	3.2km	CABG x4	7
C6	M	65	2.0km	CABG x3	12
C7	M	71	3.4km	MI, stent	12
C8	M	71	2.4km	CABG x4	7
DO1	M	48	2.5km	MI & Stent	1
DO2	M	47	2.7km	MI & Stent x3	1
DO3	M	77	10.5km	Abnormal heart valve	1
DO4	M	73	2.7km	MI & Stent	1
DO5	F	68	2.7km	MI & Stent	3

Notes: C, Completer; DO, Dropout; NS, Non-Starter; CABG = coronary artery bypass graft; MI, Myocardial Infarction.

Seven men and one woman, all Caucasian, completed the 6-week intervention. The average age was $66 (\pm 16)$. Distance from HeartSmart location ranged from 2.4 to 18.8 kilometres, with an average of 5km from the venue. All had experienced a range of single and multiple cardiac events. Average number of classes attended was eight (ranging from 4 to 12) out of a recommended twelve.

Five participants, four men and one woman, all Caucasian, dropped out. The average age was 62.6 years (\pm 14.6). Distance from HeartSmart location ranged from 2.5 to 10.5 kilometres, with an average of 4.2km from the venue. There was no significant difference between this and distance for completers. All had experienced a range of single and multiple cardiac events. Classes attended ranged from one to three.

5.2.2 Qualitative Analysis

Post Intervention Completer Interviews

Data from the Completer Mentee interviews were combined and analysed. Combined transcriptions from the interviews consisted of 10,059 words. Eight themes emerged from the grouped qualitative analysis. Themes plus their sub-themes are categorised under four headings: General experience of the HeartSmart programme; Assistance provided by Peer Mentors (Table 5.4); Mentee challenges (Table 5.5); Peer Mentor Intervention Period. Key quotations were chosen to form an explanatory narrative.

General experience of the HeartSmart programme

In order to initiate discussion, Mentees were asked to share their experience of the HeartSmart programme in general. All descriptions were extremely positive with the programme being described as 'beneficial', 'pleasant', 'very good' and 'enjoyable'. Mentees also referred to the social support received from the HeartSmart staff, the students and fellow participants [who were not PMs]. The structured class was commended for being 'well run' and 'very relaxed'. Mentees revealed they were experiencing positive outcomes from their participation in the programme with particular reference to fitness 'I haven't been this fit for a good few years' (C2) and confidence 'I was afraid to go swimming on holidays but now I'll go back to swimming' (C6). Two Mentees stated a belief in the health benefits as a motivational factor, 'You've got to remember you're here for one thing and that's for the benefit of your heart and your own confidence' (C1).

Assistance provided by Peer Mentors

Mentees were asked about the assistance provided to them by their PMs. Responses were categorised into the key themes of positive and negative support. These themes were then broken down further to reveal subordinate themes and resulting outcomes which are presented in table 5.4.

Table 5.2 Effective Peer Mentors Strategies

Key themes	Subordinate themes	Outcomes
Social Support	Emotional	Companionship / Friendship /
		↓Anxiety / Enjoyment / Attendance
	Instrumental	Task self-efficacy
Self-Efficacy	Role modelling / performance mastery	

Social Support

The most commonly cited assistance the PMs provided was social support with all Mentees describing some form of social support offered by their PM. Six of the eight Mentees described emotional social support provided by their PM. In its most basic form, Mentees described this as their PM displaying positive personality traits during interactions with them, for example, 'he was very friendly', 'very down to earth' and 'likable'. Four Mentees noted how they were aware that their PM was within close proximity. Two described this as an awareness that their PM was looking out for them, for example, '[PM] has been watching me, keeping an eye on me'(C5); 'If I wasn't here he'd be asking "where were you?"(C3). Another Mentee shared how having a PM close by provided him with support that he would be unlikely to ask for himself, 'The mentor was important, there are times I could do with people but I would never ask. I just get on with it, I don't like asking' (C7), whilst another Mentee went a step further by describing how having somebody with him eased the anxiety of joining the programme 'You're nervous when you come...[PM] was close, that was the main thing, he never left my side for 6-weeks' (C1). Introducing their Mentees into the wider group was another form of emotional social support supplied by the PMs, 'He introduced me to a few other people in the class, made me feel at home' (C2) and even though one Mentee knew some people in the class already, the introductions were still important 'He introduced me to other people he knew. There's a cousin of mine upstairs and some others who live near me as well but [PM] helped break the ice' (C5). In the case of two Mentees, the relationship they formed with their PM was expressed as a friendship, 'Friendship was very very important' (C1); 'We've been very good friends' (C7). One of the Mentees who described the relationship as a friendship went on to reveal that a

reason his relationship with his PM worked so well was the fact that he perceived his PM to enjoy the role, 'He enjoys what he's doing and that made me enjoy it even more' (C1).

Mentees were asked about the influence PMs had on their attendance. In general the feedback was neutral with six of the eight Mentees expressing that although the PM was helpful, they would have come regardless as is summed up in the following statements 'I was fairly committed to coming anyway' (C2) and 'I was coming anyway' (C3). Despite these neutral comments, four Mentees did highlight that their PM had a positive influence on their attendance with one detailing how the emotional social support provided by his PM positively influenced his attendance, 'It was a helping hand. It's better than just coming here on your own. You have someone to be with and talk to' (C6).

Six Mentees described instrumental social support provided by their PM assisting them with facility and programme familiarity, 'He showed me around, showed me all the different machines, explained the different rooms that we went into, the facilities, showers, all that sort of stuff' (C2). This support was summed up by one Mentee who stated, 'He made sure I didn't get lost' (C3). Instrumental support was viewed as important as one Mentee pinpointed 'it was all brand new to me' (C8).

Self-Efficacy

Mentees described how the PMs attempted to develop task and barrier self-efficacy through assistance with performance mastery. One Mentee explained how his PM helped him with his breathing technique, 'He'd tell me the way to breath and the right way to do the [exercise] movements' (C5) and posture 'he was telling me to keep my back straight when doing the exercise because I'm inclined to stand with my stomach out but you should have your chest out' (C5). Another Mentee referred to the fact that his PM encouraged him to build up gradually, 'He told me not to overdo it, to slow down. On the weights he said to take one or two not three or four. I thought I could do it but he said no, you're only learning' (C6). The importance of the PM in assisting to ease frustrations surrounding lack of exercise competence and hence develop barrier self-efficacy was also noted, '[Programme newcomers] are looking at people who could have been coming five years and they want to be [at that level] Then they can't be bothered because they think they're not getting it at

all, that's why you need a person with you to say "don't worry, it's not a mistake, it's a learning process" (C1). The view of the PM as an expert and a role model served to develop task self-efficacy as it was pointed out that the exercises performed in HeartSmart were different to what they had participated in before hence requiring new skills 'You're learning from [PM], I might have been used to fitness but this was a completely different thing altogether' (C1).

Mentee Challenges

Mentees were next asked about the key challenges they encountered through their participation in HeartSmart. Key and subordinate themes are outlined in Table 5.3 below followed by a detailed description of each theme.

Table 5.3 Mentee Challenges

Key themes	Subordinate themes		
Exercise Mastery	Co-ordination / weight / limited function		
Structured Class	Large class / Talking / Location / Progression between		
	Phase III and Phase IV		
Gender	Embarrassment / Socialisation		
Negative Mentoring	Absence / Negative feedback		

Mentees pointed out difficulties with perfecting the co-ordination of the aerobic moves, 'Co-ordination was the hardest thing' (C1) which led to frustration 'you think you're not getting it' (C1). Other problems with exercise mastery resulted from physical weight problems 'I had trouble getting my feet into the pedals [on an exercise machine] because I'm a little bit overweight' (C7) and limited function 'I found the treadmill the most difficult because I have problems with my legs, I have slow veins' (C3).

The size of the class was highlighted as a challenge with one Mentee stating 'It's hard coming into a class with so many people' (C1). Another Mentee recognised that the classes could not cater for the individual, '...the classes are busy and you don't get that much time on the machines...obviously they can't cater for one individual, they have to cater for the whole group' (C2). The progression between Phase III and Phase IV CR was expressed as challenging by two Mentees with one stating, 'I did that course ... [in the hospital] for 5-weeks, it's not like this

one, this is harder, more cardio, harder to do, more physical' (C7) and the other drawing attention to the differences between the programmes, 'This is completely different, there are 1 or 2 [exercises] the same but it's more heavy stuff' (C6). Previous exercise experience served as an advantage to some Mentees and helped bridge the gap between Phase III and Phase IV CR. Five Mentees stated that they were aware of what to expect as they had participated in sport or PA programmes in the past. One Mentee explained how experience had taught him the need to gradually build up fitness, 'If you put yourself under pressure in the first couple of weeks you won't stick it. You know what to expect, well I did because I played football before' (C5). Another noted he did not find the programme challenging as he was accustomed to the particular setting, 'I used to go to gyms before so the set up is familiar to me' (C2). A third Mentee, whilst not familiar with the gym setting, found that the exercise he had engaged in since having his cardiac event helped him adjust to the programme 'I haven't felt too tired or exerted or anything and I think that's because I kept myself reasonably fit, I've walked every day since I got out of hospital and then I was in the [Phase III] rehab for two months' (C8).

The high level of talking in the class was noted as a challenge by one Mentee although he also accepted that talking was positive 'There's a lot of talking in the class and when I exercised before there was never any talking allowed so I wasn't used to that but at the same time it's different here, people have a complaint here and it's better for them with the talk, so I had to loosen up and stop taking it so seriously' (C1). The location of the class and in particular the commute was stressed as a challenge by one Mentee 'I drive here and I hate the heavy traffic' (C7). Health concerns in the form of high blood pressure was pointed out an added burden for one Mentee, 'The blood pressure, it was high this morning' (C5).

The only female Mentee who took part in the study expressed difficulties with being matched with a male PM. Firstly, she found that when she was with her PM she ended up in the men's group for the section of the class when participants are divided and she was not comfortable with this, 'When I was with him I had to be in the men's group and I was quite embarrassed' (C4). Secondly, she found it difficult to socialise with and befriend other female participants of HeartSmart, 'A few would talk to you but others were standoffish. They all know each other as they've been going a long time. Some would invite you to walk with them if they saw you on your own' (C4). This was backed up by a male Mentee who stated 'I think

there should be more done for women, I don't see any women Peer Mentors. It's badly needed because there's so many women coming, we've had 3 or 4 new ones in the last month, the woman there will try and help them but at the same time they have to do their own thing' (C1).

A lack of mentoring was reported by two Mentees who stated their PM was not present after the first couple of weeks with one female Mentee stating, 'I didn't see him that often, it kind of filtered out' (C4) and a male Mentee noting, 'I've kind of grown away from my Mentor, I was missing for a week after I first signed up and when I came back he was off for a while' (C8). These comments were stated as a matter of fact but they revealed that some PMs were not fulfilling their role. Only comments by a single Mentee could be interpreted as negative input by the PM. This Mentee twice mentioned how his PM gave him negative feedback stating, 'He'd always tell me "you're doing that wrong". However, when probed as to how he felt about this feedback he commented that 'he's trying to help you out' (C5). It is therefore difficult to ascertain the impact of these negative statements.

Peer Mentor Intervention Period

Mentees were asked whether or not the 6-week PM intervention period was sufficient. All Mentees stated that the 6-week period was ideal with comments such as, '6 weeks is grand, it gives you time to get to know the person, know the exercises' and 'It's enough time to introduce you to the system' (C1). It was also noted by two Mentees that even though the 6-week intervention period was over, their PM was still watching out for them, '[PM] says, "I'm not finished with you", so you're still not left on your own, he came over to me last week and said "I'm keeping an eye on you"' (C6). As stated earlier, two Mentees noted that their PMs did not stick with them for the full 6-weeks. No further comments were provided regarding their opinions about this.

Dropout Interviews

Five of the thirteen Mentees dropped out before the end of the 6-week PM intervention period. One of these Mentees (female) was un-contactable after dropout. Data from the remaining four drop out interviews were combined and analysed. Combined transcriptions from the interviews consisted of 1,201 words. Results are presented below.

Reasons for Dropout

For the four dropouts who were available for interview, two stated that injury caused them to leave HeartSmart. For one it was a 'slipped disc' (DO2) and for the other 'back pain plus a virus' (DO3). Both individuals reported to suffering from back pain in the past, 'I've suffered with back pain for many years and it is aggravated at the moment and it is preventing me going to the class' (DO3). For another individual, his young age was the main reason for drop out as he stated, 'I was the youngest there, I'm only 46, and the rest were over 60. The older ones were able to do more than me, I didn't like that' (DO1). In this case, the Mentees selfefficacy was reduced by exercising beside individuals who were more competent and older than himself. The age gap also affected this Mentees' ability to socialise as he noted, 'I didn't have anything to say to those guys' (DO1). For the forth individual, several factors influenced his drop out. He had difficulty mastering the coordination of the warm up exercises as stated, 'I found the exercises at the start very difficult. I felt silly doing them because I couldn't do them properly... I couldn't get the co-ordination going; I had never done aerobics before... I used to like dancing but I couldn't do those moves and I felt silly' (DO4). He suggested it was possibly the class size and the pace of the exercises that affected mastery as he noted 'I could do them in my kitchen at home' (DO4). He also had difficulties with operating the treadmill which led to the speed being too fast, 'I was on the treadmill and it was going at a faster pace than what I was used to and I couldn't figure out how to slow it down' (DO4). The difficulties experienced by this Mentee in the class may have been exasperated by the fact he had an additional morbidity, 'I have Gout but I can do things at my own pace' (DO4).

Peer Mentor Assistance

When questioned on the assistance that their PM supplied, three out of four gave positive feedback. As length of stay for most was short (i.e. 1 class), they did not divulge detailed information but in general comments centred on positive personality traits with descriptions including 'very helpful' and 'very nice'. For one participant however, having a PM did not equate to a positive experience as he explained, 'I didn't think it helped, I was watching him and he could do everything perfectly and I felt silly. I know he had been going for a long time but it didn't make

a difference' (DO4). In this case it appears that the close proximity of the PM served to reduce self-efficacy as it made the Mentee feel less competent.

Returning to the Programme

Dropouts were asked if they would consider returning to the class. Both participants who dropped out due to injury informed that they were keen to return and would do so as soon as they had recovered. This was summed up in the following statements, 'I enjoyed the class, I definitely got a good workout but it was doable' (DO2) and 'I will return as soon as my back is better, I'm disappointed not to be there' (DO3). For the other two, both said they would consider returning if the class was adapted to suit their needs. One man stated he would participate in the class if the age group was lower whilst the other reflected that he would reconsider if the class was more similar to the Phase III CR classes and in particular if it was a lower intensity class where he could go at his own pace and therefore experience a sense of achievement. He outlined this desire in the following statement, '[In phase III] I did 3 minutes on the treadmill and it was really tough but I felt it was a great achievement as initially I could only do a minute and a half. I'd like to do something like that' (DO3).

Alternative methods to be physically active

Finally dropouts were asked if they were making any efforts to be physically active since dropping out of HeartSmart. All stated that they were, albeit for some this was limited due to injury with one man only capable of 'little strolls' (DO2) and another sticking to low impact exercises, 'I have a cross trainer and an old exercise bike at home that I use but I have to take it easy. They are low impact so it's better than running or aerobics. I checked with the consultant, he said I can do light exercise' (DO3). One man listed multiple activities he was engaging in, 'I have an exercise bike and a small stepper at home and I do 30 minutes a day on them. I do a bit of walking and gardening' (DO4) whilst another was predominately walking as a means to be physically active 'I walk 30 minutes a day' (DO1).

5.2.3 Quantitative Results

Uptake and Adherence

In order to establish if the PM programme had any influence on adherence rates of newcomers to HeartSmart, data for individuals who completed inductions for HeartSmart during the same 3-month period in 2010 were retrieved. Of the fourteen inductions in the same 3-month period in 2010, seven were still adhering at 6-weeks, three had dropped out and four never started. These rates are very similar to those of the Mentees in the PM study. Attendance rates of those who were still adhering at 6-weeks in 2010 and 2011 were identical with both attending an average of 8 classes out of a recommended 12. The three participants who dropped out in 2010 attended a mean of 2 classes.

Physical Activity Measures

ActigraphAccelerometer

Accelerometer data were normally distributed so a paired t-test was performed to assess changes in Mentee accelerometer counts pre and post intervention. Cut points devised for older adults were used to distinguish between sedentary, light, moderate and vigorous intensity PA (Miller et al., 2010). Minutes of sedentary, light, moderate and vigorous activity per week are reported in Tables 5.4 (pre-intervention) and 5.5 (post-intervention). MVPA are also shown in combination as this informs us if Mentees were exceeding the recommended levels of PA. Results revealed a non significant difference in pre- and post- intervention scores. All Mentees were meeting the national PA recommendations for health at both time points (150 minutes MVPA/week).

Table 5.4 Mentee's Pre-Intervention Accelerometer Results (Mins/wk)

	Median	Mean	SD	Range
Sedentary	8214	8340	671	1912
Light	1800	1720	312	958
Moderate	343	316	166	455
Vigorous	1	34	89	253
MVPA	364	350	195	529

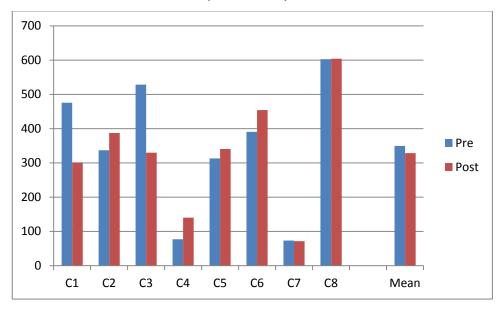
Table 5.5 Mentee's Post-Intervention Accelerometer Results (Mins/wk)

	Median	Mean	SD	Range
Sedentary	7862	7661	1468	4286
Light	1905	1811	438	1215
Moderate	334	309	138	392
Vigorous	2	20	49	141
MVPA	335	329	168	533

Changes in MVPA levels in accelerometer scores for individual Mentees preand post-intervention can be viewed in Figure 5.1.

Figure 5.1 Individual Mentee Pre- and Post-Intervention Accelerometer

Counts in for MVPA (Mins/week)



International Physical Activity Questionnaire

Data from the Mentee IPAQ results were normally disturbed, therefore paired sample t-tests were performed to assess changes in PA levels pre and post intervention. Pre- and post-intervention Mentee IPAQ results can be viewed in Tables 5.6 and 5.7 respectively. The data in these tables represent minutes engaged in sedentary, walking, moderate and vigorous activities per week. MVPA are also shown in combination as this informs us if Mentees were meeting the recommended levels of PA. Results revealed a significant increase (p<0.05) in all forms of PA in

pre- to post-intervention scores. Mentees exceeded the recommended levels of PA at both measurement time points.

Table 5.6 Mentees Pre-Intervention IPAQ Results (Mins/wk)

	Median	Mean	SD	Range
Sedentary	2413	2525	960	3165
Walk	257	303	304	910
Moderate	315	448	466	1500
Vigorous	.00	60	128	360
MVPA	643	811	736	2390
(incl Walk)				

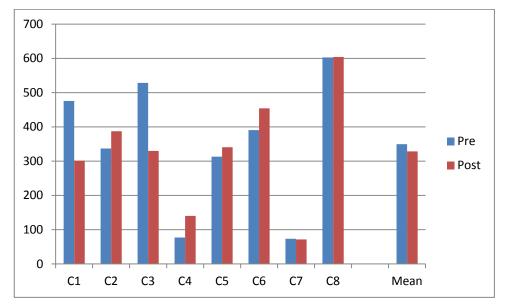
Table 5.7 Mentees Post-Intervention IPAQ Results (Mins/wk)

	Median	Mean	SD	Range
Sedentary	2610	2620*	609	2070
Walk	750	926*	619	1965
Moderate	560	1074*	1015	2510
Vigorous	130	190*	187	560
MVPA	1500	2190*	1706	4445
(incl Walk)				

Note. * p<0.05 (paired t-test).

Changes in MVPA levels in IPAQ scores for individual Mentees pre- and post-intervention can be viewed in figure 5.2.

Figure 5.2 Individual Mentee Pre- and Post-Intervention IPAQ Scores for MVPA (Mins/week)



The results of the IPAQ revealed significantly greater levels of PA and less time spend engaging in sedentary behaviour than the accelerometer results.

Psychosocial Measures

Statistical tests revealed no significant difference between pre- and post-intervention scores for any of the psychosocial measures. Pre- and post- intervention scores from each of the psycho-social measures are presented in Table 5.8.

Attendance rates and total PA as measured by the IPAQ are also included to highlight any connection between PA rates and psychosocial measures. Scores marked in red ink highlight those which deteriorated following the intervention.

 Table 5.8
 Pre-and Post-Intervention Psychosocial Scores

Participant	Attendance	PA Pre / Post	EE Pre / Post	ESE Pre / Post	ESR Pre / Post	SF-12P Pre /	SF-12M Pre /	ERA-12 Pre /
						Post	Post	Post
↓ Max Score →	12	NA	25	128	72	70	73	100
C1	9	2410 / 4920	25 / 25	61 / 58	62 / 66	40 / 48	52 / 59	39 / 50
C2	4	675 / 4200	15 / 17	81 / 70	45 / 47	58 / 60	55 / 56	53 / 58
C3	9	450 / 855	18 / 19	75 / 89	4/2	40 / 37	44 / 58	39 / 25
C4	4	20 / 475	16 / 13	122 / 111	27 / 54	35 / 34	54 / 53	36 / 47
C5	7	275 / 1440	25 / 22	115 / 117	42 / 38	59 / 59	56 / 56	83 / 94
C6	12	1174 / 1560	24 / 25	46 / 49	32 / 54	58 / 58	58 / 6	75 / 39
C7	12	610 / 3290	15 / 20	82 / 70	44 / 38	35 / 42	63 / 61	19 / 42
C8	7	870 /780	18 / 16	95 / 97	36 / 31	48 / 40	61 / 62	33 / 31
Mean	8	811 / 2190	20 / 20	89 / 88	40 / 45	53 / 54	49 / 50	57 / 60

Notes: PA = physical activity; EE = exercise enjoyment; ESE = exercise self-efficacy; ESR = exercise self-regulation; SF-12P = Short-Form 12 physical component score; SF-12M = short-form 12 mental component score; ERA-12; expectations regarding aging-12.

5.3 Discussion

All eligible newcomers to HeartSmart during the study period consented to participate in the PM programme. This uptake is superior to that reported in the study by Clark and colleagues (2011) who revealed a 72% uptake in a similar setting. Eight of the thirteen (61.5%) Mentees who signed up to the PM programme were still attending after 6-weeks. Superior retention rates have been reported in previous PM studies (Dorgo et al., 2009 - 83.3% total, 76.7% SM group, 90% PM group at 14 weeks; Carroll et al., 2007 - 81.4% at 12 months). In conflict with the study objectives, adherence levels of Mentees were no greater than newcomers who started in the same time-period a year previously prior to the introduction of the peer mentoring intervention. In addition, comparison of classes attended by completer Mentees and individuals still adhering to HeartSmart 6-weeks after induction in the previous year were identical. Despite this, analysis revealed some positive results.

The eight Mentees who completed the 6-week intervention showed significant increases in self-reported PA. These results are in line with other studies measuring PA levels at similar time intervals (Buman et al., 2011; Butler et al., 2009; Sniehotta et al., 2005; Yates et al., 2005). However, it is not possible to compare these studies directly due to different outcome instruments used. Complementing the findings of Hughes and colleagues (2007), improvements in self-reported PA were not validated by the accelerometer results. Direct comparison of PA levels measured by the IPAQ and Actigraph accelerometers has revealed IPAQ scores to be over-reported (Ottevaere, et al., 2011). Exaggerated scores on the IPAQ may be explained by a tendency of individuals to give socially desirable responses (Rzewnicki et al., 2003; Sallis & Saelens, 2000). Further research is needed to establish the most accurate tools to evaluate PA levels in this population. Although PA levels increased following the 6-week intervention, levels preintervention were above the recommended levels to achieve health enhancing benefits (DOH, 2009; WHO, 2010). This is most likely due to participants recently completing Phase III CR (Heran et al., 2011).

Seventy-five percent of Mentees in the current study described emotional social support offered to them by their PMs. This marries well with findings from Study 2 in which the PMs stated that this was the main source of support supplied. The commendatory manner in which some Mentees described the positive effect of this support is worth noting. One Mentee described how this support helped ease his

initial anxiety whilst another described the presence of a PM as providing a support he needed but would never ask for. These are extremely positive outcomes and highlight the unique resource PMs have to offer.

Mentees also referred to instrumental social support provided by their PMs. Seventy-five percent of Mentees stated that this type of support was provided, however, instrumental social support did not feature in the qualitative results from the PM study. Instrumental social support was cited by Mentees as a helpful resource and the fact that it was not mentioned by the PMs suggests that either they did not view it as an important input or simply did not remember providing it (this is possible as this would have been provided in the early stages of their role). It is vital that PMs are made aware of the positive impact of all types of social support provided to ensure that they continue to supply it. The importance of social support within a structured Phase IV CBCR setting has been established previously (Martin & Woods, 2012; Thow et al., 2008; Woodgate et al., 2007). However, the specific types - instrumental, emotional, information, appraisal - were not clarified in two of these studies. Woodgate and colleagues (2007) used a social support measure adapted from Cutrona and Russel's social provisions scale (1987) which combined subscales of guidance, reliable alliance and symptom orientated integration. Thow and colleagues (2008) did not use a specific measure of social support although attachment to the group was rated within the Exercise Motivation Inventory Questionnaire. Predominately, the importance of social support emerged through the focus group analysis in Thow's study. Having the opportunity to talk to others in a similar situation and receiving encouragement from peers were the only elements of social support cited in this study (Thow et al., 2008).

Although the social support received by the Mentees was predominately expressed in a positive light, negative mentoring was described by one completer Mentee. This was in relation to the PM using negative language to try and assist with exercise mastery. Whilst this Mentee was aware that his PM was 'trying to help', this result highlights the need to enhance the time spent on communication skills in the PM training programme. Alternative solutions may be to include a midintervention review meeting with Mentees to allow them to air any issues or problems and allow them to be addressed, rotation of Mentees to other PMs to counteract any PM-Mentee mismatches (as suggested by the PMs) or allowing the Mentees the option of a shorter intervention period.

Self-efficacy enhancement strategies were also stated by Mentees as provided by their PMs. Complimenting the findings of Study 2, these were in the form of encouragement, assistance with exercise mastery and role modelling. The vision of PMs as role models had conflicting effects on self-efficacy. In the case of one completer Mentee, role modelling was positive as he explained that his frustrations were eased by his PM reminding him that he was 'only learning' and the Mentee embraced the fact that he was 'learning from [PM]'. However, in the case of 50% of the drop outs who were interviewed, the link with a PM proved to a negative influence on adherence. In these cases, the Mentees, in line with the social comparison theory, compared themselves to their PMs and felt uncomfortable due to the gap in their abilities (Langford et al., 1997). One drop out Mentee stated the issue of negative role modelling arose as a result of his PM being significantly older than he was. This led to feelings of inadequacy as his PM and other members of HeartSmart were older and more proficient at performing the exercises than he was. The other drop out Mentee also felt incompetent exercising beside somebody much more skilful than himself although in this case age was not an issue. In both cases these feelings would have served to reduce task self-efficacy which is related to exercise mastery (Bandura, 1986) and was a contributing factor in early drop out. This supports previous findings that task self-efficacy is associated with short-term adherence to PA post cardiac event (Scholz et al., 2005). Little research has been carried out on factors affecting drop out of Phase IV CR (SIGN, 2002). Qualitative analysis from both the PMs and drop out Mentees suggest that the progression from Phase III to Phase IV CR is too great for some individuals and a transition programme is needed. The introduction of a beginners class into the HeartSmart programme, as suggested by the PMs in Study 2, may assist reduce the barriers associated with exercise mastery in HeartSmart. The issue of large age gaps between PMs and Mentees could be tackled by training some of the younger HeartSmart participants to become PMs and making matches based on age compatibility. However, in other instances difference in age did not have a negative effect. The suggestion made by the PMs in Study 2, to swap Mentees mid 6-week intervention to give Mentees the opportunity to get to know different PMs and increase possibility for bonding, is a potential solution. One other case was noted where the presence of a PM had a negative impact on the Mentee. This was in the case of the one female Mentee who completed the 6-week intervention where gender difference

with the PM led to a reduction in self-efficacy. This female Mentee felt that being matched with a male PM enforced her to exercise in predominately male company which made her uncomfortable. As noted in Study 2, attempts to recruit female PMs were unsuccessful. It may be necessary to adapt the PM training and duties to facilitate female participants who may wish to act in the role but felt they could not commit to the original training and duties.

The remaining 50% of Mentees who were interviewed after drop out cited the presence of co-morbidities and injury as the reason for discontinuation to the programme. The presence of co-morbidities is commonly cited as a reason for drop out of CR programmes (Kerins et al., 2011; Farin et al., 2007). Exit interviews revealed that both of these drop out Mentees planned to return to HeartSmart once their symptoms subsided. As noted in Study 2, one PM maintained telephone contact with the Mentee after drop out. Whilst this was not a service all PMs were willing to provide, suggestions to create regular celebratory or social events to which past participants could be invited may also serve to keep the lines of communication open.

The limited positive change in any of the psychosocial measures (exercise self-regulation, exercise enjoyment, exercise self-efficacy, health related quality of life and expectations regarding aging) and the high instance of negative change in these measures requires further investigation. We can speculate that the short intervention period was the cause of this, as higher drop out occurs in the initial stages of an exercise programme (Marcus et al., 2000; Prochaska & DiClementi, 1983). It has also been suggested that lack of improvement in exercise self-efficacy in Phase IV CR interventions is due to initial high levels present following completion of Phase III CR (Butler et al., 2009; Moore et al., 2006; Lear et al., 2003). A closer look at the eighteen studies outlined in Tables 2.3 and 2.5 do not help to clarify the issue. Only seven actually included a self-efficacy measure whilst three of the studies, which specifically referred to the inclusion of self-efficacy enhancement in their interventions, did not include a measure for it (Pinto et al., 2011; Yates et al., 2005; Castro et al., 2011). Of the seven studies that measured self-efficacy, only two reported an increase (Parent & Fortune, 2000; Sniehotta et al., 2005). In the study by Sniehotta and colleagues (2005) self-efficacy was increased by participants who planned their PA and received feedback on their PA diaries whereas there was no increase in self-efficacy when feedback was not received.

Whilst this finding suggests that regular feedback is required to increase selfefficacy, incorporating this into the training and duties of the PMs in the current study did not result in a positive change in this measure. Participants in the study by Parent and Fortune (2000) significantly increased levels of exercise self-efficacy immediately post cardiac operation as a result vicarious experience provided through peer support. This resulted in significantly greater PA levels 4-weeks post operation in comparison to a control group who received no peer support and informs us that PM can positively increase exercise self-efficacy. Despite self-efficacy not increasing according to the quantitative measure in the current study, qualitative analysis of completer Mentee interviews reveals effort was made by at least two PMs to increase exercise self-efficacy. This is supported by qualitative data from the PM study in which six PMs reported offering encouragement and assistance with performance mastery and acting as role models; all of which are sources of selfefficacy (Bandura, 1997). The inconsistent level of support provided by the PMs may have influenced the lack of change in self-efficacy. Further research is required to establish successful methods of increasing self-efficacy in this population as we know that multiple types of self efficacy are necessary for adherence to PA post cardiac event (Study 1; Blanchard et al., 2007; Rodgers, Murray, Courneya, Bell & Harber, 2009; Rodgers & Sullivan, 2001; Luszczynska & Sutton, 2006; Scholz, Sniehotta and Schwarzer, 2005).

Exercise self-regulation, exercise enjoyment and expectations regarding aging were not measured in any of the studies outlined in Tables 2.3 or 2.6. These measures were included in the current study as they are positively associated to exercise adherence to structured exercise Phase IV CBCR (Martin & Woods, 2012; Thow et al., 2008). As was the case with exercise self-efficacy, it is possible that these were well developed at baseline as a result of recent completion of Phase III CR as exercise motivation and enjoyment have been linked to exercise adherence (Moore, 2006; Thow et al., 2008). The short intervention period may also have been a contributing factor to lack of change in these measures. Further research is required on methods to improve these psychological components in individuals following Phase III CR.

5.4 Conclusion

This study provides valuable insight into effective and non-effective strategies used by PMs to increase adherence rates of newcomers to HeartSmart. Social support and self-efficacy enhancement strategies were the predominant methods incorporated by the PMs in this study. These resulted in both positive and negative outcomes for the Mentees. Personalities of both PMs and Mentees greatly influenced outcomes and the importance of fine-tuning the intervention to suit individual Mentee needs is apparent. Changes are required in both the HeartSmart programme in general and the PM training and duties in order to maximise the potential of the unique resources PMs have to offer newcomers to HeartSmart. Further research is required to clarify the most appropriate format for a PM intervention in this setting. The most accurate measurement of PA and acknowledgement of potential social desirability bias in self-reporting PA needs further examination.

5.5 Limitations

Several factors limit the results of this study:

- The small Mentee sample reduces the impact of the quantitative results;
 Mentee recruitment was hindered by limited participants joining the
 HeartSmart programme within the study period;
- As Completer Mentees were continuing to attend HeartSmart following intervention completion, it is possible that this impacted on their willingness to reveal negative aspects of the PM or HeartSmart programme;
- HeartSmart during the same time period the previous year. Whilst this was useful in establishing if any changes in adherence occurred, the previous years' participants cannot be classed as a control group. However, the nature and context of the study deemed it impractical to have a control group. Firstly, if control participants attended HeartSmart classes, it would not have been possible to ensure no interaction occurred between them and the PMs. Secondly, the different delivery of other structured Phase IV CBCR programmes rendered it infeasible to compare the Mentees to a control arm in another programme;

- The relatively short intervention period limits our understanding of changes to PA long-term;
- No entrance interview was undertaken with Mentees. The inclusion of such may have served to enhance our understanding of the initial fears, barriers and needs with regards to commencing HeartSmart.

Chapter 6: Conclusion

CVD is the most common cause of mortality and morbidity in the world, accounting for 30% of all cause mortality (WHO, 2011). Whilst there has been a decline in the number of CVD related deaths in recent years (National CV Policy, 2010-2019), we now face new challenges as CVD related morbidity is increasing (Law, 2002). In individuals with existing CVD, increased PA levels can result in a significant reduction in CVD risk factors (Warburton et al, 2006). CR, of which exercise is an integral component, is recommended to prevent secondary occurrences of cardiac events (Balady et al., 2007; Graham et al., 2007; SIGN, 2002). Lack of adherence to CR and maintenance of recommended levels of PA long-term following a cardiac event prevents the majority of individuals from achieving the associated health-enhancing benefits (Heran et al., 2011). Research has demonstrated that interventions following Phase III CR can positively influence PA adherence rates in this population (Arrigo et al., 2008; Butler et al., 2009; Hughes et al., 2007; Luszczynska et al., 2006; Pinto et al., 2011; Sniehotta et al., 2005). However, the most appropriate and effective intervention components and intervention delivery style remains unclear. In addition, many of the interventions tested required extensive staff resources, which may not be a viable option in the current economic climate. It is essential that researchers possess an in-depth understanding of the target population and research setting prior to intervention design. It is also increasingly necessary to prioritise cost-effectiveness and sustainability into research design to insure that the intervention can continue to be implemented in times of economic hardship.

This thesis provides evidence that sustained adherence to a structured exercise Phase IV CBCR programme is positively influenced by social support provided within the class, high levels of multiple types of self-efficacy, an appreciation of the components of structured exercise classes and a belief in the health benefits of engaging in regular PA (Study 1). These components all marry well with the SCT which posits that human behaviour is determined by the interaction of environmental influences, attributes of the behaviour itself and personal factors (Bandura, 1986).

This thesis also informs us that delivery of a short PM training programme and subsequent PM intervention can positively develop the social climate within a

structured exercise Phase IV CBCR programme and result in the provision of emotional and instrumental social support to Mentees. This social support serves to reduce anxiety and increase enjoyment within the structured class. However, results reveal a vast difference in the support supplied by different PMs revealing that the need to regulate the support provided by PMs is essential. Regulating social support supplied by PMs is a research challenge as excessive regulation may eliminate the natural environment necessary to build a rapport.

The PMs effectively used self-efficacy enhancement strategies, in the form of performance mastery, role modelling and encouragement, to assist Mentees with exercise mastery. However, the use of PMs as role models had a negative effect on self-efficacy in some Mentees. In these instances, the PMs experience and competence in exercise mastery highlighted the Mentees own lack of ability and served to reduce their self-efficacy and in one case result in drop out. While this was a negative result in this research study, it is important that it is highlighted to reduce the probability of it re-occurring in future interventions. The introduction of a beginners class into the HeartSmart programme, as suggested by the PMs, would provide Mentees with a basic level of exercise competence prior to being matched with a PM and may prevent reduction in self-efficacy from occurring.

Participation in the PM role did not significantly change PA levels of PMs or Mentees (with the exception of a significant increase in Mentees IPAQ scores) with all meeting the recommended guidelines before and after the intervention. This is a positive result. Firstly, the extra responsibilities of acting in the PM role did not reduce PMs own PA. Secondly, as PA levels generally decline following the completion of Phase III CR (Bethell et al., 1999; Bock et al., 2003), lack of decline and sustained adherence to recommended levels is positive. The extensive difference in PA levels as revealed in the IPAQ results in comparison to the accelerometer results compliments previous findings of exaggeration on self-reported PA measures (Ottevaere et al., 2011; Rzewnicki et al., 2003; Sallis & Saelens, 2000) and this should be taken into consideration in studies using self-report methods alone.

There is limited research available on the use of PMs to positively influence adherence to PA or CBCR. Even less research exists on the use of PMs in structured Phase IV CBCR. Research that has been conducted has focused predominately on the outcomes for Mentees. This thesis provides preliminary data in this scant

research area. Further research is required to gain a better understanding of the PM concept in a structured Phase IV CBCR setting. This research should incorporate a larger cohort of mixed gender participants (both PMs and Mentees). The depth of qualitative research needs to be increased and possibly include observation and joint interviewing with PMs and Mentees. Longer term follow up of study participants should be sought as should assessment of heart and/or general health indicators should be included e.g. blood pressure, cholesterol, weight etc. Additionally, further research is needed to establish the most successful strategies that should be incorporated to increase exercise adherence in this specific population.

This thesis is limited by a number of factors. Firstly, all research took place in one structured Phase IV CBCR setting with predominately male participants. Secondly, lack of measures to record type and number of times a strategy was used by PMs limits intervention fidelity. Thirdly, the small sample of Mentees in Study 3, relatively short intervention period and lack of control group reduce the impact of the results. Finally, knowledge that information received would be fed back to HeartSmart staff may have resulted in reluctance by participants in all three studies to provide negative feedback (despite notification that identities would be kept confidential).

In conclusion, the desire and willingness of long-term adherers of a structured Phase IV CBCR programme to support programme newcomers is an under-utilised resource. This thesis provides evidence that the completion of a short PM training programme and subsequent implementation can produce positive outcomes. It is important that we utilise all available resources in order to assist individuals adhere to PA post cardiac event. The results of this thesis reveal that positive outcomes can be achieved through the provision of a short PM training programme for long-term adherers. Further research is required to establish the following:

- The quantity and type of social support needed and desired by newcomers to a structured Phase IV CBCR programme;
- Appropriate methods of delivering specific PM training components to ensure they are utilised effectively in practice;
- The amount of regulation required to place on PM duties to ensure maximum assistance for Mentee without overloading the PMs, undermining their abilities or limiting their individual characteristics;

- The most successful strategies to increase PA levels of cardiac populations;
- Best methods of measuring PA levels in a cardiac population.

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Appendix A - Journal Article Published in the Journal of Aging and Physical Activity

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What Sustains Long-Term Adherence to Structured Physical Activity After a Cardiac Event?

Antonia M. Martin and Catherine B. Woods

Purpose: Research addressing methods to sustain long-term adherence to physical activity among older adults is needed. This study investigated the motivations and supports deemed necessary to adhere to a community-based cardiac rehabilitation (CBCR) program by individuals with established coronary heart disease. **Methods:** Twenty-four long-term adherers (15 men, 9 women; age 67.7 ± 16.7 yr) took part in focus-group discussions. **Results:** Constant comparative analysis supported previous research in terms of the importance of referral procedures, social support, and knowledge of health benefits in influencing uptake and adherence to CBCR. Results also highlighted the routine of a structured class and task-, barrier-, and recovery-specific self-efficacy as necessary to sustain long-term adherence for this specific clinical group. **Discussion:** Older adults themselves provide rich information on how to successfully support their long-term adherence to structured exercise sessions. Further research into how to build these components into any exercise program is necessary.

Keywords: cardiac rehabilitation, exercise self-efficacy, motivation, community support

Cardiovascular disease is the most common cause of mortality and morbidity in the world, accounting for 30% of all causes of death (Yusuf, Reddy, Ounpuu,

& Anand, 2001). In the case of individuals with existing coronary heart disease, evidence suggests that exercise capacity is the strongest predictor of mortality in comparison with other known cardiovascular risk factors (Myers et al., 2002). Individuals who have suffered a cardiac event are encouraged to undergo cardiac rehabilitation (CR), the purpose of which is to educate patients on the meaning of heart disease and associated risk factors and help them implement the changes necessary to reduce these risk factors and prevent secondary occurrence. CR con- sists of four phases, of which physical activity is a key component. The aim is to gradually build up the patients' exercise capacity by educating them on the impor- tance of physical activity (Phases I and II), encouraging them to attend supervised (generally hospital-based) exercise classes (Phase III), and helping them maintain the recommended physical activity levels long-term (Phase IV; Scottish Intercol- legiate Guidelines Network, 2002).

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Compared with usual care, patients who participate in exercise-based CR programs have been shown to significantly increase their physical activity levels (Oliveira, Riberio, & Gomes, 2008). However, research has revealed that only

12.2% of individuals who have suffered a cardiac event actually partake in Phase III CR (Suaya, Stason, Ades, Normand, & Shepherd, 2009). Referral by a medically trained individual (nurse, consultant, or general practitioner) has been reported as the strongest predictor of attendance (Barber, Stommel, Kroll, Holmes-Rovner, & McIntosh, 2001; Dolansky, Moore, & Visovsky, 2006; Jackson, Leclerc, Erskine,

& Linden, 2005), but as few as 16% of those eligible for CR are actually referred (Barber et al., 2001). Factors affecting the decision to refer include the patient's age, gender, race (Barber et al., 2001), specific cardiac event suffered, and health insurance status (Jackson et al., 2005). Research consistently highlights lower uptake and adherence of women in CR programs (Barber et al., 2001; Jackson et al., 2005; Suaya et al., 2009; Thornhill & Stevens, 1998). Factors affecting an individual patient's decision to attend CR include distance to program venue (De Angelis, Bunker, & Schoo, 2008; Thornhill & Stevens, 1998), social support (Barber et al.,

2001; De Angelis et al., 2008; Dolansky et al., 2006; Jackson et al., 2005), other commitments, lack of interest (De Angelis et al., 2008), dislike of group activi- ties (Clark, Barbour, White, & MacIntyre, 2004; Tod, Lacey, & McNeill, 2002), cost, and a lack of understanding of what CR entails and of belief in its benefits (Dolansky et al., 2006).

For those who do attend Phase III CR, evidence suggests that physical activity levels gradually decline after program completion (Bethell, Turner, & Mullee, 1999; Bock, Carmona-Barros, Esler, & Tilkemeier, 2003; Hughes, Mutrie, & MacIntyre,

2007; Moore et al., 2006), with as few as 28% maintaining recommended levels of physical activity at 12 months (Moore et al., 2006). These statistics on decline and dropout are higher than for the normal population (Dishman, 1994), and limited information on long-term adherence to exercise programs among older adults (Conn, Valentine, & Cooper, 2002) restricts further comparison.

Research addressing adherence to physical activity after Phase III CR has revealed that engaging in one-on-one exercise consultations (decisional balance, goal setting, relapse prevention, problem-solving barriers, exploration of activity options, and social support; Hughes et al., 2007), taking part in group counseling and behavior-modification sessions (self-efficacy enhancement, problem-solving skills, and relapse-prevention strategies; Moore et al., 2006), use of physical activity diaries (Arrigo, Brunner-LaRocca, Lefkovits, Pfisterer, & Hoffmann, 2008), and devising an action plan for physical activity performance (Sniehotta et al., 2005) positively affect levels of physical activity in comparison with usual care over a 6- to 12-month period after Phase III CR.

A key concept in these interventions is self-efficacy. Self-efficacy is part of social cognitive theory (Bandura, 1986) and suggests that social, cognitive, and behavioral factors play an important part in an individual's choice to adhere to, or to avoid, exercise. In social cognitive theory, self-efficacy is described as an individual's belief in his or her ability to perform a particular behavior in a variety of circumstances (Bandura, 1997). Self-efficacy beliefs are highly correlated with physical activity participation (Focht, Knapp, Gavin, Raedeke, & Hickner, 2007),

with positive affect postexercise when a state of flow (challenge-meeting ability) is achieved (McAuley, Jerome, Marquez, Elavsky, & Blissmer, 2003) and with positive psychological well-being in older adults (Netz, Wu, Becker, & Tenenbaum, 2005).

Bandura believed that to understand the evolving nature of behavior change the individual has to master a number of different tasks requiring different types of self-efficacy (Bandura, 1997); that is, although high self-efficacy in relation to exercise performance may motivate an individual to commence a physical activ- ity program, it may not result in his or her adhering to the program. Hence, more recent studies have examined specific types of exercise self-efficacy and support the necessity of having multiple types to achieve sustained adherence (Rodgers, Murray, Courneya, Bell, & Harber, 2009; Rodgers & Sullivan, 2001). Scholz, Snie- hotta, and Schwarzer (2005) studied stage-specific self-efficacy beliefs in a sample of individuals during and 2 and 4 months after Phase III CR. They found that task self-efficacy was initially needed to form an intention to act or commence the new behavior, but maintenance self-efficacy, also referred to as self-regulatory (Bandura,

1997; Woodgate, Brawley, & Weston, 2005) or barrier self-efficacy (Blanchard et al., 2007), was required to continue to perform the behavior under challenging conditions, and finally recovery self-efficacy was needed to enable the individual to resume the behavior should the maintenance of the behavior change or be inter- rupted. This requirement of different types of self-efficacy for successful adherence to physical activity is supported in both the cardiac (Blanchard et al., 2007; Luszc- zynska & Sutton, 2006) and general older adult population (Rodgers et al., 2009; Stigglebout, Hopman-Rock, Crone, Lechner, & van Mechelen, 2006). Similarly, Umstattd and Hallam (2007) found that barrier self-efficacy was useful only when explaining neophyte exercise experiences in an older adult population; it had limited predictive effect on explaining exercise maintenance. Thow, Rafferty, and Kelly (2008) interviewed long-term adherers (≥5 years) to a Phase IV community-based CR (CBCR) program to gain insight into factors that helped sustain adherence. Both quantitative (EMI-2) and qualitative (focus groups) methods were used, and results revealed that ill-health avoidance, positive health outcomes, enjoyment, and social factors were key motivations for continued participation. A limitation to this study was the small sample size (two focus groups with 5 men in one and 4 women in the other), and self-efficacy was not mentioned as an influential factor. The purpose of the current study was to build on Thow et al.'s work by develop- ing a more in-depth understanding of the key correlates that explain medium- to long-term adherence to community-based physical activity after a cardiac event. This information is important because it will help advise strategies to increase the number of people with established coronary heart disease who engage in regular health-enhancing physical activity.

Methods

A Phase IV CBCR program running since 2006 with a weekly attendance of approximately 80 adults (age 50–85 years, 70% male) with established coronary heart disease was the setting for this study. All participants were referred from one of three local Phase III hospital-based CR programs. The program is predominantly exercise based and is run by sport-science and health professionals in a community setting. Classes are 1 hr, 15 min in length and run five times per week.

Ethical Considerations

All participants of a Phase IV CBCR program were given a plain-language state- ment outlining the study, the requirements for inclusion, and expectations of them should they opt to participate. Once selected for inclusion, individuals completed an informed-consent form allowing the researchers access to their demographic and medical data (age, marital status, medical history) held by the program staff. All focus-group sessions were taped and transcribed. To protect confidentiality and encourage participants to be frank and critical in their comments, no individual identifiers were included in the transcripts; each participant was allocated a code and referred to as such in the transcriptions. Focus-group tapes and transcriptions were stored securely and accessible only to the researchers. The study protocol was approved by the research ethics committee of Dublin City University.

Participant Selection

Inclusion criteria included regular attendance (averaging two sessions/week) at the program for the previous 6 months or longer with a lapse no greater than 1 month within that period. Six months

was chosen as minimum adherence because it is accepted as the time frame for behavior change to be regulated (Prochaska & DiCle- mente, 1983). A recruitment letter was sent to all potential participants explaining the purpose of the research study and the set dates for five focus-group sessions. An opportunity was provided to ask questions and indicate interest. Once ethical procedures—informed consent—were completed, participants were allocated to one of five scheduled focus-group sessions based on their availability and gender. At least 4 participants were allocated per group, based on the recommendations of Kitzinger (1995). Groups were gender specific to minimize the potential for sensitivities and, therefore, a reluctance to share experiences and opinions, and because of the large differential in the numbers in the full class (it is mainly made up of men) we felt it necessary to specifically target women for recruitment pur- poses. No other randomization method was deemed necessary because all willing participants were allocated to a group.

Focus Groups

Focus groups were the qualitative method chosen because they generate rich data by capitalizing on interparticipant communication (Kitzinger, 1995). Five focus-group sessions were held, three with men and two with women, with 4–7 participants in each.

The moderator introduced each session and led the participants through a series of 10 questions developed using guidelines by Krueger (1998), for example, "What influenced you to join the program?" and "List five positive things about the program in order of importance" (participants were given the chance to write these down and then discuss as a group). Although each focus group followed the same set of questions, to ensure that the conversation flowed participants were given the opportunity to stray from the particular question being asked as long as the conversation remained within the bounds of the topic of the research. This was to ensure that the participants were given the opportunity to explore their opinions and ideas. Notes from the focus-group sessions were recorded manually

by an assistant moderator on a predesigned data-recording sheet and via an audio tape recorder. Participant verification was checked by providing a summary of each group's discussion at the end of the focus group to verify that the researcher was providing a correct summary of the discussion according to the participants.

Data Analysis

The moderator and assistant met directly after each focus-group session to debrief and discuss and capture initial thoughts. Each focus group was transcribed verbatim before the next one commenced. Analysis of the transcription was conducted manually, first by comparing it with the assistant moderator's notes to fill in inau-dible phrases or gaps in the tapes, followed by the constant comparative method to analyze the data. This involved finding, highlighting, and comparing emerging themes from focus groups.

For theme identification, the researcher looked for patterns, themes, concerns, or suggestions that were posed repeatedly by the focus-group participants. Data for each theme were then grouped together, read repeatedly, reanalyzed, and, if neces- sary, broken down into subordinate themes to better reflect the insight derived from the data provided by the participants. These themes included sought or expected information, as well as emergent themes that were unexpected and revealed insights.

All transcripts plus the complete list of themes and subthemes were then passed to a colleague to assess and provide feedback on analysis. Discussion took place to ensure that all data were linked to the appropriate theme, and new themes were developed where necessary. When all data had been coded and themed, the researcher chose key quotations (denoted by participant gender and length of adher- ence in the Results section) from each theme and linked them with an explanatory narrative to describe key findings.

Results Participant Details

Twenty-four participants, 15 men (mean age 65.1 ± 14 years) and 9 women (mean age 72 ± 9 years), all White, took part in the study. Average program adherence was 20 months (\pm 10 months), and distance from the venue ranged from 2.4 to

31.2 km. Twenty of the participants were married, 1 was separated, 2 were single, and 1 was widowed. All except 1 man were retired. They had experienced a range of single to multiple cardiac events.

Theme

Data from the focus groups were filed under two headings: factors influencing uptake and adherence (Table 1) and strategies to increase future uptake and adher- ence (Table 2).

Factors Influencing Uptake and Adherence. Instrumental and emotional social support proved to be influential in both uptake and adherence. This support was provided by health professionals, family and friends, fellow participants, and program staff.

Table 1 Factors Influencing Uptake and Adherence

Keythemes	Subordinate themes
Social support	Instrumental (health professionals), emotional (family and friends, fellow participants, community-based cardiac rehabilitation staff)
Structured class	Novel exercises, specialist staff, routine, purpose
Health Self-efficacy	Belief in health benefits Task, barrier, recovery

Table 2 Strategies to Increase Future Uptake and Adherence

Keythemes	Subordinate themes
Recruitment methods	Existing participants, health professionals, program staff, quick transfer from Phase III
Support Motivation	Staff:participant ratio, group meetings Challenge and variety, goal setting, fitness testing and feed- back, gender divide, reinforce health benefits

Most participants stated that they had been encouraged to progress to the Phase IV CBCR program by Phase III health professionals. This support was instrumental in nature, by outlining CBCR location, time, and enrollment procedures: "In [the hospital] they had a poster up stating that [CBCR] was commencing at that time.

. . . They encouraged us to come and also to feed back to them" (M3, 18 months).

Both emotional and instrumental support from family and friends were important factors for many participants. Although some were made aware of the program by those closest to them, for others it was the extra encouragement that spurred them on. One woman revealed how a family member was of paramount importance to her attendance: "My son had heard about it before I did and he said when you come out, you should look it up. And I've no excuse, he drops me over" (F7, 10 months).

Emotional support received from fellow participants and program staff was strongly emphasized. Although participants referred to the company and fun aspect they provided, it is clear that support goes beyond what one might experience from an exercise class open to the whole public. They specified that the class provides an opportunity to exercise with people who "are in the same boat" (F2, 19 months), and this provided an additional support: "Their eyes don't glaze over if you talk about your problems because they've had the same problems" (F4, 16 months). Another woman explained how the program staff made her feel at ease: "I found the team was so nice and they made you so welcome" (F7, 10 months).

The various aspects and components of the CBCR class emerged as a theme that positively affected adherence. Participants revealed that the exercises carried out in the class were novel and not ones they would independently perform—"You do exercises that you wouldn't do if you weren't in the class scenario" (M12, 19 months)—which provided a new dimension to their physical

activity: "I walk a lot but I find these exercises stimulating" (M3, 18 months). They also referred to the safety benefits of exercising in the presence of specialist staff: "You feel safe, particularly at the beginning. . . . You could take it a bit further because you knew there were people there who knew what they were doing" (M9, 13 months).

Participants explained how CBCR had become a part of their routine and they were committed to attending—"Sets target to keep fit at set hours. . . . On Tuesday and Thursday I never make any other commitments" (M3, 18 months)—and pro- vided a sense of purpose as 1 male participant explained,

I think in a curious way, [it gives] a certain sense of identity. . . . Sometimes, whatever we work at can identify us, give us a sort of a place in society. [Going to CBCR], I had a purpose and I think psychologically it was good for me." (M15, 19 months)

This sentiment was backed up by a female participant who stated, "I love getting up in the morning and knowing where I'm going and that it's here" (F9, 26 months).

An understanding of the health benefits of continuing to adhere to physical activity was apparent. Participants viewed their continued participation as "an insurance policy to make sure we're not back in the stage that we just left . . . and a very important safeguard to keep us on the straight and narrow" (M14, 16 months). The concept of their health being in their own hands was evident: "I wanted to do it myself. . . . It's terrible saying 'cardiac cripple' but not to become one. You needed to get out there and start your life again" (F1, 30 months).

Three distinct types of self-efficacy were prominent in helping the participants sustain their exercise program. First, task self-efficacy, or the participants' ability to successfully perform the exercises, had a very positive effect: "It shows you the possibilities of what you can do after a heart attack, you know, it builds up your confidence" (M11, 10 months). Second, barrier self-efficacy was demonstrated. Dis- tance from the program venue and heavy traffic were expressed as inconveniences, and although they affected the number of classes attended, they did not lead to nonparticipation—for example, "I've often come when I've had to go somewhere. I just go home and get ready and get cleaned up and then go" (M8, 22 months). Third, participants presented recovery self-efficacy. Most had experienced lapses in adherence, predominantly because of holidays, illness, and injury, but once the reason for the lapse ceased, they immediately returned to the program. Strategies to

Strategies to Increase Future Uptake and Adherence. The need to address methods of recruitment to the Phase IV CBCR program the participants were engaged in was strongly conveyed. It was suggested that existing participants could be used to encourage new people to join the program because they were in the best position to convey the reality of the classes: "[It would help if they had the opportunity] to interact with us after we finished [exercising], to get feedback from ourselves who are doing it" (M13, 30 months).

Health professionals were also suggested as a means to increase awareness of the program: "I'll tell you frankly, too many people don't know these things are available. . . . Maybe doing circulars to doctors or GPs, telling them what you're doing and I think you'd get an awful lot more people to come" (M3, 18 months). Other suggestions included CBCR staff visiting Phase III CR classes or incorpo- rating a visit to a Phase IV CBCR class into the Phase III CR program because it was believed that this might help reduce some initial anxiety: "It was very difficult to assimilate in my own mind, what the hell we were going to do. . . . You went away and you were a bit worried because you thought, 'I might not be able to do this'" (M3, 18 months). The need to transfer quickly from Phase III to Phase IV was also highlighted: "They're after doing their 10 weeks [in Phase III CR] and they are in their stride a little bit and if they came in then . . . but if they come in raw . . ." (F3, 30 months).

The importance of maintaining and increasing the initial support to newcomers was highlighted. It was felt that because of the increased participant numbers the initial support had declined:

There was a time when people would come in and you'd be grouped together for the first week, to be encouraged and that. And they would have lots of students around them showing them what to do.... That's not necessarily the case now. (F2, 19 months)

Another suggestion was to hold regular group meetings for newcomers: "I say every month or something like that there should be a meeting whereby they should be spoken to, asked how they feel" (M8, 22 months).

Participants were strong in the opinion that more could be done to improve participants' motivation, and in particular they wanted to see an increase in the challenge and variety of the exercises: "I find that the stuff we're doing every week, it's all repetition really. . . . You could lose motivation doing it" (M8, 22 months). In addition to changes in the exercises performed, goal setting, fitness tests, and feedback were stated as motivational tools that could be better used for

newcomers—"I would certainly for beginners after a month or so ... put in a fitness assessment" (M8, 22 months)—and long-term adherers to inform them of their progress: "It would be a good check wouldn't it [fitness test], once a year even, or 6 months" (M6, 18 months), "You know you're doing what you're doing but are you getting any better?" (F2, 19 months). The only concept to emerge solely from male participants was that of a gender division in the class, "Well I noticed with the advanced class, you never get any women in it because I think women are intimidated" (M7, 22 months). Reinforcement of the benefits of maintaining physical activity was also noted as a strategy to maintain or increase motivation.

Discussion

Consistent with research focusing on Phase III CR, this study found a number of similar factors influencing uptake and long-term adherence to Phase IV CBCR. The predominant factor influencing uptake in Phase IV CBCR was referral to the program by a health professional; this is similar to Phase III and supports previous research (Barber et al., 2001; Dolansky et al., 2006; Jackson et al., 2005). It also stresses the importance of good links between community and hospital settings to ensure speedy and smooth transition from Phase III to Phase IV.

Similar to Phase III, support from family and friends was perceived as a key motivator in terms of both uptake and adherence (Barber et al., 2001; De Angelis et al., 2008; Dolansky et al., 2006; Jackson et al., 2005), and the support of fellow participants with a common medical history was paramount to continued adher-

ence (Clark et al., 2004; Jones, Greenfield, & Jolly, 2009; Thow et al., 2008). In addition, both Phase III and Phase IV participants demonstrated knowledge of the benefits of remaining physically active (Dolansky et al., 2006; Thow et al., 2008; Wyer, Earll, Joseph, & Harrison, 2001) and viewed their participation as a method of controlling their health and avoiding the pitfalls that led to their cardiac event in the first place (Clark et al., 2004; Thow et al., 2008; Wyer et al., 2001).

The current study develops our knowledge of adherence further by highlight- ing having a structured class and enhancing self-efficacy as essential to long-term adherence to Phase IV CBCR. Elements of the structured class, including the range of exercises taught and the presence of specialized staff, were important for sustaining adherence, which supports findings from Phase III (Thornhill & Stevens,

1998). Many viewed the classes as part of their weekly routine and were committed to attending each week because it provided them with a sense of purpose. This was particularly evident among the retired individuals—some stated that it gave them a sense of identity. This is a novel finding, one that highlights the role of habit or routine as an important factor in helping individuals adhere to a structured exercise program long term by making it a component part of their everyday lives.

The current study also revealed task, barrier, and recovery self-efficacy as essential for sustained adherence. This is an important finding because it enforces the need for multiple types of self-efficacy to sustain behavior change. Task self- efficacy has been shown to be positively associated with uptake and short-term adherence to physical activity after a cardiac event (Scholz et al., 2005), provided the program does not progress too quickly (Rodgers et al., 2009). However, Rodg- ers and Sullivan (2001) found that the presence of high task self-efficacy did not relate to long-term adherence, and indeed it was reported in nonexercisers. Task self-efficacy was reported as important by the adherers in the current study. They felt it provided them with the necessary belief in their ability to carry out the prescribed exercises of the program, particularly when the exercises were new or challenging.

The case for barrier (or maintenance) self-efficacy is less clear, and although strong links with physical activity have been reported in the short term—that is, up to 2 months post-CR (Blanchard et al., 2007; Blanchard, Rodgers, Courneya, Daub,

& Knapik, 2002; Luszczynska & Sutton, 2006)—results for long-term adherence conflict. Blanchard et al. (2007, 2002) reported a significant decline in the relationship from 2 to 12 months post-CR, whereas other studies have revealed strong correlations up to 8 months post-CR (Luszczynska & Sutton, 2006; Scholz et al.,

2005). In a nonclinical population of older adults, a multivariate analysis revealed no relationship between barrier self-efficacy and exercise maintenance (Umstattd et al., 2007). The current study supports the necessity of barrier self-efficacy for long-term adherence and the importance of having coping strategies in place to deal with barriers as they arise.

More united support appears to be available for recovery self-efficacy, which has been linked to adherence in both the cardiac (Luszczynska & Sutton, 2006; Scholz et al., 2005) and general older adult population (Stigglebout et al., 2006). As would be expected, lapses will occur in long-term adherence to physical activ- ity for a variety of reasons (e.g., illness, injury); the importance of

recovery self- efficacy is paramount.

The inconsistency of instruments used to measure self-efficacy, plus the multiconceptualization of the construct itself, makes it difficult to ascertain a definitive view of its true relationship to long-term adherence to physical activity after a cardiac event. The current findings inform us that all types of self-efficacy must be present at all times during the behavior-change continuum to allow specific types to be used to their full potential when the need arises. Future research must evalu- ate this further, particularly the notion of a temporal concept—that is, that some forms of self-efficacy are more important than others at different times depending on one's location on the behavior-change continuum.

Strategies to increase future uptake and adherence to Phase IV CBCR focused on recruitment methods, support, and motivation. Complementing previous findings (Clark et al., 2004; Thornhill & Stevens, 1998), suggestions included better marketing of the program and a more indepth introduction to Phase IV CBCR during the Phase III program. The use of current class members to help recruit new participants has also been previously suggested (Clark et al., 2004; De Angelis et al., 2008). Peer support was recommended by the participants, who would fulfill this role, which suggests that they would be willing to cooperate, although the level of commitment required would need to be addressed. This is a novel idea, and future research needs to explore the impact of a peer-led inter- vention on adherence to Phase IV CBCR. It may also be possible to incorporate this into the monthly group-support meetings that were also suggested. A desire to increase motivation by methods including more challenging exercises and feedback strengthens the finding that these individuals are motivated by a desire to improve their physical health.

Conclusion

It is apparent that long-term adherers to a CBCR program share the following characteristics: appreciation of the various aspects of a Phase IV CBCR program, awareness of their medical condition and the benefits of maintaining physical activ- ity and establishing a routine, and strong task, barrier, and recovery self-efficacy. To increase the number of people successfully sustaining physical activity levels after a cardiac event, we need to work with them to develop these attributes. In an effort to achieve this, the following are recommended:

- Development of task, barrier, and recovery exercise self-efficacy in individuals after a cardiac event
- Introduction of educational components into Phase IV CBCR programs to increase awareness of the importance of maintaining physical activity after a cardiac event
- Phase IV CBCR providers' establishment of a closer working relationship with Phase III CR providers to ease the transition from one to the other
- Development of a routine, a purpose among participants, which helps them get into the habit of attending the class and building exercise into their daily lives
- Training of current long-term adherers to become peer mentors in the program.

Limitations

All participants were from the same Phase IV CBCR program; only one program was assessed. Strategies for increasing uptake and adherence are from the perspective of existing long-term adherers, who may not understand the barriers faced by those who do not attend. Finally, participants were aware that results of the study would be seen by the program organizers, and this may have inhibited responses (even though they were notified that all data would be kept anonymous).

Acknowledgments

This work was supported by Dublin City Council. We sincerely thank all the participants who took part in the focus-group sessions.

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Appendix B – Abstract

Title: What sustains long-term adherence to phase IV community-based cardiac rehabilitation?

Background: Long-term adherence to physical activity following a cardiac event is uncommon. Studies have revealed that uptake and participation in exercise-based cardiac rehabilitation (CR) programmes remains low with most of this research focusing on phase III CR. Little is known about what enables and motivates people to successfully adhere to physical activity following a cardiac event.

Objectives of the Study: The objectives of this study were two-fold:

- a) To gain insight into the influences and motivations of successful long-term adherers to a Community-Based Cardiac Rehabilitation (CBCR) programme and
- b) To seek methods of influencing future uptake and adherence of CBCR.

Methods: Twenty-four participants (15 men and 9 women, aged 67.7 years \pm 16.7) with established Coronary Heart Disease (CHD) who had been attending a CBCR programme continuously for at least 6 months attended focus groups. Constant comparative analysis was used to generate themes to explain reasons for long-term adherence and seek methods of increasing adherence in others.

Results: Social support, structured class, health benefits and self-efficacy were the strongest influences of long-term adherers of phase IV CBCR. Social support was both instrumental and emotional and was provided by health professionals, family and friends, fellow participants and programme staff. Specific elements of the

structured class including the presence of specialised staff, the performance of novel exercises, the routine and sense purpose of attending were highlighted as positively affecting adherence. The participant's belief in the health benefits gained by continued adherence was also strongly conveyed. Finally long-term adherers demonstrated high levels of self-efficacy in relation to the task of performing the exercises, overcoming barriers to adherence and returning to the programme following a minor lapse.

Developing specific recruitment and support methods for newcomers were identified as strategies to increase future uptake and adherence to CBCR. Various methods were suggested such as a more wide spread advertising campaign, use of existing participants to encourage uptake of the programme, increase in initial support for new participants and additional use of motivational tools such as fitness tests, goal setting and the reinforcement of the health benefits.

Conclusion: Whilst there appears to be an internal motivation amongst long-term adherers to maintain their physical activity levels post cardiac event, the introduction of more targeted recruitment strategies and greater emphasis on initial support and continued motivation may help increase the numbers of long-term adherers.

Appendix C - submitted to CARDI Ageing Globally – Ageing Locally International Conference.

Background: Long term adherence to physical activity (PA) following a cardiac event is uncommon. Research has revealed that peer social support, a belief in the health benefits of exercise and task specific self-efficacy are necessary, for this population, to adhere long-term (> 6 months) to structured PA (Martin & Woods, 2011). Peer mentoring suggests that individuals who share similar problems have a unique resource to offer one another. This study examined the impact of Peer Mentors (PMs) on adherence of newcomers to an established phase IV Community-Based Cardiac Rehabilitation Programme (CBCRP).

Methods: Long-term adherers (N=8, 100% male, 64-77yrs, > 12mths attendance) of a phase IV CBCRP were trained as PMs. Training (8 hours over 2 days, plus a midmentorship support meeting) covered benefits, recommended levels, overcoming barriers, self-efficacy and goal setting for PA. The PM role was to provide support, during 2 weekly exercise sessions, with the aim of increasing newcomer adherence rates. Mentees (N=13, 82% male, 50-77yrs), who had recently experienced a cardiac event were recruited and paired with a PM. Outcome measures included attendance rates, assessment of PA level (via accelerometry), psychosocial correlates (mentees only; via self-report self-efficacy, ERA-12, SF-12 questionnaire) and interviews (focus group with PMs, 1-1 in-depth interviews with mentees).

Results: PMs rated training highly and reported a positive experience in the role although time allocated to role varied. The challenges identified were assisting exercise mastery, conflicting input from CBCRP staff, gauging support required by the mentee, and dealing with increased responsibility. Recommendations given were for recruitment of more PMs, female PMs, flexible match period, formalise initial contact and an increase in PM duties. No change was found in PMs PA levels post-intervention. Mentees: Eight (7male) mentees were still attending CBCRP at 6-weeks (mean 67% adherence). These Mentees significantly increased PA levels and reported positive experiences of the PM programme. Reasons for dropout included injury (N=2), illness (1), pace too challenging (N=1) and feeling too young for the class (N=1).

Conclusion: The training of PMs to provide support to newcomers in an established phase IV CBCRP had a positive impact on both PMs and Mentees. It helped newcomers 'fit in' to an 'old programme'. However, peer mentoring alone was insufficient to address adherence issue for all participants; future research needs to examine this problem further.

Reference:

Martin, A.M. & Woods, C.B. (2012). What Sustains Long-Term Adherence to Structured Physical Activity After a Cardiac Event? *Journal of Aging and Physical Activity. Journal of Aging and Physical Activity*, 20 (2)135-147.

Appendix 2 - Informed Consent Form for Study 1 Participants

Statement of Informed Consent

Project Title: What motivates people to become and stay physically active?

The study will be undertake at primarily at Dublin City University

Principle Investigators:

Dr. Catherine Woods 01-7008008 catherine.woods@dublincity.ie

Ms. Antonia Martin 087-1254709 antonia.martin35@mail.dcu.ie

Purpose of Study:

I understand that the purpose of this study is to hold a group interview, during which questions will be asked to establish what motivates people to become and stay physically active following completion of a phase III cardiac rehabilitation programme in the hospital.

Involvement in Study:

I understand that I will be part of a group interview, and I will be asked questions in relation to my own experience of beginning exercise and what has helped me to stay regularly active since I left the hospital. The interview will last approximately 60 minutes, and it will be audio taped to allow the researcher to analyse the information.

Voluntary Status:

I understand that my participation in this study is voluntary, and that if I wish to withdraw from the study or leave at any time, I may do so, and that I do not need to give an yreasons or explanations for doing so. I understand that this will have no effect on my ongoing participation in the DCU HeartSmart programme.

Confidentiality:

I understand that because of this study, there could be violations of my privacy. To prevent violations of my own or others privacy, I have been asked not to talk about any of my own of others' private experiences that I would consider too personal or revealing.

I also understand that all the information I give will be kept confidential to the extent permitted by law, and the names of all the people in the study will be kept confidential.

Benefit:

I understand that I may not receive any direct benefit from participating In this study, but that my participation may help others in the future.

The members of the research team have offered to answer any questions I may have about the study and what I am expected to do.

Confirmation of particular requirements:

Participant, pleas complete the following (circle Yes or No for each question)

Have you read or had read to you the Plain Language Statement?	Yes / No
Do you understand the information provided?	Yes / No
Have you had an opportunity to ask questions and discuss this study?	Yes / No
Have you received satisfactory answers to all your questions?	Yes / No

I have read and understood the information in this form. My questions and concerns have been answered by the researchers and I have a copy of this consent form. Therefore, I consent to take part in this research project.

Participant Signature:	
Name in BLOCK CAPITALS:	
Witness:	
Date:	

If you have any concerns or questions about this study, please contact either Antonia Martin on 087-1254709 / Antonia.martin35@mail.dcu.ie or The Secretary, Research Ethics Committee, Office of the Vice-President for Research, Dublin City University,

Tel: 01-7008000; Fax: 01-7008002.

Appendix 3 – Ethics Proposal for Study 1

Research Ethics Committee: Notification Form for Low-Risk Projects and Undergraduate Dissertations

DCU Research Ethics Committee has introduced a procedure for notification to the committee of

- 1. Low-risk social research projects, in which personal information that is deemed not sensitive is being collected by interview, questionnaire, or other means
- 2. dissertations on undergraduate programmes in all disciplines.

The committee requires researchers to concisely answer the following questions within this form (before the project starts):

Project Title:

A qualitative analysis of motivations and barriers to participation in a community-based cardiac rehabilitation programme ("HeartSmart").

Applicant Name and E-mail:

Antonia Martin. antonia.martin35@mail.dcu.ie

If a student applicant, please provide the following:

Level of Study (Undergrad/Taught MSc/Research MSc/Phd): MSc Supervisor Name and E-mail:

Dr. Catherine Woods. <u>catherine.woods@dcu.ie</u>
Dr. Noel McCaffrey. Noel.McCaffrey@dcu.ie

Questions:

1. Provide a lay description of the proposed research (approx. 300wds):

This study will seek to gain an insight, through focus group discussion, into the key motivations of participants who continue to participate in a community-based cardiac rehabilitation programme (CRP). Participants will be recruited from the Dublin City University (DCU) HeartSmart programme, which is a phase IV CRP that was established in DCU in 2006. Twenty-four participants will be recruited based on a set of inclusion criteria. All interested participants will be advised as to the nature of the study, and following individual consent, will be allocated a time to attend DCU to participate in one of four focus group sessions. Each focus group will be made as homogenous as possible based on gender, age and length of time attending HeartSmart.

Each focus group will consist of six participants and will last approximately 60 minutes. A total of ten questions will be put to the group for discussion. All sessions will be recorded with an audio tape recorder and written notes will also be taken. The content of each session will be transcribed and key themes will be noted. A written report will be produced describing the findings of the study. A similar study received full ethical approval from the DCU ethics committee in 2006 [DCUREC/2006/31b].

2. Detail your proposed methodology (1 page max.):

The DCU HeartSmart programme is a community-based cardiac rehabilitation programme that offers participants the opportunity to exercise in an appropriate and safe environment. A random selection of twenty-four participants (12 male, 12 female) will be recruited from this programme to participate in one of four focus group sessions. Inclusion criteria includes:

- i. Participating in HeartSmart for at least 6 months;
- ii. Having a lapse of not longer than 1 month in that period.

The twenty-four participants will be divided into four groups; therefore, there will be six participants in each group. This will ensure that there will be enough people to generate a discussion whilst ensuring that all participants will get an opportunity to contribute. Groups will be made as homogenous as possible to ensure maximum compatibility. Key factors that will be considered are gender, age and length of time participating in HeartSmart.

Location: The focus group will be held directly after the HeartSmart programme in DCU. This will increase the likelihood of attendance as the participants will already be in the vicinity and there will be no additional travel costs.

Room set up: Chairs will be laid out in circle format. This is to ensure all participants can see the moderator and each other and will encourage group discussion. The assistant moderator will be seated outside of the group circle so participants will not be distracted by note taking.

Consent: Prior to commencing the focus group discussion, participants will be asked to fill in a consent form. (Appendix 1)

Refreshments: Refreshments will be provided prior to commencing the session. As participants are very likely to know one another, this will give them a chance to mingle thus creating a relaxed environment conducive to open group discussion.

Moderator & assistant moderator

- The moderator and assistant moderator will arrive 30 40 minutes prior to the session commencing to set up equipment and arrange the room.
- The moderator will direct the session while the assistant moderator will set outside the group taking notes. All sessions will be recorded with an audio tape recorder.
- The moderator and assistant moderator will remain approximately 30 minutes after the session to de-brief.
- The moderator will introduce the session and lead into the sequence of questions. A total of ten questions will be asked. These will include an Opening question, two transition questions, six key questions and an end question. (Appendix 2).

Analysis & Reporting

- The moderator and the assistant moderator will record key themes immediately after each session.
- The research team will transcribe each audiotape verbatim and conduct content analysis to establish main themes.
- A report will be written up describing findings of the study.

3. Detail the means by which potential participants will be recruited:

The focus group study will be advertised in the HeartSmart class by programme staff and flyers (appendix 3). Details of the topic and purpose of the focus group will be given to all potential participants in both oral and written format (Plain Language Statement). (Appendix 4). Once potential participants have orally agreed to participate, they will be assigned to one of the four focus groups. A follow-up phone call or face-to-face reminder will be given to the potential participant two days prior to the focus group date.

4. How will the anonymity of the participants be respected?

The confidentiality of subjects will be respected at all stages of the research project. Participants' identity, or other personal information will not be revealed or published. Each subject will be assigned an identification number, which they will be referred to as in all subsequent analysis and reports. All personal data will be stored under this ID number. The investigators alone will have access to this data. Confidentiality of information provided can only be protected within the limitations of the law. It is possible for data to be subject to subpoena, freedom of information claim or mandated by reporting by some professions.

5. What risks are researchers or participants being exposed to, if any?

There are no risks involved in this research project.

6. Have approval/s have been sought or secured from other sources? Yes/No $\,$

If Yes, give details:

7. Please confirm that the following forms are attached to this document: Informed Consent Form Yes/No Plain Language Statement Yes/No

If not, explain why:

NB – The application should consist of <u>one file only</u>, which incorporates all supplementary documentation. The completed application must be proofread and spellchecked before submission to the REC. All sections of the form should be completed. Applications that do not adhere to these requirements will not be accepted for review and will be returned directly to the applicant.

The administrator to the Research Ethics Committee will assess, on receiving such notification, whether the information provided is adequate and whether any further action is necessary. Please complete this form and e-mail to fiona.brennan@dcu.ie

<u>Please note:</u> Project supervisors of dissertations on undergraduate programmes have the primary responsibility to ensure that students do not take on research that could expose them and the participants to significant risk, such as might arise, for example, in interviewing members of vulnerable groups such as young children.

In general, please refer to the Common Questions on Research Ethics Submissions for further guidance on what research procedures or circumstances might make ethical approval necessary (http://www.dcu.ie/internal/research/questions_ethics_submissions.pdf)

Appendix 1

Statement of Informed Consent

PROJECT TITLE: What motivates people to become and stay physically active?

The study will be undertaken primarily at Dublin City University.

PRINCIPAL INVESTIGATORS:

Dr. Catherine Woods 01 7008008 catherine.woods@dcu.ie

Dr. Noel McCaffrey 01-7008187 Noel.mccaffrey@dcu.ie

Ms. Antonia Martin 087 1254709 antonia.martin35@mail.dcu.ie

PURPOSE OF STUDY:

I understand that the purpose of this study is to hold a group interview, during which questions will be asked to establish what motivates people to become and stay physically active following completion of a phase III cardiac rehabilitation programme in the hospital.

INVOLVEMENT IN STUDY:

I understand that I will be part of a group interview, and I will be asked questions in relation to my own experience of beginning exercise and what has helped me to stay regularly active since I left the hospital. The interview last approximately 60 minutes, and it will be audio taped to allow the researcher to analyse the information.

VOLUNTARY STATUS: I understand that my participation in this study is voluntary, and that if I wish to withdraw from the study or leave at any time, I may do so, and that I do not need to give any reasons or explanations for doing so. I understand that this will have no effect on my ongoing participation in the DCU HeartSmart Programme.

CONFIDENTIALITY: I understand that because of this study, there could be violations of my privacy. To prevent violations of my own or others' privacy, I have been asked not to talk about any of my own or others' private experiences that I would consider too personal or revealing.

I also understand that all the information I give will be kept confidential to the extent permitted by law, and the names of all the people in the study will be kept confidential.

BENEFIT: I understand that I may not receive any direct benefit from participating in this study, but that my participation may help others in the future.

The members of the research team have offered to answer any questions I may have about the study and what I am expected to do.

Confirmation of particular requirements:

Participant, please complete the following (Circle Yes or No for each question)

Have you read or had read to you the Plain Language Statement? Yes / No Do you understand the information provided? Yes / No Have you had an opportunity to ask questions and discuss this study? Yes / No

Have you received satisfactory answers to all your questions? Yes / No

I have read and understood the information in this form. My questions and concerns have been answered by the researchers and I have a copy of this consent form. Therefore, I consent to take part in this research project.

Date:		
Witness:		
Name in BLOCK CAPITALS:	 	
Participants Signature:		

If you have any concerns or questions about this study, please contact either Antonia Martin on 087-1254709 / antonia.martin35@dcumail.ie or The Secretary, Research Ethics Committee, Office of the Vice-President for Research, Dublin City University, Tel: 01-7008000, Fax: 01-7008002

Appendix 2

Interview Script

Thank you all for taking the time to attend this session today. You have been invited here as you are all long-term participants of the HeartSmart programme. Dublin City University is currently carrying out research concerning physical activity behaviour in cardiac patients and as you have all been successful in maintaining your physical activity levels since completing Phase III cardiac rehabilitation, we would like to gain an insight into factors that have motivated you to do so. There is no right or wrong answers to these questions so don't feel like we are looking for a special answer. If it is ok, we will audiotape our discussion so we can go back and listen to it later. You do need know that no one else will hear this tape (unless a transcribe?) and we will keep you names confidential. The information will be used purely for research purposes.

(Start tape. State date, time, ID of focus group, recorder mane and moderator name).

- 1. Please introduce yourself to the group stating your name and how long you have been attending HeartSmart.
- 2. When you think of HeartSmart, what comes to mind?
- 3. What influenced you to join HeartSmart?
- 4. List 5 positive things about HeartSmart in order or importance. (Write on a piece of paper and call out)
 - 5. What role do others have in your continued participation in the HeartSmart programme?

- 6. Have you experience any lapses in your adherence to the programme (i.e. periods where you did not attend)? What were the reasons for this?
- 7. What was the key factor that influenced your return to the programme?
- 8. If you were in charge of HeartSmart, what would you change? Why does this need changing?
- 9. We would like to help others become successful in physical activity uptake and adherence. What advice do you have for us?
- 10. Summary Question. 2-3 minute oral summary followed by:
 Is this an adequate summary? Is there anything else anybody wants to add?

Parallel Questions if needed (for certain questions only):

- 2. What do you associate with HeartSmart?
- 2. What were the main reasons you initially joined the HeartSmart programme?
- 3. List the five main reasons you continue to participate in the HeartSmart programme in order of importance.
- 4. How have other people influenced your continued attendance at HeartSmart?
- 5. If there were periods of time when you did not attend HeartSmart, what were the reasons for this?
- 6. What prompted you to return?
- 7. How could we improve the HeartSmart programme?
- 8. How would you encourage somebody to attend HeartSmart?

Probe questions if needed:

- a. Would you explain further?
- b. Can you give me an example?
- c. Would you say more?
- d. Is there anything else?
- e. Please describe what you mean.
- f. I don't understand.

Attention HeartSmart Participants

* Have you been participating in HeartSmart for 6 months or longer?

* Would you be willing volunteer an hour of your time to participate in a research study?

Dublin City University (DCU) is carrying out research looking at the motivations and barriers of participants in the HeartSmart Programme. Information will be collected through a 60-minute group discussion. Results of this research will influence future programme design and recruitment.

If you are interested or would like further information, please ask a member of the HeartSmart staff or contact Antonia Martin on 087-1254709

Appendix 4

Plain Language Statement Introduction to research

Dublin City University (DCU) is carrying out research looking at the motivations and barriers to participation in the DCU HeartSmart programme.

Involvement in this research study will involve the following:

As a long-term participant of DCU's HeartSmart programme, I would participate in a focus group discussion for about 60 minutes. The purpose of the focus group is to gain insight into what motivates participants to continue to attend the HeartSmart programme and what barriers you may have had to

overcome to do so. The focus group session will consist of six long-term participants of the HeartSmart programme and will be facilitated by a researcher - Ms. Antonia Martin. The interview will be audio-recorded to allow the researchers to analyse the data. A second member of the research team will be present to take notes.

Confidentiality:

I also understand that all the information I give will be kept confidential to the extent permitted by law, and the names of all the people in the study will be kept confidential.

VOLUNTARY STATUS: I understand that my participation in this study is voluntary, and that if I wish to withdraw from the study or leave at any time, I may do so, and that I do not need to give any reasons or explanations for doing so. I understand that this will have no effect on my ongoing participation in the DCU HeartSmart Programme.

I understand that I may not receive any direct benefit from participating in this study, but that my participation may help others in the future. Refreshments will be provided on the day.

If you have any queries regarding the conduct of this project you can contact: The Secretary, Research Ethics Committee, Office of the Vice-President for Research, Dublin City University, Tel: 01-7008000, Fax: 01-7008002.



Dublin City University

Offlice of the Vice-President for Research Dublin 9, Ireland

Dr. Catherine Woods School of Health and Human Performance

25th March 2009

REC Reference:

DCUREC/2009/052

Proposal Title:

A qualitative analysis of motivations and barriers to participation in a community-based cardiac rehabilitation

programme ("HeartSmart")

Applicants:

Dr. Catherine Woods, Dr. Noel McCaffrey, Ms. Antonia Martin

Dear Catherine

This research proposal qualifies under our Notification Procedure, as it is similar to a previously approved project utilising approved school protocols and has consequently been evaluated as a low-risk project. Therefore, the DCU Research Ethics Committee approves this research proposal. Should substantial modifications to the research protocol be required at a later stage, a further submission should be made to the REC.

Yours sincerely,

Mr. Brian Trench

Chair

DCU Research Ethics Committee

Office of the Vice-President for Research

Telephone 353 (0)1 700 8000 Facsimile 353 (0)1 700 8002 Email research@dcu.ie Website www.dcu.ie <u>Appendix 4 – Recruitment letter for Study 1</u>

Antonia Martin

School of Health and Human

Performance

Dublin City University

Dublin 9

Participant Address

Date

Dear HeartSmart Participant,

I am writing to invite you to attend a focus group concerning the motivations and influences of long-term adherers of HeartSmart. As you have been regularly participating in the programme for over 6-months, we are interested in hearing your views. I have enclosed a document outlining the study in full and the commitment required by you should you agree to participate.

Focus groups will be held on the DCU campus immediately after the HeartSmart class on the 12th, 14th, 19th, 21st and 26th of May 2009. If you wish to participate or require any further details, please do not hesitate to contact me (details above). I look forward to hearing from you.

Yours sincerely,

Antonia Martin

Research Student, DCU

Mobile No. xxxx / Email: xxxxxxx

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Appendix 5 – Script & Questions for Study 1 Focus Groups

Thank you all for taking the time to attend this session today. You have been invited here as you are all long-term participants of the Heart Smart programme. Dublin City University is currently carrying out research concerning physical activity behaviour in cardiac patients and as you have all been successful in maintaining you physical activity levels since completing Phase III cardiac rehabilitation, we would like to gain an insight into factors that have motivated you to do so. There is no right or wrong answer to these questions so don't feel like we are looking for a particular answer. If it is ok, we will audio tape our discussion so we can go back and listed to it later to ensure we collect all information. You do need to know that no one else will hear this tape and we will keep your names confidential. The information will be used purely for research purposes.

(Start tape. State date, time, ID of focus group, moderator and assistant moderator names).

- 1. Please introduce yourself to the group stating your name and how long you have been attending HeartSmart.
- 2. When you think of HeartSmart, what comes to mind?
- 3. What influenced you to join HeartSmart?
- 4. List 5 positive things about HeartSmart in order of importance. (Write on a piece of paper and read out to the group).
- 5. What role do others have in your continued participation in the HeartSmart programme?
- 6. Have you experienced any lapses in your attendance to the programme, i.e. periods where you did not attend? What were the reasons for these lapses?
- 7. What was the key factor that influenced your return to HeartSmart?
- 8. What changes would you make to HeartSmart to make it better for you?
- 9. We would like to help others become successful in physical activity uptake and adherence following a cardiac event. What advice do you have for us?
- 10. Summary question 2-3 minute oral summary by moderator followed by: Is this an accurate summary? Is there anything else anybody would like to add?

Parallel questions if needed:

2. What do you associate with HeartSmart?

- 3. What were the main reasons you initially joined the HeartSmart programme?
- 4. List the 5 main reasons you continue to participate in the HeartSmart programme in order of importance.
- 5. How have other people influenced your continued attendance at HeartSmart?
- 6. If there were periods of time when you did not attend HeartSmart, what were the reasons for this?
- 7. What prompted you to return?
- 8. How could we improve the HeartSmart programme?
- 9. How would you encourage somebody to attend HeartSmart?

<u>Appendix 6 – Focus Group Recording Sheet for Study 1</u>

HeartSmart Focus Group

Group Number: Date:	
Moderator:	
Assistant Moderator: 1. Please introduce yourself to the gr	oup stating your name and how long you
have been attending HeartSmart.	oup stating your name and not long you
Name	Length of Attendance
Notes:	

3. What influenced you to join HeartSmart? Participant Comments	Participant	Comments

When you think of HeartSmart, what comes to mind?

piece	of paper and read out to the group).
Participant	Comments
	<u> </u>
5. What	role do others have in your continued participation in the HeartSmart
	role do others have in your continued participation in the HeartSmart amme?
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List 5 positive things about HeartSmart in order of importance. (Write on a

4.

Participant	Comments
articipant	Comments
'. What	was the key factor that influenced your return to HeartSmart?
	was the key factor that influenced your return to HeartSmart? Comments
	was the key factor that influenced your return to HeartSmart? Comments
7. What	

Have you experienced any lapses in your attendance to the programme, i.e.

6.

Participant	Comments
and a	dherence following a cardiac event. What advice do you have for us?
	dherence following a cardiac event. What advice do you have for us? Comments
	Comments Comments
Participant	

What changes would you make to HeartSmart to make it better for you?

8.

10.	Summary question – 2-3 minute oral summary by moderator followed by:
	Is this an accurate summary? Is there anything else anybody would like to
	add?

Participant	Comments
Notes:	
	· · · · · · · · · · · · · · · · · · ·
	· · · · · · · · · · · · · · · · · · ·

<u>Appendix 7 – Plain Language Statement for Peer Mentors (Study 2)</u>

Peer Mentoring Programme

Introduction to research

The purpose of this study is to examine the effects of the introduction of Peer Mentors on retention and participation rates of participants in a Phase IV community-based cardiac rehabilitation programme (HeartSmart). Current long-term adherers of the HeartSmart programme will be recruited and trained as Peer Mentors. They will then, under the supervision of the research team and the HeartSmart team, mentor newcomers to the HeartSmart programme over a 6 week period.

Involvement in this research study will involve the following:

As part of the recruitment process you will be required to complete a questionnaire seeking information on any past mentoring experience (although past mentoring experience is not essential). This questionnaire is designed to ensure that the peer mentors trained will be capable of carrying out the necessary tasks.

Physical activity levels of the recruited peer mentors will be assessed before and after the study period using both a questionnaire and also by a small device that measures how quickly and often you move for a period of 7 days. This device is about the size of a match box and will be worn around your waist.

The recruited peer mentors will attend 10 hours training that will take place in Dublin City University at the following times:

Thursday 24th March 9am – 1pm (lunch provided)

Tuesday 29th March 9am – 1pm (lunch provided)

Thursday 31st March 9am – 11am

Training topics will include both practical and theoretical aspects incorporating exercise self-efficacy, benefits and recommended levels of physical activity, practical training of the performance of HeartSmart exercises and overcoming barriers. On completion of training, participants will:

- 1. Understand and embrace the duties of a Peer Mentor in the HeartSmart programme;
- 2. Have increased knowledge of various aspects of physical activity (benefits, recommended levels, (Frequency, Intensity, Time and Type) principle, rate of perceived exertion);
- 3. Have a heightened awareness of the barriers to participating in physical activity and methods to overcome these barriers;
- 4. Be competent to assist newcomers complete exercises in the correct manner;
- Be confident and enthusiastic about commencing their role as Peer Mentors.

On completion of training, the trained recruits will act as peer mentors for newcomers to the HeartSmart programme. Duties will include:

- showing new participants around the facility;
- building rapport with them;
- greeting them at the beginning of programme and checking in with them at the tea break at the end of each class;
- reinforcing what to do at each exercise stations;
- providing encouragement and support;
- offering solutions and advise to overcome barriers to attendance;
- encouraging them to perform at the appropriate intensity;
- reinforcing the benefits of remaining physical activity;
- sharing personal experiences where appropriate to enforce points;
- reporting back to the research team.

Peer mentors will also be required to attend two 1-hour support meetings with the research team during the period of the 6 week intervention (at weeks 2 and 4). These support meetings are designed to offer the peer mentors the opportunity to discuss their progress to date, seek assistance with any issues that may have arisen and request additional support if required.

Potential risks to participants from involvement in the research study

Carrying out the role of Peer Mentor may result in reduced effort to your own

physical exertion in the HeartSmart programme for the 6-week period. To assist you

maintain your own level of physical fitness, you will be entitled to attend an

additional 2 sessions per week in the DCU gym free of charge at a time of your

Benefits to participants from involvement in the research study

You will benefit from the additional knowledge received during the training

programme. You will also gain experience in the role of a peer mentor and

experience satisfaction from assisting newcomers participate and adhere to the

HeartSmart programme.

Confidentiality

The confidentiality of peer mentors will be respected at all stages of the research

study. Each Peer Mentor will be assigned an identification number under which all

your details will be stored in a secure file and saved in a passport protected file in a

computer at DCU. Only the investigators working on this research project will have

access to this file. However, confidentiality of information provided can only be

protected within the limitations of the law. It is possible for the data to be subject to

subpoena, freedom of information claim or mandated reporting by some profession.

Data Storage

All data collected will be stored on the DCU campus for 5 years following the

completion of the research study, in line with regulations. The principal investigator

will then destroy the data.

Voluntary participation

Involvement in this research study is on a completely voluntary basis. Withdrawal at

any time will be accepted and there will be no penalty should you wish to do so.

If you have any queries regarding the conduct of this project you can contact:

The Secretary, Research Ethics Committee, Office of the Vice-President for

Research, Dublin City University,

Tel: 01-7008000, Fax: 01-7008002

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Appendix 8 – Informed Consent Form for Peer Mentors (Study 2)

PROJECT TITLE:

Examination of the effects of the introduction of Peer Mentoring in a Phase IV

Community-Based Cardiac Rehabilitation Programme.

The study will be undertaken at Dublin City University.

PRINCIPAL INVESTIGATORS:

Dr. Catherine Woods 01-7008008 / catherine.woods@dcu.ie

Ms. Antonia Martin 087-1254709/antonia.martin35@mail.dcu.ie

I am being asked to participate in this research study. The study has the

following purpose:

To examine the effects of the introduction of Peer Mentors on retention and

participation rates of participants in a Phase IV community-based cardiac

rehabilitation programme (HeartSmart). Current long-term adherers of the

HeartSmart programme will be recruited and trained as Peer Mentors. They will

then, under the supervision of the research team and the HeartSmart team, mentor

newcomers to the HeartSmart programme over a 6 week period.

This is what will happen during the research study:

1. I will complete a pre-screening questionnaire regarding previous mentoring

experience as part of the recruitment process.

2. I will be required to undertake initial assessments. This will include a

questionnaire regarding my current level of physical activity and I will also

be required to wear a motion sensor (a small instrument the size of a match

box) on my waist for 7 days to count the number of steps I take each day.

3. I will be required to attend 6 hours training over 2 evenings in DCU covering

the following topics: exercise self-efficacy, benefits and recommended levels

of physical activity, practical training of the performance of HeartSmart

exercises and overcoming barriers.

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- 4. I will act as a peer mentor to newcomers of the HeartSmart programme for a 6-week period. Duties will include:
 - showing new participants around the facility;
 - building rapport with them;
 - greeting them at the beginning of programme and checking in with them at the tea break
 - at the end of each class;
 - reinforcing what to do at each exercise stations;
 - providing encouragement and support;
 - offering solutions and advise to overcome barriers to attendance;
 - encouraging them to perform at the appropriate intensity;
 - reinforcing the benefits of remaining physical activity;
 - sharing personal experiences where appropriate to enforce points;
 - reporting back to the research team.
- 5. I will be required to attend a support meetings during the 6-week intervention to discuss my progress, seek assistance with any issues that may have arisen and request additional support if required.
- 6. At the end of the 6-week intervention, I will be required to again complete a questionnaire regarding my current level of physical activity and I will also be required to wear a motion sensor (a small instrument the size of a match box) on my waist for 7 days to count the number of steps I take each day.
- 7. At the end of the 6-week intervention, I will also be required to attend a 1-hour focus group to assess my experience of the peer mentoring programme.

Confirmation of particular requirements:

Participant, please complete the following (Circle Yes or No for each question)

Have you read or had read to you the Plain Language Statement?	Yes / No
Do you understand the information provided?	Yes / No
Have you had an opportunity to ask questions and discuss this study?	Yes / No
Have you received satisfactory answers to all your questions?	Yes / No

VOLUNTARY STATUS: Involvement in this research study is on a completely voluntary basis. While you are encouraged to complete the study, withdrawal at any time will be accepted and there will be no penalty should you wish to do so

CONFIDENTIALITY: The confidentiality of subjects will be respected at all stages of the research project. Each subject will be assigned an identification number under which all their details will be stored in a secure file and saved in a passport protected file in a computer at DCU. Only the investigators working on this research project will have access to this file. However, confidentiality of information provided can only be protected within the limitations of the law. It is possible for the data to be subject to subpoena, freedom of information claim or mandated reporting by some profession.

Signature:

I have read and understood the information in this form. My questions and concerns have been answered by the researchers and I have a copy of this consent form. Therefore, I consent to take part in this research project.

Participant Signature:	_
Name in BLOCK CAPITALS:	_
Witness:	
Date:	

Appendix 9 – Ethics for Studies 2 & 3



Dublin City University RESEARCH ETHICS COMMITTEE

DCU	APPLICATION FOR APPROVAL OF A PROJECT INVOLVING HUMAN PARTICIPANTS Application No. (office use only) DCUREC/2010/	T]
	Period of Approval (office use only)/ to	
studies. The signed origina submitted to the DCU Researc NB - The hard copy must be only, which incorporates all be proofread and spellcheck form should be completed. Accepted for review and will Applications must be complete except where indicated. No	used by researchers seeking ethics approval for individual projects and all and an electronic copy of your completed application must be the Ethics Committee. The electronic copy should consist of one file is supplementary documentation. The completed application must keed before submission to the REC. All sections of the application Applications which do not adhere to these requirements will not be be returned directly to the applicant. The don't have a submission to the REC. All sections of the application applications will not be be returned directly to the applicant. The don't have a submission to the REC. All sections of the application applications will not be accepted, by handwritten applications will be accepted. Research must not roval has been received from the Research Ethics Committee.	
PROJECT TITLE	Examination of the effects of the introduction of Peer Mentoring in a Phase IV Community-Based Cardiac Rehabilitation Programme	
PRINCIPAL INVESTIGATOR(S)	Dr. Catherine Woods Ms. Antonia Martin	
original and electronic copy). If	mentary information is included in your application (in both signed f questionnaire or interview questions are submitted in draft form, a copy st be submitted for final approval when available.	
Informed Consent form	nent/Information Statement	ABLE

Please note:

1. Any amendments to the original approved proposal must receive prior REC approval.

 As a condition of approval investigators are required to document and report immediately to the Secretary of the Research Ethics Committee any adverse events, any issues which might negatively impact on the conduct of the research and/or any complaint from a participant relating to their participation in the study

Please submit the **signed original**, **plus the electronic copy** of your completed application to: Ms. Fiona Brennan, Research Officer, Office of the Vice-President for Research (fiona.brennan@dcu.ie, Ph. 01-7007816)

Guidelines to Applicants

- 1.1 PRINCIPAL INVESTIGATOR(S): The named Principal Investigator is the person with primary responsibility for the research project. Doctoral researchers and Research Masters or their supervisors may be listed as Principal Investigators, depending on the conventions of the discipline and on the individual case. It should be made clear, in subsequent sections of this application, who is carrying out the research procedures. In the case of Taught Masters and undergraduate student projects the supervisors are Principal Investigators.
- **2.0 PROJECT OUTLINE:** Provide a brief outline of the project, aims, methods, duration, funding, profile of participants and proposed interaction with them. This description must be in everyday language that is free from jargon. Please explain any technical terms or discipline-specific phrases.
- **2.1 LAY DESCRIPTION:** Provide a brief outline of the project, including what participants will be required to do. This description must be in everyday language which is free from jargon. Please explain any technical terms or discipline-specific phrases. (No more than 300 words).
- **2.2 AIMS OF AND JUSTIFICATION FOR THE RESEARCH:** State the aims and significance of the project (approx. 400 words). Where relevant, state the specific hypothesis to be tested. Also please provide a brief description of current research, a justification as to why this research should proceed and an explanation of any expected benefits to the community. **NB all references cited should be listed in an attached bibliography.**
- **2.3 PROPOSED METHOD:** Provide an outline of the proposed method, including details of data collection techniques, tasks participants will be asked to do, the estimated time commitment involved, and how data will be analysed. If the project includes any procedure which is beyond already established and accepted techniques please include a description of it. (No more than 400 words.)
- **2.4 PARTICIPANT PROFILE:** Provide number, age range and source of participants. Please provide a justification of your proposed sample size. Please provide a justification for selecting a specific gender.
- 2.5 MEANS BY WHICH PARTICIPANTS ARE TO BE RECRUITED: Please provide specific details as to how you will be recruiting participants. How will people be told you are doing this research? How will they be approached and asked if they are willing to participate? If you are mailing to or phoning people, please explain how you have obtained their names and contact details. This information will need to be included in the plain language statement. If a recruitment advertisement is to be used, please ensure you attach a copy to this application.
- **3.3 POTENTIAL RISKS TO PARTICIPANTS AND RISK MANAGEMENT PROCEDURES:** Identify, as far as possible, all potential risks to participants (physical, psychological, social, legal or economic etc.), associated with the proposed research. Please explain what risk management procedures will be put in place.
- **3.6 ADVERSE/UNEXPECTED OUTCOMES:** Please describe what measures you have in place in the event that there are any unexpected outcomes or adverse effects to participants arising from involvement in the project.
- **3.7 MONITORING:** Please explain how you propose to monitor the conduct of the project (especially where several people are involved in recruiting or interviewing, administering procedures) to ensure that it conforms with the procedures set out in this application. In the case of student projects please give details of how the supervisor(s) will monitor the conduct of the project.
- **3.8 SUPPORT FOR PARTICIPANTS:** Depending on risks to participants you may need to consider having additional support for participants during/after the study. Consider whether your project would require additional support, e.g., external counselling available to participants. Please advise what support will be available.
- **4.0 INVESTIGATORS' QUALIFICATIONS, EXPERIENCE AND SKILLS:** List the academic qualifications and outline the experience and skills relevant to this project that the researchers and any supporting staff have in carrying out the research and in dealing with any emergencies, unexpected outcomes, or contingencies that may arise.
- **5.2 HOW WILL THE ANONYMITY OF THE PARTICIPANTS BE RESPECTED?** Please bear in mind that where the sample size is very small, it may be impossible to guarantee anonymity/confidentiality of participant identity. Participants involved in such projects need to be advised of this limitation.
- **5.3 LEGAL LIMITATIONS TO DATA CONFIDENTIALITY:** Participants need to be aware that confidentiality of information provided can only be protected within the limitations of the law i.e., it is possible for data to be subject

to subpoena, freedom of information claim or mandated reporting by some professions. Depending on the research proposal you may need to specifically state these limitations.

6.0 DATA/SAMPLE STORAGE, SECURITY AND DISPOSAL: For the purpose of this section, "Data" includes that in a raw or processed state (e.g. interview audiotape, transcript or analysis). "Samples" include body fluids or tissue samples.

8.0 PLAIN LANGUAGE STATEMENT: Written information in plain language that you will be providing to participants, outlining the phases and nature of their involvement in the project and inviting their participation. Please note that the language used must reflect the participant age group and corresponding comprehension level.

9.0 INFORMED CONSENT FORM: This is a very important document that should be addressed by participants to researchers, requiring participants to indicate their consent to specific statements, and give their signature.

FOR FURTHER INFORMATION AND NOTES ON THE DEVELOPMENT OF PLAIN LANGUAGE STATEMENTS AND INFORMED CONSENT FORMS, PLEASE CONSULT THE DCU REC WEBSITE: WWW.DCU.IE/RESEARCH/ETHICS

1.	ADM	INISTRA	ATIV	E DETAILS			
_	ROJECT	_		Research Project Practical Class Student Research F (please give details, V Research Masters PhD		☐ Clinical T ☐ Other - <i>I</i>	Consultancy Trial Please Describe:
Project	Startda	nte: 15-0	01-20	11	Project E	nd date: 30	0-09-2011
1.1 PRINCIF		TIGATOR		TACT DETAILS (see G	Guidelines)		
TITLE	SURI	VAME		FIRST NAME	PHONE	FAX	EMAIL
Dr.	Wood	ds		Catherine	017008008		Catherine.woods@dcu.ie
OTHER		GATORS:					
TITLE				FIRST NAME	PHONE 0871254709	FAX	EMAIL
Ms.	Martin	<u>1</u>		Antonia	08/1254/09		martia35@mail.dcu.ie
(NB - if must att	Nursing, ach the	please note	e all s the N	OOL/ CENTRE: tudents including PhD's lursing Ethics Advisory	Health & Human	n Performance	
1.2	WILL	THE RESE	ARCI	H BE UNDERTAKEN O	ON-SITE AT DUB	LIN CITY UNI\	/ERSITY?
	√	YES		NO (If N	NO, give details of	off-campus lo	cation.)
1.3				BEING SUBMITTED T Y SUBMITTED TO AN			TTEE, OR HAS
		YES	\checkmark	NO (If)	/ES, please provid	de details and d	copies of approval(s) received etc.
DECLA	RATION	N BY INVE	STIG	ATORS			

The information contained herein is, to the best of my knowledge and belief, accurate. I have read the University's current research ethics guidelines, and accept responsibility for the conduct of the procedures set out in the attached application in accordance with the guidelines, the University's policy on Conflict of Interest and any other condition laid down by the Dublin City University Research Ethics Committee or its Sub-Committees. I have

attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my obligations and the rights of the participants.

If there any affiliation or financial interest for researcher(s) in this research or its outcomes or any other circumstances which might represent a perceived, potential or actual conflict of interest this should be declared in accordance with Dublin City University policy on Conflicts of Interest.

I and my co-investigators or supporting staff have the appropriate qualifications, experience and facilities to conduct the research set out in the attached application and to deal with any emergencies and contingencies related to the research that may arise.

Signature(s):	
Principal investigator(s):	
Print name(s) in block letters: Date:	

2. PROJECT OUTLINE

2.1 LAY DESCRIPTION (see Guidelines)

Ten long-term adheres of the DCU phase IV cardiac rehabilitation programme, HeartSmart, will be recruited and trained as Peer Mentors. Training will take place over two half days in DCU and will cover the following topics: Exercise self-efficacy, benefits and recommended levels of physical activity, practical training of the performance of HeartSmart exercises, overcoming barriers. On completion of training, participants will:

- Understand and embrace the duties of a Peer Mentor in the HeartSmart programme;
- 2. Have increased knowledge of various aspects of physical activity (benefits, recommended levels, FITT principle, RPE);
- 3. Have a heightened awareness of the barriers to participating in physical activity and methods to overcome these barriers;
- 4. Be competent to assist newcomers complete exercises in the correct manner;
- 5. Be confident and enthusiastic about commencing their role as Peer Mentors.

The peer mentors, under the supervision of HeartSmart staff, will then mentor twenty newcomers to HeartSmart over a six week period. These twenty newcomers will be recruited in the usual fashion i.e. referral from phase III CR programmes. The following outcomes will be measured:

- a) retention and participation rates;
- b) minutes of physical activity;
- c) exercise self-efficacy;
- d) social support;
- e) health profile

The peer mentors will also attend two 1-hour support meetings during the 6-week intervention. These will take place at weeks 2 and 4. The purpose of these is to offer the Peer Mentors the opportunity to discuss their progress to date, seek assistance with any issues that may have arisen and request additional support if required.

Current physical activity levels of the peer mentors will be measured both subjectively and objectively before the training commences and after the 6-week intervention. Focus groups will also be carried out with the Peer Mentors following the 6-week intervention to evaluate their experience.

2.2 AIMS OF AND JUSTIFICATION FOR THE RESEARCH (see Guidelines)

Cardiac rehabilitation is a comprehensive therapeutic exercise and patient-education programme, predominantly for patients with CHD; in particular those who have survived a myocardial infarction, have undergone coronary artery bypass graft surgery, or have had catheter-based interventions. Currently in Ireland, after discharge from acute hospitals, patients enter an 8-10 week hospital-based cardiac rehabilitation programme — Phase III. This involves a gradual increase in physical activity, continuation of risk-factor modifications and development of maintenance programmes.

Long-term adherence to physical activity following a cardiac event remains uncommon (Beswick, 2004). In Ireland there is a very limited number of formal Phase IV CBCR programmes (Delaney, 2006). Programmes that are available are therefore often

oversubscribed, leading to reduced support for participants. Peer mentoring is based on an idea that individuals who share similar problems have a unique resource to offer one another (Medevene, 1992). Studies carried out with long-term adherers to Phase IV CR have revealed that they are willing to assist new participants sustain physical activity levels (De Angelis et al. 2008, Clark et al. 2004).

The aim of this study is to train long-term adherers of a Phase IV Community-Based Cardiac Rehabilitation (CBCR) programme to become peer mentors and act as such to newcomers of the programme for a 6-week period. The study will assess the impact of the intervention on both the Peer Mentors and the Newcomers.

For the Peer Mentors, our primary objective is to assess their perception of the Peer Mentoring Experience. This information will be established via focus groups. The secondary objective is to measure volume of physical activity per week.

For Programme Newcomers, our primary objective is to measure a) programme attendance (participation and retention) and b) exercise self-efficacy. Secondary objectives are to measure c) volume of physical activity per week, d) number of subjects reaching current recommended levels of physical activity and e) health related quality of life.

Hypotheses:

- 1. Peer Mentors will have a positive experience in their new role;
- 2. Peer Mentors will increase their volume of physical activity per week as a result of the knowledge gained in the training programme;
- 3. The retention and participation of the 20 newcomers to the programme will excel that of the 20 pervious newcomers;
- 4. The exercise self-efficacy of newcomers will improve following the 6-week intervention period;
- 5. Newcomers will show improvements in volume of physical activity per week, number of subjects reaching current recommended levels of physical activity and health profile following the 6-week intervention.

2.3 PROPOSED METHOD (see Guidelines)

<u>Recruitment:</u> Peer Mentors will be recruited from the HeartSmart programme following a screening process (see 2.4 below). Recruitment of new participants to the programme will not be altered although they will be informed of the new element of the programme when commencing and consent sought to act as participants in the study (see 2.4 below).

Assessments:

Both Peer Mentors and Newcomers will be required to complete the following questionnaire and test at baseline and 6-weeks:

Physical activity levels: Actigraph GT1M activity monitor - 7 days (Accelerometer, objective measure of physical activity level).

International Physical Activity Questionnaire (IPAQ, subjective measure of physical activity).

A copy of the Physical Activity protocols can be found in appendix 1.

On completion of the study i.e. following the 6-week intervention, Peer Mentors will take part in a focus group. This is a qualitative analysis to assess their perception of the training and its implementation. Sample questions are included in Appendix 2.

Newcomers will be required to complete the following additional questionnaires at baseline and 6-weeks:

Behaviour Change: Exercise Self-Efficacy
Health Related Quality of Life: SF-12 Questionnaire
ERA 12 Questionnaire

A copy of the behaviour change and health related quality of life protocols can be found in appendix 3.

Programme attendance of the newcomers will be measured using the HeartSmart attendance sheets. These figures will be compared against figures for the previous 20 newcomers who joined the programme prior to the addition of Peer Mentoring.

Peer Mentor Training

Peer mentors will initially attend seven hours training, taking place over two half days. The training programme will cover topics such as exercise self-efficacy, benefits and recommended levels of physical activity; practical training of the performance of HeartSmart exercises, overcoming barriers. Following training, the peer mentors will act as a support for newcomers to the HeartSmart programme for a period of six weeks. Duties will include:

- showing new participants around the facility;
- building rapport with them;
- greeting them at the beginning of programme and checking in with them at the tea break at the end of each class:
- reinforcing what to do at each exercise stations;
- providing encouragement and support;
- offering solutions and advise to overcome barriers to attendance;
- encouraging them to perform at the appropriate intensity;
- reinforcing the benefits of remaining physical activity;
- sharing personal experiences where appropriate to enforce points;
- reporting back to the research team.

Programme Newcomers

Apart from the additional questionnaires and physical activity measurement, newcomers will be inducted and instructed in accordance to the standard procedure of all newcomers to the HeartSmart programme. The addition of the Peer Mentors will provide an additional support in addition to that already provided by the HeartSmart staff.

2.4 PARTICIPANT PROFILE (see Guidelines)

Ten Peer Mentors will be recruited from the HeartSmart Class (inclusion criteria below). As varied a mix of age and gender as possible will be trained. This will leave a ratio of 2 to one. Twenty participants will be recruited from phase III CR programmes as is the current procedure in the HeartSmart programme. The age and gender of the new participants will therefore not be determined by the research team.

2.5 MEANS BY WHICH PARTICIPANTS ARE TO BE RECRUITED (see Guidelines)

Invitation to become peer mentors will be offered to all eligible participants of the CBCR programme through a recruitment flyer (appendix 4). Inclusion criteria:

- Attendance at CBCR programme for at least 12 months;
- Good communication skills, sociable, motivation (appendix 5);
- Willingness to be trained and work as peer mentors.

Recruitment of new participants to the programme will not be altered.

2.6 PLEASE EXPLAIN WHEN, HOW, WHERE, AND TO WHOM RESULTS WILL BE DISSEMINATED, INCLUDING WHETHER PARTICIPANTS WILL BE PROVIDED WITH ANY INFORMATION AS TO THE FINDINGS OR OUTCOMES OF THE PROJECT?

The results will be used to form the basis of a master's thesis and will be presented at a minimum of one international conference and will be submitted for publication in peer reviewed scientific journals. The identity of individual subjects will not be divulged and will only be presented as part of a group.

2.7						nission to gain access to another location, ers of approval to be provided when available.
		YES		NO	\checkmark	NOT APPLICABLE
obtaine	١.	ES, please s	specify fr	om whor	n and attach a	copy. If NO, please explain when this will be

2.8 HAS A SIMILAR PROPOSAL BEEN PREVIOUSLY APPROVED BY THE REC?

	(If YES, please state both the REC Application Number and Project Title)							
3.	RISK AND RISK MANAGEMENT							
3.1	ARE THE RISKS TO SUBJECTS AND/OR RESEARCHERS ASSOCIATED WITH YOUR PROJECT GREATER THAN THOSE ENCOUNTERED IN EVERYDAY LIFE? ☐ YES ✓ NO If YES, this proposal will be subject to full REC review							
	If NO, this proposal may be processed by expec	dited admi	nistrative review					
3.2	DOES THE RESEARCH INVOLVE:	YES	NO					
	 use of a questionnaire? (attach copy)? interviews (attach interview questions)? observation of participants without their knowledge? participant observation (provide details in section 2)? audio- or video-taping interviewees or events? access to personal and/or confidential data (including student, patient or client data) without the participant's specific consent? administration of any stimuli, tasks, investigations or procedures which may be experienced by participants as physically or mentally painful, stressful or unpleasant during or after the research process? performance of any acts which might diminish the self-esteem of participants or cause them to experience embarrassment, regret or depression? investigation of participants involved in illegal activities? procedures that involve deception of participants? administration of any substance or agent? use of non-treatment of placebo control conditions? collection of body tissues or fluid samples? collection and/or testing of DNA samples? participation in a clinical trial? administration of ionising radiation to participants? 	>>						
3.3 Guidelir	POTENTIAL RISKS TO PARTICIPANTS AND RISK MANAGEMENT PROCEDURED (nes) Exercise testing carries with it a very small risk of abnormal heart rhythme attack or death in less than one in 30,000 people. This risk is increased, he with this subject cohort. Participants may experience some anginal symptom as an increased blood pressure or arrythmias. With all exercise sessions, there is a risk of delayed onset of muscle so particularly in untrained individuals. Programme Newcomers will be advised and training to exercise at their own level of intensity and to increase progress help minimize any discomfort. Participants may also experience some discomfort due to the effects of esuch as increased respiration and sweating.	oreness, sed that ad given sively to						
3.4	ARE THERE LIKELY TO BE ANY BENEFITS (DIRECT OR INDIRECT) TO PARTIC FROM THIS RESEARCH?	CIPANTS						
	√ YES □ NO							

YES

NO

The Peer Mentors will benefit from increased knowledge received in the training course. The new participants, as with all new participants to HeartSmart, will benefit increased

knowledge regarding recommended levels of physical activity for people living with CHD and methods of achieving these recommendations. They will also benefit from advice on how to change their own behaviour, how to overcome common barriers to exercise. They will meet other people in similar situations to themselves and will be provided with a supportive and safe environment in which they can feel free to exercise.

4.		ESTIGAT ox. 200 words			ATIONS, EXPERIENCE AND SKILLS
		YES	√	NO	(If YES, please provide further details.)
3.9	DO Y	OU PROPO	SE TO	OFFER PAYME	ENTS OR INCENTIVES TO PARTICIPANTS?
3.8	I do		ate the	PANTS (see G need for add	suidelines) ditional support for participants involved in the
	Prince Dr. Con Rese Ms. stude Bi-we meet	cipal Investicatherine Wearch Stude Antonia Ment (Year 3)	gator loods, S ent artin, B) ngs tak de oppo	Senior Lecture Sc in Health e place between tunities to as	r in Exercise Psychology and Physical Activity n, Fitness and Leisure (2000), current M.Sc een the PI and the student researcher. These seess progress, give feedback and monitor the
3.7		ITORING (s		elines)	
3.6	The asperming of the emer Adva even camp	school of ects of this e or injuries we re research rgency cra anced Card at of a serio ous. All su	Health study and an ill be acted to team she cartiliac Life us advertises where the team of the team o	and Human Ind an emerged dressed by a or the on-site and defibrile Support) will erse outcome,	(see Guidelines) Performance has the facilities to deal with all ency plan is in place to for adverse events. All in individual trained in first aid (either a member e staff). The laboratory is equipped with a lator. An individual trained in first aid (of libe present during each test. In the unlikely the subject will be brought to the VHI clinic or to have the usual care with their hospital (as is ion).
		YES	$\sqrt{}$	NO	(If YES, please describe.)
3.5				an off-campus	D RESEARCHERS? (e.g. risk of infection or where location)

<u>Dr. Catherine B. Woods</u> is Senior Lecturer in Exercise Psychology, Physical Activity and Health at Dublin City University. Dr. Woods' research examines Active Living, the Built Environment, Physical Activity for Health and the Policy Agenda.

Relevant Experience

Dr. Woods' research interests include examining the public health impact of physical inactivity, identifying factors that influence the level of participation in physical activity and examining the psychosocial benefits of physical activity, especially in relation to young people. Her work on the Take PART (Physical Activity Research for Teenagers) study has led to numerous publications and much national media interest. She has published three book chapters, ten peer-reviewed journal articles, supervised three Ph.D and two M.Sc. research students to completion, and presented her work at numerous national and international conferences.

Ms. Antonia Martin was awarded a 2.1 Bachelor of Science Degree in Health, Fitness & Leisure from the Institute of Technology, Tralee in 2000. She currently works as a Sport & Recreation Officer with Dublin City Councils' Local Sports Partnership.

5.	CONFIDENTIALITY/ANONYMITY	
5.1	WILL THE IDENTITY OF THE PARTICIP	ANTS BE PROTECTED?
	√ YES □ NO	(If NO, please explain)
IF YOU	U ANSWERED YES TO 5.1, PLEASE ANSW	VER THE FOLLOWING QUESTIONS:
5.2	HOW WILL THE ANONYMITY OF Guidelines)	THE PARTICIPANTS BE RESPECTED? (see
	To ensure participant's confidentiality of consent statements will be signed by the study. Participants will be reassured that of confidence. In order to do this, all procorrespond to the data collected from that The information gathered from the study in Dublin City University. All personal det	will not be violated, individual confidentiality and ne researchers and given to all participants in the all information provided will be treated in the strictest articipants will be given an ID number, which will t point on. This ensures confidentiality is maintained. will be entered into a password protected database alls will be stored in a secure place, which can only 0 number on the questionnaire can be used by the e maintaining confidentiality from others.
	In the qualitative study, no identifiers will be	be associated with data collected.
5.3	LEGAL LIMITATIONS TO DATA CON information in the plain language stateme.	NFIDENTIALITY: (Have you included appropriate nt and consent form? See Guidelines)
	√ YES □ NO	(If NO, please advise how participants will be advise
		n the plain language statement. n only be protected within the limitations of the law. bpoena, freedom of information claim or mandated
6	DATA/SAMPLE STORAGE, SECUR	ITY AND DISPOSAL (see Guidelines)
<u> </u>	DATAGAMI EL GIGRAGE, GEGGR	TIT AND DIGITOOAL (see Guidelines)
6.1 stored	HOW WILL THE DATA/SAMPLES BE S	STORED? (The REC recommends that all data be
	Stored at DCU Stored at another site purpose)	(Please explain where and for what
6.2	WHO WILL HAVE ACCESS TO DATA/S.	AMPLES?
	Access by named researchers only	\checkmark
	Access by people other than named repurpose)	searcher(s) [(Please explain who and for what
	Other :	(Please explain)

6.3 IF DATA/SAMPLES ARE TO BE DISPOSED OF, PLEASE EXPLAIN <u>HOW</u>, <u>WHEN</u> AND BY WHOM THIS WILL BE DONE?

Data will be stored for 5 years following the completion of the study. The raw data (i.e. questionnaire, tapes, physical measurement data sheets) will be stored in DCU in a specific locked area in the School of Health and Human Performance. The electronic data will be stored by the principal investigators on password protected computers. All data will be destroyed by the principal investigators.

FUNDING 7. 7.1 **HOW IS THIS WORK BEING FUNDED?** The research is being undertaken voluntarily by Antonia Martin as part of a research masters. 7.2 PROJECT GRANT NUMBER (If relevant and/or known) Not relevant DOES THE PROJECT REQUIRE APPROVAL BEFORE CONSIDERATION FOR FUNDING 7.3 BY A GRANTING BODY? YES NO HOW WILL PARTICIPANTS BE INFORMED OF THE SOURCE OF THE FUNDING? 7.4 7.5 DO ANY OF THE RESEARCHERS, SUPERVISORS OR FUNDERS OF THIS PROJECT HAVE A PERSONAL, FINANCIAL OR COMMERCIAL INTEREST IN ITS OUTCOME THAT MIGHT COMPROMISE THE INDEPENDENCE AND INTEGRITY OF THE RESEARCH, OR BIAS THE CONDUCT OR RESULTS OF THE RESEARCH, OR UNDULY DELAY OR OTHERWISE AFFECT THEIR PUBLICATION? YES (If Yes, please specify how this conflict of interest will be addressed.)

8. PLAIN LANGUAGE STATEMENT (Approx. 400 words – see Guidelines)

For Peer Mentors

Introduction to research

The purpose of this study is to examine the effects of the introduction of Peer Mentors on retention and participation rates of participants in a Phase IV community-based cardiac rehabilitation programme (HeartSmart). Current long-term adherers of the HeartSmart programme will be recruited and trained as Peer Mentors. They will then, under the supervision of the research team and the HeartSmart team, mentor newcomers to the HeartSmart programme over a 6 week period.

Involvement in this research study will involve the following:

As part of the recruitment process you will be required to complete a personality survey and a questionnaire seeking information on any past mentoring experience (although past mentoring experience is not essential). This questionnaire is designed to ensure that the peer mentors trained will be capable of carrying out the necessary tasks.

Physical activity levels of the 10 recruited peer mentors will be assessed before and after the study period using both a questionnaire and also by a small device that measures how quickly and often you move for a period of 7 days. This device is about the size of a match box and will be worn around your waist.

The recruited peer mentors will attend 2 half day training sessions that will take place in Dublin City University. Training topics will include both practical and theoretical aspects incorporating exercise self-efficacy, benefits and recommended levels of physical activity, practical training of the performance of HeartSmart exercises and overcoming barriers. On completion of training, participants will:

- 6. Understand and embrace the duties of a Peer Mentor in the HeartSmart programme;
- Have increased knowledge of various aspects of physical activity (benefits, recommended levels, (Frequency, Intensity, Time and Type) principle, rate of perceived exertion);
- 8. Have a heightened awareness of the barriers to participating in physical activity and methods to overcome these barriers;
- 9. Be competent to assist newcomers complete exercises in the correct manner;
- 10. Be confident and enthusiastic about commencing their role as Peer Mentors.

On completion of training, the 10 recruits will act as peer mentors for 20 newcomers to the HeartSmart programme. Duties will include:

- showing new participants around the facility;
- building rapport with them;
- greeting them at the beginning of programme and checking in with them at the tea break at the end of each

class;

- reinforcing what to do at each exercise stations;
- providing encouragement and support;
- offering solutions and advise to overcome barriers to attendance;
- encouraging them to perform at the appropriate intensity;
- reinforcing the benefits of remaining physical activity;
- sharing personal experiences where appropriate to enforce points;

- reporting back to the research team.

Peer mentors will also be required to attend two 1-hour support meetings with the research team during the period of the 6 week intervention (at weeks 2 and 4). These support meetings are designed to offer the peer mentors the opportunity to discuss their progress to date, seek assistance with any issues that may have arisen and request additional support if required.

Potential risks to participants from involvement in the research study

Carrying out the role of Peer Mentor may result in reduced effort to your own physical exertion in the HeartSmart programme for the 6-week period. To assist you maintain your own level of physical fitness, you will be entitled to attend an additional 2 sessions per week in the DCU gym free of charge at a time of your choice.

Benefits to participants from involvement in the research study

You will benefit from the additional knowledge received during the training programme. You will also gain experience in the role of a peer mentor and experience satisfaction from assisting newcomers participate and adhere to the HeartSmart programme.

Confidentiality

The confidentiality of peer mentors will be respected at all stages of the research study. Each Peer Mentor will be assigned an identification number under which all your details will be stored in a secure file and saved in a passport protected file in a computer at DCU. Only the investigators working on this research project will have access to this file. However, confidentiality of information provided can only be protected within the limitations of the law. It is possible for the data to be subject to subpoena, freedom of information claim or mandated reporting by some profession.

Data Storage

All data collected will be stored on the DCU campus for 5 years following the completion of the research study, in line with regulations. The principal investigator will then destroy the data.

Voluntary participation

Involvement in this research study is on a completely voluntary basis. Withdrawal at any time will be accepted and there will be no penalty should you wish to do so.

If you have any queries regarding the conduct of this project you can contact:

The Secretary, Research Ethics Committee, Office of the Vice-President for Research,

Dublin City University,

Tel: 01-7008000, Fax: 01-7008002

For Programme Newcomers:

Introduction to research

The purpose of this study is to examine the effects of the introduction of Peer Mentors on

retention and participation rates of participants in a Phase IV community-based cardiac

rehabilitation programme (HeartSmart). Current long-term adherers of the HeartSmart

programme will be recruited and trained as Peer Mentors. They will then, under the

supervision of the research team and the HeartSmart team, mentor newcomers to the

HeartSmart programme over a 6 week period.

Involvement in this research study will involve the following:

In addition to the usual assessments undertaken by all newcomers to the HeartSmart

programme, you will be required to complete additional questionnaires concerning exercise

self-efficacy, health related quality of life and physical activity levels. Physical activity

levels will also be measured objectively pre and post study using a small device that

measures how quickly and often you move for a period of 7 days. This device is about the

size of a match box and will be worn around your waist.

Confidentiality

The confidentiality of subjects will be respected at all stages of the research study. Each

subject will be assigned an identification number under which all your details will be stored

in a secure file and saved in a passport protected file in a computer at DCU. Only the

investigators working on this research project will have access to this file. However,

confidentiality of information provided can only be protected within the limitations of the

law. It is possible for the data to be subject to subpoena, freedom of information claim or

mandated reporting by some profession.

Data Storage

All data collected will be stored on the DCU campus for 5 years following the completion of

the research study, in line with regulations. The principal investigator will then destroy the

data.

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Voluntary participation

Involvement in this research study is on a completely voluntary basis. Withdrawal at any time will be accepted and there will be no penalty should you wish to do so.

If you have any queries regarding the conduct of this project you can contact:

The Secretary, Research Ethics Committee, Office of the Vice-President for Research, Dublin City University, Tel: 01-7008000, Fax: 01-7008002

9. INFORMED CONSENT FORM (Approx. 300 words – see Guidelines)

For Peer Mentors:

PROJECT TITLE: Examination of the effects of the introduction of Peer Mentoring in a Phase IVCommunity-Based Cardiac Rehabilitation Programme.

The study will be undertaken at Dublin City University.

PRINCIPAL INVESTIGATORS:

Dr.CatherineWoods 01-7008008 catherine.woods@dcu.ie

Ms. Antonia Martin 087-1254709 antonia.martin35@mail.dcu.ie

I am being asked to participate in this research study. The study has the following purpose:

To examine the effects of the introduction of Peer Mentors on retention and participation rates of participants in a Phase IV community-based cardiac rehabilitation programme (HeartSmart). Current long-term adherers of the HeartSmart programme will be recruited and trained as Peer Mentors. They will then, under the supervision of the research team and the HeartSmart team, mentor newcomers to the HeartSmart programme over a 6 week period.

This is what will happen during the research study:

- 8. I will complete a pre-screening questionnaire regarding personality traits and previous mentoring experience as part of the recruitment process.
- 9. I will be required to attend DCU for initial assessments. This will include a questionnaire regarding my current level of physical activity and I will also be

required to wear a motion sensor (a small instrument the size of a match box) on my waist for 7 days to count the number of steps I take each day.

- 10. I will be required to attend 2 half day training sessions in DCU covering the following topics: exercise self-efficacy, benefits and recommended levels of physical activity, practical training of the performance of HeartSmart exercises and overcoming barriers.
- 11. I will act as a peer mentor to newcomers of the HeartSmart programme for a 6-week period. Duties will include:
 - showing new participants around the facility;
 - building rapport with them;
 - greeting them at the beginning of programme and checking in with them at the tea break at the end of each class;
 - reinforcing what to do at each exercise stations;
 - providing encouragement and support;
 - offering solutions and advise to overcome barriers to attendance;
 - encouraging them to perform at the appropriate intensity;
 - reinforcing the benefits of remaining physical activity;
 - sharing personal experiences where appropriate to enforce points;
 - reporting back to the research team.
- 12. I will be required to attend two 1-hour support meetings during the 6-week intervention (at weeks 2 and 4) to discuss my progress, seek assistance with any issues that may have arisen and request additional support if required.
- 13. At the end of the 6-week intervention, I will be required to again complete a questionnaire regarding my current level of physical activity and I will also be required to wear a motion sensor (a small instrument the size of a match box) on my waist for 7 days to count the number of steps I take each day.
- 14. At the end of the 6-week intervention, I will also be required to attend a 1-hour focus group to assess my experience of the peer mentoring programme.

Confirmation of particular requirements:

Participant, please complete the following (Circle Yes or No for each question)

Have you read or had read to you the Plain Language Statement?

Yes / No

Do you understand the information provided?

Yes / No

Have you had an opportunity to ask questions and discuss this study?

Yes / No

Have you received satisfactory answers to all your questions?

Yes / No

VOLUNTARY STATUS: Involvement in this research study is on a completely voluntary basis. While you are encouraged to complete the study, withdrawal at any time will be accepted and there will be no penalty should you wish to do so

CONFIDENTIALITY: The confidentiality of subjects will be respected at all stages of the research project. Each subject will be assigned an identification number under which all their details will be stored in a secure file and saved in a passport protected file in a computer at DCU. Only the investigators working on this research project will have access to this file. However, confidentiality of information provided can only be protected within the limitations of the law. It is possible for the data to be subject to subpoena, freedom of information claim or mandated reporting by some profession.

Signature:

I have read and understood the information in this form. My questions and concerns have been answered by the researchers and I have a copy of this consent form. Therefore, I consent to take part in this research project.

Participants Signature:	
Name in BLOCK CAPITALS:	
Witness:	
Date:	

For Programme Newcomers:

PROJECT TITLE: Examination of the effects of the introduction of Peer Mentoring in a Phase IV Community-Based Cardiac Rehabilitation Programme.

The study will be undertaken at Dublin City University.

PRINCIPAL INVESTIGATORS:

Dr. Catherine Woods: 01-7008008 / catherine.woods@dcu.ie

Ms. Antonia Martin: 087-1254709 / antonia.martin35@mail.dcu.ie

I am being asked to participate in this research study. The study has the following

purpose:

To examine the effects of the introduction of Peer Mentors on retention and participation

rates of participants in a Phase IV community-based cardiac rehabilitation programme

(HeartSmart). Current long-term adherers of the HeartSmart programme will be recruited

and trained as Peer Mentors. They will then, under the supervision of the research team and

the HeartSmart team, mentor newcomers to the HeartSmart programme over a 6 week

period.

This is what will happen during the research study:

1. I will be required to attend DCU for initial assessments. This will include a

questionnaires regarding exercise self-efficacy, health related quality of life, and my

current level of physical activity. My physical activity level will also be measured

objectively using a motion sensor (a small instrument the size of a matchbox). I will

be required to wear this on my waist for 7 days to count the number of steps I take

each day.

2. I will repeat the above assessments after 6-weeks if I am still attending the

HeartSmart programme.

Confirmation of particular requirements:

Participant, please complete the following (Circle Yes or No for each question)

Have you read or had read to you the Plain Language Statement?

Yes / No

Do you understand the information provided?

Yes / No

Have you had an opportunity to ask questions and discuss this study?

Yes / No

Have you received satisfactory answers to all your questions?

Yes / No

VOLUNTARY STATUS: Involvement in this research study is on a completely voluntary

basis. While you are encouraged to complete the study, withdrawal at any time will be

accepted and there will be no penalty should you wish to do so

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CONFIDENTIALITY: The confidentiality of subjects will be respected at all stages of the research project. Each subject will be assigned an identification number under which all their details will be stored in a secure file and saved in a passport protected file in a computer at DCU. Only the investigators working on this research project will have access to this file. However, confidentiality of information provided can only be protected within the limitations of the law. It is possible for the data to be subject to subpoena, freedom of information claim or mandated reporting by some profession.

Signature:

I have read and understood the information in this form. My questions and concerns have been answered by the researchers and I have a copy of this consent form. Therefore, I consent to take part in this research project.

Participants Signature:	
Name in BLOCK CAPITALS:	
Witness:	
Date:	

Dublin City University Ollscoil Chathair Bhaile Átha Cliath



Dr. Catherine Woods School of Health and Human Performance

≱ 10th February 2011

REC Reference:

DCUREC/2010/108

Proposal Title:

Examination of the effects of the introduction of Peer

Mentoring in a Phase IV Community-Based Cardiac

Rehabilitation Programme

Applicants:

Dr. Catherine Woods, Ms. Antonia Martin

Dear Catherine,

Further to expedited review, this research proposal is approved. Should substantial modifications to the research protocol be required at a later stage, a further submission should be made to the REC.

Yours sincerely,

Dr. Donal O'Mathuna

Chair

DCU Research Ethics Committee

Office of the Vice-President for Research

Office of the Vice-President for Research

Dublin City University, Dublin 9, Ireland

T+353 1 700 8000 F+353 1 700 8002 E research@dcu.ie www.dcu.ie

Appendix 10 – Peer Mentor Recruitment Flyer

PEER MENTORS REQUIRED FOR THE HEARTSMART PROGRAMME



- Have you been attending HeartSmart for longer than 6 months?
- Would you like to support newcomers to the HeartSmart?
- Would you be willing to partake in a 10-hour Peer Mentor training programme.

If you have answered yes to the above questions, please fill in an application form and return to a member of the Research or HeartSmart team.

Appendix 11 - Peer Mentor Application Form

Peer Mentor Application Form

Name:	-
Address:	
Contact Number:	
Occupation:	_
Do you have any teaching/coaching/mentoring experience? Yes	☐ No
If yes, please describe briefly your experience; include a brief descri of experience, approximate date and length of time.	ption of the type
Please tell us why you want to be in this program and how you think will benefit you.	the program

Thank you for taking the time to complete this application

Appendix 12 – Peer Mentor Training Schedule

PEER MENTOR TRAINING

Name:	Antonia Martin	Date: January 2011
Location:	Syndicate Room, DCU Sports Club	Time/Duration: 8 Hours
Group:	HeartSmart Participants	Number of Learners: 9
Topic:	Training Programme for Peer Mentors	

Aim:

To provide long-term adherers of the HeartSmart programme the knowledge, skills and confidence to act as Peer Mentors to newcomers to the Programme.

Objectives

- 1. Participants will understand the purpose of the study and the key concepts of mentoring.
- 2. Participants will agree on the role & responsibilities of Peer Mentor and the knowledge, skills and attitudes required.
- 3. Participants will have a clear understanding of the benefits of physical activity following a cardiac event and the recommended levels at which it should be performed.
- 4. Participants will have a clear understanding of Rate of Perceived Exertion.
- 5. Participants will be aware of the barriers to participating in physical activity following a cardiac event.
- 6. Participants will understand exercise self-efficacy and will be aware of how it will be used in their role as a Peer Mentor.
- 7. Participants will understand the concept of SMART goals and the benefits of setting goal.
- 8. Participants will understand the correct technique and teaching points of a number of exercises performed in the HeartSmart Class.
- 9. Participants will reveal confidence in their ability to commence their role as peer mentors.

Day 1

- Role and Responsibilities of a Peer Mentor
- Benefits and recommendations for Physical Activity Theory & Practical (RPE)
- Barriers to Participating in Physical Activity

Time	Topic	Tutor Activity	Learner Activities	Assessment	Resources
9.00 -	Introduction & Ice-	Welcoming, explaining, pairing	Listening to each other,	Recalling	PowerPoint
9.25	breaker, outline of	participants, encouraging feedback,	feeding back to the group.	information about	
(25	aims & objectives	listening.		each other.	
mins)	-	PowerPoint presentation, actively			
		encourage questions			
9.25 –	What is Peer	Tutor lead presentation using PowerPoint.	Listening	Visual and verbal	PowerPoint
9.35	Mentoring	Actively encourage questions.	_	display of	
(10	_			understanding.	
mins)				_	
9.35 –	Roles, knowledge,	Activating brainstorm, listening, writing all	Brainstorming, working in	Participation,	Flipchart,
10.05	skills & attitudes of	suggestions on flipchart, grouping	groups, listening to each	visual and verbal	markers,
(30	a peer mentor	participants into 3 groups, checking in to	other, feeding back to the	display of	bluetac,
mins)		ensure they understand the task,	group.	understanding.	PowerPoint
		encouraging feedback.		_	
10.05-	Pros & Cons for	Activating brainstorm to establish pros and	Brainstorming, engaging	Participation,	Flipchart,
10.20	Mentors	cons and possible solutions to problems,	in discussion.	visual and verbal	markers,
(15		emphase support from research team.		display of	bluetac,
mins)				understanding.	PowerPoint

Time	Topic	Tutor Activity	Learner Activities	Assessment	Resources
10.20 – 10.30 (10 mins)	Benefits of PA following a cardiac event	Activating brainstorm, listening, writing all suggestions on flipchart, probing questions, encouraging full group participation. Linking concept to new role as peer mentors. PowerPoint to highlight key benefits	Brainstorming, listening to each other.	Participation, visual and verbal display of understanding.	Handouts, Flipchart, PowerPoint.
10.30 – 10.50 (20 mins)	Barriers to participating in PA following a cardiac event.	Activating brainstorm, listening, writing all suggestions on flipchart, probing questions, encouraging full group participation. Linking concept to new role as peer mentors. PowerPoint to highlight barriers.	Brainstorming, listening to each other.	Visual and verbal display of understanding.	Flipchart, PowerPoint.
10.50 – 11.20	30 Minute Break				
11.20 – 11.40 (20 mins)	Overcoming barriers	Activating brainstorm on overcoming barriers.	Listening, discussing, offering solutions to barriers in role-play.	Participation in session. Verbal and visual display of understanding of exercise.	Handouts, PowerPoint, Flipchart
11.40 – 11.55 (15 mins)	Recommended levels of PA	PowerPoint presentation to outline recommended frequency of PA and explain RPE. Encouraging participant input of their own levels and ideals.	Active listening and participation.	Participation, visual and verbal display of understanding.	Handouts, PowerPoint.

Time	Topic	Tutor Activity	Learner Activities	Assessment	Resources
11.55 –	Move rooms	Room Set up	Prepare (correct clothing		
12.15			etc.)		
12.15 –	Shuttle walk test	Clearly outline test and required	Complete test using RPE	Completion of	Cones, water,
1.00		participant activity. Stress the importance	to determine intensity.	test and	CD
(30		of using RPE.		appropriate use of	
mins)				RPE scale	

Day 2: Exercise Self-Efficacy & Goal Setting

Time	Topic	Tutor Activity	Learner Activities	Assessment	Resources
9.00 -	Welcome back.	Display list of topics covered in previous	Active participation, query	Visual and verbal	PowerPoint
9.30	Review of previous	training. Invite questions and clarify any	misunderstandings.	display of	
(30	days training.	queries or misunderstandings.		understanding.	
mins)					
9.30 -	Exercise self-	PowerPoint presentation to explain	Listening, recalling own	Participation,	PowerPoint,
10.00	efficacy	exercise self-efficacy, activating	experiences, sharing	visual and verbal	Handouts.
(30		discussion, probing questions, encouraging	information, connecting	display of	
mins)		full group participation. Linking concept	self-efficacy with their	understanding.	
		to new role as peer mentors.	duties as a peer mentor.		
10.00 -	SMART Goals	Explanation of goal-setting and importance	Listening	Visual and verbal	PowerPoint
10.05		of setting SMART goals.		display of	
(5 mins)				understanding.	
10.05 -	Setting goals	Instruct participants to fill in their own	Completion of task, active	Visual and verbal	Goal Setting
11.30		goal setting sheets. Compare goals with	engagement in discussion.	display of	Handouts
(25		those of newcomers (sample sheets)		understanding.	(Blank &
mins)					Newcomers)
10.30 –	30 Minute Break				
11.00					

Time	Topic	Tutor Activity	Learner Activities	Assessment	Resources
11.00 -	Demonstration of	Clearly demonstrate and give correct	Listening and observation.	Active	Handouts of
11.30	HeartSmart	teaching and safety points of each exercise.	Practice each exercise	participation.	teaching and
(30	exercises	Explain the muscles worked and purpose	repeating the teaching and		safety points of
mins)		of performing each exercise.	safety points.		all exercises.
11.30 -	Role Play	Instruct PM's to demonstrate exercises to	Role play to demonstrate	Successful	Cue cards,
12.00		each other. Supervise, encourage and give	exercises to fellow PM's.	demonstration of	exercise
(30		feedback.		skills learnt	equipment.
mins)					
12.00 -	Role Play	Pair PMs and instruct them to act out	Active engagement, role	Participation,	Handouts (list
12.40		various scenarios giving each PM the	play, feedback.	visual and verbal	of scenarios,
(40		opportunity to act as Mentor and Mentee.		display of	possible
mins)		Swap pairs so each PM has the opportunity		understanding.	actions),
		to work with different personalities.			Flipchart
		Encourage active listening. Seek			
		feedback, discuss responses.			
12.40 –	Recap and Q & A	Recap on all topics covered and provide	Listening. Vocalising any	Commitment	PowerPoint
1.00	session	feedback to the group on how they	concerns. Committing to		
(20		preformed. Open the floor to Questions	commence their role as		
mins)		and provide answers. Instil confidence	Peer Mentors.		
		that they are prepared to begin their role as			
		peer mentors.			
1.00-	Advise on next	Distribute handouts outlining next steps	Listening	N/A	Handouts
1.10	steps	i.e. start of intervention, dates for support			
(10		meetings, contact details of research team.			
mins)					

Slide 1

Peer Mentor Training

Dr. Catherine Woods, Head of School of Health & Human Performance Ms. Antonia Martin, MSc Research Student

Slide 2

Aim

To provide long-term adherers of HeartSmart with the knowledge, skills and confidence to act as peer mentors to newcomers to the programme.



Objectives



Participants will:

- Understand the purpose of the study and the key concepts of mentoring;
- Agree on the role & responsibilities of Peer Mentor;
- Understand the benefits of physical activity following a cardiac event and the recommended levels at which it should be performed;
- ▶ Have a clear understanding of Rate of Perceived Exertion (RPE);
- Be aware of the barriers to participating in physical activity following a cardiac event and strategies to overcome barriers;

Slide 4

Objectives

- Understand exercise self-efficacy and be aware of how it will be used in their role as a Peer Mentor;
- Understand the concept of SMART goals and the benefits of setting goals;
- Demonstrate correct technique and teaching points of a number of exercises performed in the HeartSmart Class;
- Reveal confidence in their ability to commence their role as Peer Mentors.



What is Peer Mentoring





Peer Mentoring is based on an idea that individuals who share similar problems have a unique resource to offer one another

Slide 6

Role & Responsibilities of HeartSmart Peer Mentors

- Build Rapport
- Assist with facility & programme familiarity
- Reinforce benefits of adherence to physical activity
- Offer assistance to overcoming barriers to participation
- Encourage performance at appropriate intensity



Slide 7

Role & Responsibilities of HeartSmart Peer Mentors

- Encourage realistic goal setting
- Assist with exercise familiarity
- Provide encouragement and support
- Set a good example
- Report back to research team



Slide 8

Pros & Cons of Mentoring

- Personal satisfaction from helping others
- Networking
- Personal development
- Increased motivation & confidence

- Lack of time
- Personality mismatch
- Negative mentee attitude
- Lack of understanding of role

Pros

Cons

Benefits of Physical Activity Following a Cardiac Event

- Decreased risk of mortality
- Decreased risk of subsequent coronary events
- Increased aerobic capacity
- Improved quality of life
- Improved blood lipid levels
- Reduced risk of depression



Slide 10

Recommended Levels of Physical Activity Following a Cardiac Event

- Frequency Daily
- Intensity Moderate
- <u>Time</u> − 30 minutes
- <u>T</u>ype Walking, cycling, swimming etc.

^{*} Participants should gradually build up their physical activity *

Why Bother?

- Health
 - "It's an insurance policy to make sure we're not back in the stage that we just left... and a very important safeguard to keep us on the straight and narrow"



- **Fellow Participants**
- "you're with like minded people... you can say something to someone here and know that they know what your talking about, they know the background ... That's what motivates me to come here"
- Sense of 'wellbeing' post class
 - "The way I feel after [the class], it's a great feeling, I must honestly say, when you're doing the exercise you're nearly falling, but it's absolute great feeling when you get home you could clean the house from top to bottom, it gives you great energy".

Slide 12

Barriers

- > Lack of time / Other Commitments
 - "I probably missed a couple of days because I do voluntary work"
- Lack of interest / Boredom
 - "You enjoy doing your exercise and all that, but after a couple of weeks you get tired and you want a break
- Age (too old / too young)
 - "God, I'm here with all these people and some of them are very frail"



Barriers

> III health

"I was in hospital for a week and they gave me more medication and then I was recovering for a while but I couldn't come back for 6 weeks"

> Distance to venue

"I'm a long distance...it's quite difficult to even get over the one day"

> Weather

"getting out of bed is a problem...
especially in the winter"



Slide 14

Barriers

Lack of support / Molly Coddling

"Well I really think that people think that when they have something wrong with their heart that they're invalids and a lot of people I would think, lie down under their illness"

- Dislike of groups activities
 - "... there are some people who might not be able to mix easily... it might be a barrier for them...a barrier for them, yes"
- Lack of belief in the benefits



Exercise Self-Efficacy

Self-Efficacy is a person's belief in his or her capability to successfully perform a particular task and influence events that affects their life.



Slide 16

Types of Self-Efficacy

- > Task
- > Barrier
- > Recovery

Sources of Self-Efficacy

- > Performance Mastery
- > Role Models
 "If you can do it so can I"
 - > Encouragement
- > Physiological and affective states

Slide 18

Goal Setting

Setting goals is a process that allows people to specify then work towards their own objectives



Slide 19

SMART Goals > Specific > Measurable > Attainable > Realistic > Time bound SMART Goal A goal without a plan is just a wish. - Antoine de Saint-Exuperys

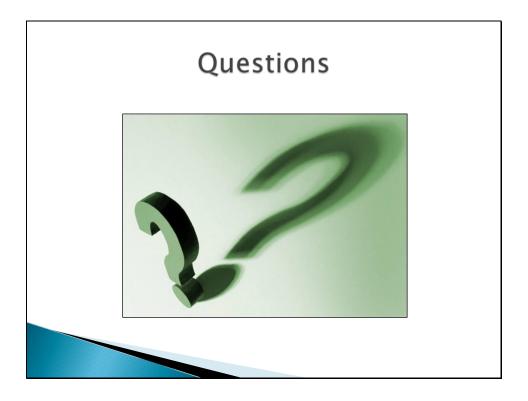
Slide 20

Recap

- Role & Responsibilities of Peer Mentors
- Benefits and recommended levels of PA
- Barriers
- Exercise Self-Efficacy
- Goal Setting
- Exercise demonstration
- Putting it into Practice



Slide 21



Appendix 14 – Borg RPE Scale

Rate of Perceived Exertion - Borg Scale

- 6 no exertion at all
- 7 extremely light

8

9 very light

10

11 light

12

13 somewhat hard

14

15 hard

16

17 very hard

18

- 19 extremely hard
- 20 maximal exertion

<u>Appendix 15 - Incremental Shuttle Walk Test Protocol</u>

Protocol for ISWT

Incremental Shuttle Walk Test (ISWT)

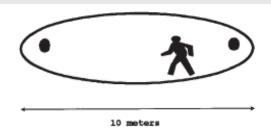
The ISWT requires participants to walk up and down a 10-m course marked out by 2 cones inset 0.5 m from either end to avoid abrupt changes in direction (see Figure 1). Participants are required to keep in time with a series of audio signals (bleeps). The goal is to reach each cone on the sound of the bleep. The initial walking speed is 0.5m.s⁻¹ and increases by 0.17m.s⁻¹ every minute (Figure 1). This change in speed corresponds to a change in level and is denoted by a triple bleep. The number of shuttles the participants are required to complete increases by 1 within consecutive levels: that is, for level 1, 3 shuttles lasting for 20 seconds each; for level 2, 4 shuttles lasting for 15 seconds each; and so on (Figure 1). No encouragement is provided to the participants during the test. The end of the test is determined either by the participant being too breathless to maintain the required speed or by the operator, when the participant fails to complete two consecutive shuttles in the time allowed (not being at the cone when the beep sounds). If a participant fails to complete a shuttle in the time allowed, a warning is given to that participant and another 10m shuttle is allowed to give the participant the opportunity to recover the lost distance. If the participant is unable to do so the test is discontinued.

Equipment

- Flat, non-slippery surface at least 10 metres in length
- The ISWT cd
- CD player
- Tape measure
- Cones
- Recording sheets
- Bibs (coloured and numbered) if necessary
- Automated blood pressure monitors

Procedure

- 1. The 10m course is measured out and two cones are inset 0.5m from either end (Figure 1). A pair of cones is allotted to each participant as their personal shuttle walk station.
- 2. Participants have their resting blood pressure recorded.
- 3. Participants perform a light warm-up that consists of 5 minutes of walking followed by some stretching.
- 4. Participants line up beside their allotted cone and await the beginning of the test. All participants start at the same end of the course and are asked to walk in the same direction around the cones i.e. either clockwise or anticlockwise.
- 5. The shuttle walk test CD is played and volume adjusted so that each participant can hear the CD clearly. The first track on the CD provides a standardised set of instructions to the participants about what the test involves. Once these instructions are finished, an opportunity for the participants to ask any questions relating to the test is provided and these questions are answered.
- 6. The test commences and follows the procedure outlined in the ISWT section above until all participants complete the test. Participant scores are recorded in the ISWT data collection sheet (see Figure 2).



Level	Speed	Nº of shuttles	Distance ambu-
	m/s	per level	lated at the end
			of each level(m)
1	0.50	3	30
2	0.67	4	70
3	0.84	5	120
4	1.01	6	180
5	1.18	7	250
6	1.35	8	330
7	1.52	9	420
8	1.69	10	520
9	1.86	11	630
10	2.03	12	750
11	2.20	13	880
12	2.37	14	1020

SWT protocol.

Figure 1: ISWT Protocol

Record Card E V E L SHUTTLE

Figure 2: ISWT data collection sheet

Appendix 16 - HeartSmart Goal Setting Sheet

Goal Setting for Physical Activity and Exercise

	•
Short Term	2 weeks HEARTSMART
♣ FREQUENCY	
*INTENSITY	
*TIME	
*TYPE	
Medium Term	2 months
НОМЕ	HEARTSMART
* FREQUENCY	
*INTENSITY	
*TIME	
♣ TYPE	
LONG TELM	
Once complete file copy into participant's file, original goes to the participant.	
Participant Signature:	
HeartSmart Staff Signature:	Date

Squats

Muscles Worked

- Gluteus
- Quadriceps
- Hamstrings
- Calves

Teaching Points

- Stand with you feet shoulder width apart, toes pointing forward, stomach held in
- Keeping your back straight, push buttocks out behind you and bend knees
- Lower to a point where your thighs are parallel to the ground
- Return to starting position

Safety Points

- Breathe out on effort i.e. on way up
- Do not let knees move in front of your toes
- Do not squat deeper than 90' (right angle) at the knee
- Start with shallow squats and gradually increase



Leg curl

Muscles Worked

- Hamstrings

Teaching Points

- Stand with legs slightly wider than hip width apart, Hands on hips
- Keep your stomach tight and back straight
- Raise heel to buttocks allowing opposite knee to bend slightly
- Alternate legs

Safety Points

- Remember to breathe



Rower

Muscles Worked

- Legs
- Back
- Arms
- Gluteus

Teaching Points

- Grip handle with both hands and straighten legs (do not lock out knees), lean back slightly, handle drawn to the body, forearms horizontal
- Relax arms and allow to extend; lean forward from hips, bend knees and allow body to slide forward maintaining arm and body position
- Continue to slide forward until shins are vertical And body is pressed up to the legs
- The legs push down as the body levers back, arms Remain straight
- The arms draw the handle past the knees then strongly to the body, legs straight (do not lock knees), forearms horizontal
- Repeat

Safety Points

- Breathe out on effort i.e. pull
- Do not lock out at knees
- Use legs, not back, to push

Side Lunge

Muscles Worked

- Gluteus
- Hamstrings
- Quadriceps
- Calves
- Abductors

Teaching Points

- Stand straight, feet together, toes pointing forward
- Hold stomach tight
- Step one foot to the side opening you stance wider than shoulder width apart
- Keeping your back straight, push buttocks out behind you and bend knees
- Lower to a point where your thighs are parallel to the ground
- Return to starting position

Safety Points

- Breathe out on effort i.e. on way up
- Do not let knees move in front of your toes
- Do not squat deeper than 90' (right angle) at the knee
- Start with shallow squats and gradually increase

Wall Press Up

Muscles Worked

- Chest
- Triceps

Teaching Points

- Position yourself facing wall, with approximately one foot between you and the wall, feet hip width apart
- Place two hands on wall, shoulder width apart at chest level, fingers point upwards
- Hold stomach in
- Keeping rest of body in position, slowly bend elbows until Forehead is almost touching wall
- Straighten arms to return to starting position (do not lock out at elbows)

Safety Points

- Breathe out on effort i.e. the push



Frontal Raise

Muscles Worked

- Shoulders

Teaching Points

- Stand with feet hip width apart, arms down by sides, palms facing backwards
- Keeping arms straight, slowly raise them to shoulder height
- Return to starting position

Safety Points

- Breathe out on effort i.e. lift
- Keep stomach muscles tight
- Do NOT use back to assist lift



Upright Row

Muscles Worked

- Shoulders
- Biceps

Teaching Points

- Stand with feet hip width apart, arms hanging down in front of legs (slightly narrower than shoulder width), palms facing body
- Hold stomach muscles tight
- Raise elbows so that hands move towards chin and elbows are at ear height (much wider than shoulders)
- Slowly lower arms and repeat

Safety Points

- Breathe out on effort i.e. lift
- Keep stomach muscles tight
- Do NOT use back to assist lift



Appendix 18 – Peer Mentor Role Play Scenarios

Role Play Scenarios:

- 1. A mentee is absent for a week of HeartSmart. They return to the class and do not mention the absence.
 - Mention that you missed them at HS the previous week.
 - Ask if there was any particular reason they missed the class.
 - Actively listen to their response to determine how to respond i.e. barriers from home, injury/illness, dislike of class, attempt to exercise alone etc.
- 2. A mentee is attending regularly but does not appear to be working at an optimal level to achieve health benefits.
 - Ask how they are finding the exercises.
 - Ask them what level they are working at on the RPE scale.
 - Encourage them to train at the optimal level.
 - Reinforce health benefits.
 - Revisit their goals.
- 3. A mentee is getting very attached to you. They want to spend all the HeartSmart session in your company. They do not complete any task without checking with you first and do not engage with other participants or HS staff.
 - Praise their progress and their ability to participate in the class.
 - Initiate introductions with other newcomers.
 - Explain that you are not always able to pair with them in the class but they are welcome to check in with you before and after.

- 4. A mentee's attendance is very irregular. They tell you they are doing their best but cannot give 100% at HS as they have too many other outside commitments.
 - Enquire as to their other commitments.
 - Empathise with their barriers.
 - Question why they joined HS to begin with.
 - Reinforce the need for them to make time to look after their health.
 - Reinforce the health benefits.
 - Assist them to make plans to prioritise HS.
- 5. You feel a mentee is pushing themselves too hard. They are attending classes 3 times per week, are exercising at home on days they are not attending HS.
 - Praise their efforts and progress.
 - Caution them as to the risks of doing too much too soon.
 - Reinforce that this is a lifestyle change and what they do must be sustainable.
 - Revisit their goals.
- 6. After 4-weeks of attending HS, a mentee informs you that they have enough knowledge and skills to exercise at home and they are dropping out of the programme.
 - Probe them to reveal any barriers they may have to attending HS.
 - Question whether or not they enjoyed attending the programme.
 - Assist them overcome barriers to attendance.
 - Re-enforce benefits of exercising in a group setting e.g. commitment to attend at set times, professional staff in attendance, social aspect.

- 7. On the first day a mentee tells you that they feel overwhelmed with the number of people in the class and do not feel comfortable exercising in this environment.
 - Probe them to reveal particular aspects they do not like.
 - Ask is there anything they do like about HS.
 - Re-enforce the benefits of adhering to the programme.
 - Encourage them to committee to another few sessions to see if they change their minds or to at least become more familiar with what exercises they are capable of.
- 8. A mentee is performing an exercise incorrectly. You demonstrate the correct method of performing the exercising and give them teaching points. They continue to perform the exercise incorrectly.
 - Praise the progress the participant has made.
 - Re-emphasise the teaching points and demonstrate again.
 - Do not get too concerned, a member of the HS team is responsible for this.
- A mentee is very frustrated as they have been attending for 4 weeks but are still finding the classes very hard work and are complaining that they have not lost any weight.
 - Praise their efforts and commitment to the programme so far e.g. attendance, mastery of exercises.
 - Re-enforce the benefits of exercise adherence.
 - Question whether they enjoy the classes.
 - Revisit their goals and see what progress they have made.
 - Encourage them to stick with it it will get easier.
 - Recommend they check with their GP regarding weight loss.



HeartSmart

Peer Mentor

Programme

HEARTSMART PEER MENTOR PROGRAMME



Peer mentoring is based on an idea that individuals who share similar problems have a unique resource to offer one another. Among older adults, peer mentors have been reported to be empathic and respectful toward one another, and through positive role modelling they can dispel the stereotypes of aging more affectively than can younger professionals. Peer mentoring has benefits for both the mentor and the mentee. It gives the mentor the opportunity to make new friends, practice their social skills and benefit from the experience of helping others. On the other hand, the mentees are offered the opportunity to learn form a more experienced peer and are also provided with a source (a buddy) to assist them settle into the new activity/community quicker. Peer mentoring involves good communication as it is relationship based.

For most physical activity interventions, the greatest number of dropouts occurs during the initial 3 months of the program. It is foreseen that the introduction of peer

mentors to the HeartSmart programme will provide additional support for newcomers and lead to increased adherence. You have been selected to train as a peer mentor as you have the necessary attributes to excel in this role e.g. approachability, credibility, motivational skills and confidence. In this new role, we believe you can transcend the values of the HeartSmart programme and assist mentees find individual methods to adhere to the programme.

Aim & Objectives of Peer Mentor Training Programme

Aim

To provide long-term adherers of HeartSmart with the knowledge, skills and confidence to act as peer mentors to newcomers to the programme.



Objectives

Participants will:

- 1. Understand the purpose of the Peer Mentor Training Programme;
- 2. Agree on the role & responsibilities of HeartSmart Peer Mentors;
- 3. Understand the benefits of physical activity following a cardiac event and the recommended levels at which it should be performed;
- 4. Have a clear understanding of Rate of Perceived Exertion (RPE);
- 5. Be aware of the barriers to participating in physical activity following a cardiac event:
- 6. Understand exercise self-efficacy and be aware of how it will be used in the Peer Mentor role:
- 7. Understand the concept of SMART goals and the benefits of setting goals;

- Be competent in performing the standard exercises involved in the HeartSmart class and be aware of exercise adaptations and progressions;
- 9. Reveal confidence in ability to commence the role of Peer Mentors.

Outcomes of Mentoring

People primarily engage in mentoring relationships as they can see the potential for positive outcomes. A review of the literature on mentoring from a variety of settings highlighted the following potential positive outcomes of mentoring for both the Mentors and the Mentees:

Positive Outcomes for Mentors

- Collegiality & networking;
- ♣ Reflection (re-appraisal of beliefs, practice, ideas and values i.e. you reflect on your own commitment to physical activity and it may serve as an incentive to improve, work harder or try new things;
- ♣ Facilitates personal development e.g. a worthwhile experience. Working and assisting different people and personalities helps us get to know ourselves better;
- Personal satisfaction, pride, growth;
- Increased motivation and confidence.



Positive Outcomes for Mentees

- Support, empathy, listening, encouragement, counselling, friendship "knowing there is somebody there in the background I can turn to is a great source of comfort";
- Assistance with learning of new environment, skills and community;
- Forum to share ideas, information, problems "enables participants to establish that their problems are not unique to them alone";

- Feedback via positive reinforcement or constructive criticism;
- Increased motivation and confidence.

However, it is also possible that problematic outcomes occur from the mentoring relationship:

Problematic outcomes for mentors

- Lack of time;
- Personality mismatch (values, beliefs, ideology);
- Lack of understanding of role and responsibilities;
- Feeling of extra burden and responsibility;
- Negative Mentee attitudes;
- Jealousy, negative attitudes of others.

Problematic outcomes for mentees

- Time restraints of Mentors "I feel acutely embarrassed if I need to bother him";
- Personality mismatch (values, beliefs, ideology);

Be aware that different Mentees may require different levels of support. If you are experiencing any difficulties or confusion in your role as a Peer Mentor, please contact a member of the Research or HeartSmart team.

- Mentors over-harsh, over-critical defensive, stifling, untrusting;
- Overprotective Mentors;
- Cloning or conforming.



Responsibilities of HeartSmart Peer Mentors



1. Build Rapport

- Remember Mentees name and be welcoming, friendly, helpful and receptive. This will help put people at ease;
- Make time to interact and socialise. Be accessible before and after class, and during the class for first couple of sessions. Greet them at the beginning of programme and check in with them at the tea break at the end of each class;
- Listen to your Mentees and demonstrate sensitivity and empathy. Share
 personal experiences where appropriate to enforce points. By
 authentically admitting limitations (being open), you give your
 participants permission to be human as well. Validate their experience –
 you've been there.

2. Assist with facility & programme familiarity

- How to access the car park
- Working the wristband
- Location of toilets and showers
- Location of lockers and how to access
- · Where to sign in
- Where and how to take Blood Pressure
- Class format
- Location of water
- Invite them to stay for tea & coffee after class

3. Reinforce benefits of adherence to physical activity

 Use your knowledge of the health and social benefits of HeartSmart to encourage Mentees to maintain adherence to HeartSmart.

4. Offer assistance to overcoming barriers to participation

Share personal strategies – What has worked for you?

5. Encourage performance at the appropriate intensity

 11-13 on Rate of Perceived Exertion Scale. Remember they are not as advanced as you are so their RPE will be higher than yours if completing the same exercise! Show them adaptations to exercises.

6. Encourage realistic Goal Setting

 Encourage Mentees to make SMART goals (Specific, Measurable, Attainable, Realistic, Time bound);



 Challenge unrealistic goals and expectations, for example, immediate mastery of exercises or expectation of immediate results. Stress the importance of personal mastery rather than perfection.



7. Provide encouragement and support

- Continuously praise effort and commitment, reinforce evidence of growth and improvement;
- Acknowledge fears and personal challenges and assist Mentees overcome these – remember that some people will not naturally express these so you;
- Encourage Mentees to seek support from family and friends to assist them maintain recommended levels of physical activity.

8. Assist with exercise familiarity

- Demonstrate exercises if needed and show adaptations;
- Display confidence in their ability to perform the exercises and improve;
- Remember: You are there as a support but the overall responsibility of this is with the HeartSmart staff.

9. Set a good example

- Maintain good attendance. Let them know if you will be missing a class and explain why;
- Wear the correct gear;
- Demonstrate enthusiasm, commitment, positivity and a 'Can-Do' attitude;

 Express how you have achieved your goals i.e. how you mastered the exercises and have continued to attend HeartSmart.

10. Report back to research team

• At bi-weekly support meetings and at post-intervention focus groups.

Physical Activity and Coronary Heart Disease

In the case of individuals with existing coronary heart disease (CHD), evidence suggests that exercise capacity is the strongest predictor of mortality in comparison with other known cardiovascular risk factors. Even small increases in physical fitness are associated with a significant reduction in cardiovascular risk, even if you have existing disease.

Benefits of Physical Activity Following a Cardiac Event

- Decreased risk of mortality
- Decreased risk of subsequent coronary events
- Increased aerobic capacity by strengthening and enlarging the heart muscle, therefore improving its pumping efficiency and reducing resting heart rate, (known as aerobic conditioning) and strengthening the muscles involved in respiration facilitating the flow of air in and out of the lungs
- Improved circulation efficiency and reduced blood pressure
- Increased total number of red blood cells in the body, facilitating transport of oxygen
- Improved blood lipid levels
- Improved mental health, including reduced stress and lowered incidence of depression leading to improved quality of life
- Strengthens muscles throughout the body, reducing the risk falling and the risk of developing osteoporosis
- · Reduced risk of diabetes
- Improved posture, balance and co-ordination
- Increased metabolic rate
- Feel good factor
- Opportunity to meet new people

Recommended Levels of Physical Activity for Individuals with Existing Heart Disease



- Individuals should be advised to undertake regular physical activity sufficient to increase exercise capacity;
- ♣ Individuals should be advised to be physically active for 30 minutes a day to the point of slight breathlessness. Those who are not achieving this should be advised to increase their activity in a gradual, step-by-step way, aiming to increase their exercise capacity. They should start at a level that is comfortable, and increase the duration and intensity of activity as they gain fitness:

In general CR (Cardiac Rehabilitation) programs last one hour [15 min warm up 30 min of strength and aerobic exercise (walking, biking, dancing etc. based on heart rate guidelines of 70% of maximal safe heart rate) and 15 minutes cool down with stretching and relaxation. There is no benefit to attempting to obtain a heart rate above 70% of your maximum. Everyone is encouraged to exercise daily for at least 30 minutes with specific guidelines based on their individual heart health. Physical activity levels are advanced based on individuals' aerobic capacity and other criteria such as orthopedic concerns, age, balance and other co-morbidities.

In order for people to continue to adhere to physical activity, it is paramount that they experience some benefits. Some of the benefits stated above will not be immediately apparent to new participants. It is important to remind Mentees of the benefits of maintaining recommended levels of physical activity and encourage them to find something they enjoy about the programme.

FITT Principle

The FITT principle is a set of rules that will help individuals get the most out of their exercise routine. FITT stands for Frequency, Intensity, Time and Type.

Frequency: how often you exercise Daily

Intensity: how hard you work during exercise 11-13 RPE

Time: how long you exercise 30 Minutes

Type: the type of activity you do Aerobic

Frequency

The frequency at which we participate in exercise depends on the type of exercise and our fitness levels. Following any form of fitness training, the body goes through a process of rebuild and repair to replenish its energy reserves consumed by the exercise. The frequency of exercise is a fine balance between providing just enough stress for the body to adapt to and allowing enough time for healing and adaptation to occur. Exercising too frequently and too intensely hinders the body's ability to recover and adapt. As a rule of thumb, the harder you train, the more recovery you should allow for. Following a cardiac event, it is recommended to engage in moderate intensity physically activity for 30 minutes every day to health enhancing benefits.

Intensity

Intensity refers to how much work is being done whilst exercising. Intensity can be measured using both objective and subjective measures. Consciously or subconsciously we are continually monitoring exertion from physical. During CR programmes, both objective and subjective techniques are used to establish whether the participant is working within a safe yet effective exercise level.



Measuring exercise intensity

Heart Rate

Heart rate is an objective measure of exercise intensity and is measured as beats per minute (bpm). Heart rate can be monitored and measured by taking your pulse at the wrist, arm or neck. An approximation of maximum heart rate (MHR) can be calculated as follows: MHR = 220 - age. For beginners a target heart rate zone of 50-70 percent of maximum of heart rate is a good place to start. So if, for example, you are 65 years old your predicted maximum heart rate is 155 (220 - 65). Multiply 155 by 50% and 70% and you can your target HR zone of 77 - 108bpm. For fitter, more advanced individuals, a target heart rate zone of 70-85 percent of their maximum of heart rate may be more appropriate. Staying with the example above, that 65 year old now has a heart rate zone of 108 - 132bpm.

Rate of Perceived Exertion (RPE)

Borg RPE Scale

21	no exertion at all
22	extremely light
23	
24	very light
25	
26	light
27	
28	somewhat hard
29	
30	hard
31	
32	very hard
33	
34	extremely hard
35	maximal exertion

Perceived exertion is a subjective measure of intensity and is defined as "the intensity of effort, strain, discomfort or fatigue that is felt during exercise". These perceptions are directly related to increases in breathing, increased HR and changes to body temperature. The original RPE scale was developed by Borg and asks participants to rate their RPE on a scale of 6 – 20, 6 meaning no exertion at all and 20 meaning maximal exertion. Within this scale the user selects the number which they feel corresponds to the intensity of their physical effort ("how are they feeling"). This number otherwise known as the rate of perceived exertion (RPE) is extremely beneficial in exercise testing, prescription and regulation in CR. To select a level on the RPE scale, one can use memory and anchoring. This requires the participant to think about what it feels like to exercise at a very low intensity. They will then be asked to assign the lowest numerical rating on the scale to the feeling of exertion they remember having when they performed at that low level of exercise. Next the participant will be asked to remember performing at a very high exercise intensity, one so high that they could not physically continue and would have to stop due to exhaustion. Then they will be able to assign the highest scale rating to this

memory of exertion at maximal exercise intensity. It is recommended that CR participants employ an RPE of 11-13 and those who have developed their fitness further should employ an RPE of 12-14. RPE has been shown to be a reliable and valid method of measuring exercise intensity. RPE is less intrusive than asking someone to wear a heart rate monitor and allows participants to measure their intensity without the need for specialised equipment. RPE can be used on its own or in collaboration with other methods such as heart rate or talk test.

Time

Individuals should aim to maintain their heart rate within the target heart rate zone for at least 30 minutes a day. These 30 minutes can be made up in 10 minute intervals, i.e. you can achieve the recommended levels by being physically active for 10 minutes three times a day or 15 minute intervals twice a day.

Type

The best type of exercise to tax or improve the cardiovascular system should be continuous in nature and make use of large muscle groups. Examples include running, walking, swimming, dancing, cycling, aerobics classes, circuit training and so on.

As a Peer Mentor it is important for you to be aware of the FITT principle and in particular the Rate of Perceived Exertion.

Encourage your mentee to exercise at an RPE of 11-13 at a level which they would describe as somewhat hard and that would cause them to breathe slightly heavier. They should always be able to talk.

Barriers Affecting Adherence to Physical Activity



Despite the well known benefits of physical activity, uptake and adherence still remains low. Research focusing on barriers to uptake and adherence to exercise-based cardiac rehabilitation include:

- Lack of time / Other Commitments
- Lack of belief in the benefits
- Age (too young / too old)
- Lack of support or Molly Coddling
- Lack of interest
- III health
- Distance to venue
- Weather
- Dislike of groups activities

Most people face barriers when attempting to adhere to physical activity. Assist your mentees to identify any barriers they may be experiencing and assist them to identify solutions to overcome these barriers.

Self-Efficacy

Self-efficacy is a concept of the social learning theory. Albert Bandura defined selfefficacy as a person's belief in his or her capability to successfully perform a particular task and further more a person's ability to influence events that affects their life. Your self-efficacy beliefs determine how you think, feel, motivate yourself, and behave. If you have a strong sense of efficacy, then you approach difficult tasks as challenges to be mastered rather than as threats to be avoided. Self-efficacy is needed to master skills. When learning complex tasks, high selfefficacy causes people to strive to improve their assumptions and strategies, rather than look for excuses such as not being interested in the task. When people have low self-efficacy, they also tend to blame either the situation or another person when things go wrong. Denial of any responsibility for poor performance inhibits the chance that an individual will learn how to perform more effectively in the future. People are inclined to become anxious or depressed when they perceive themselves as unable to manage aversive events or gain what they value highly. Thus, self-efficacy is also related to the experience of stress and occupational burnout. Specifically, low self-efficacy can readily lead to a sense of helplessness and hopelessness about one's capability to learn how to cope more effectively with the challenges and demands of one's work. When this occurs, low self-efficacy can be distressing and depressing, thereby preventing even highly talented individuals from performing effectively.



Types of Self-Efficacy

In relation to the HeartSmart programme, three specific types of self-efficacy are needed to adhere to the programme long-term:

1)Task self-efficacy

Task self-efficacy is required to form an intention to act and complete the exercises.

2) Barrier self-efficacy

Barrier self-efficacy is required to continue the behaviour despite perceived barriers.

3) Recovery self-efficacy

Recovery self-efficacy is needed to enable the individual to resume the behaviour should the maintenance of the behaviour change or be interrupted.

Sources of Self-Efficacy

The information and feedback an individual obtains from the performance of a task are referred to as sources of self-efficacy. Four key information sources influence an individual's self-efficacy: performance accomplishment, role-modelling, verbal persuasion and physiological & affective states.



Performance accomplishment

This is the most powerful source of self-efficacy as it provides evidence that the individual is capable of performing the desired behaviour. It is based on personal experience and therefore has the greater authenticity for the individual. In order to successfully perform complex behaviours, it is necessary to first break them down into easily mastered sub-skills and hence gradually increasing confidence. It is

important that small successes are praised before more challenging tasks are attempted. This ensures that the individual experiences continued success when mastering the behaviour and hence self-efficacy is continuously increased. This is why greater support is needed in the initial stages of behaviour change to help build confidence and minimise frustration. If the individual experiences repeated failures, self-efficacy is reduced. Once the behaviour has been successfully mastered, the individual is then aware that they have the capacity to perform the particular task and are therefore are more likely to recover from and future setbacks regarding this behaviour. However, capability cannot be judged by performance alone. Other factors that affect successful mastery of a task include situational obstructions, assistance provided by others, resources and equipment and circumstances in which the activity is performed. If an individual attributes their success to any of these mentioned external factors, self-efficacy will not increase as the credit will be attributed to the external source. All individuals hold self-belief regarding their capabilities and it is difficult to change or challenge this self-belief. If an individual has low self-efficacy, they are likely to find a means to discredit a personal accomplishment by placing the reason for success on an external force even if it has been proved that they can perform the behaviour. Knowledge and skills do not necessarily create high self-efficacy especially when there is a lack of self-belief. To successfully change self-belief, accomplishment in a challenging task is required and the achievement must be recognised and commended. Four key dimensions are used to judge success: Ability, effort, difficulty of task and luck. Ability is a stable internal factor, effort a stable external factor, task difficulty is an unstable internal factor and luck is an unstable external factor. Physical and emotional states and also affect performance.

Peer Mentors should endeavour to shadow your mentees for their first two sessions, assisting mentees with the exercises if needed, prompting them in the various teaching and safety point. If you think they are struggling, suggest that they concentrate on keeping their leg muscles moving and breathing regularly.

Role Modelling

For the majority of tasks, there is no clear measure of adequacy. People therefore measure their capabilities in social comparison to others. Role modelling can provide people with ideas about how they could perform certain tasks. It occurs when people observe others perform a task that they are attempting to learn and inspires confidence that they too can perform this task successfully. The person they are observing may therefore be viewed as a role model. If the individual identifies with the role model and views them as possessing similar characteristics to themselves, it is likely to increase self-efficacy in their own ability to perform the task. People also naturally chose role models who have similar attributes (e.g. age, gender, and ethnicity) and possess competencies they themselves aspire to. Effective role models approach challenging activities as an opportunity to learn and develop their knowledge, skills and effectiveness, rather than as a test of how talented they are. They respond to setbacks by exploring what can be done differently in the future. They demonstrate the development of skill, persistence and learning, rather than the defensiveness and blaming that cause mistakes to recur and subsequent performance to decline. It is not necessary for role models to be perfect and in fact self-efficacy is more likely to increase by encountering people who succeed despite difficulties, such as slow progression, rather than those achieve quick success without problems.

You have been chosen as a Peer Mentor as you are a good role model. You are competent in completing the exercises in the HeartSmart class and have successfully adhered to the HeartSmart programme for longer than 6 months. You have suffered a similar cardiac event as your mentee which may help them relate to you and view you as a good role model.

Verbal persuasion

Verbal persuasion is used to build self-efficacy by praising effort and accomplishments. The impact of verbal persuasion is reliant on a respect towards the person providing the appraisal i.e. the greater the perceived credibility and expertise of the appraiser, the greater the impact of the appraisal on the self-efficacy of the individual. It is important that verbal persuasion is honest and relates to the particular skills of the individual concerned. Persuasive encouragement has

the greatest impact when it encourages skill attainment that is only slightly beyond the individuals current capabilities. If the individual is encouraged to accomplish a skill that is too far in advance of their current capabilities, the effect is lessened. It is important that the person providing the verbal persuasion is aware of both inherent talent and effort expended. Efficacy-raising feedback should highlight how consistent efforts have enabled substantial improvements. Success should be measured in terms of self-improvement rather than in comparison to others. It is important to highlight the individuals' achievements to date rather than making reference to how far they have to go until their ultimate objective is achieved. Effective verbal persuasion is reinforced with corresponding actions, for example, although encouraging messages can raise self-efficacy, attempts at building self-efficacy through verbal persuasion may easily degenerate into empty sermons unless they are soon supported by efficacy-affirming experiences (i.e. performance accomplishments). In short, you must ensure that praise is earned. Positive self-talk is also a form of verbal persuasion and can be used to raise self-efficacy.

It is important to encourage mentees to attempt all the exercises in the HeartSmart class. Some participants will naturally be more competent than others so it is important that you encourage them not to compare themselves to others but to think about their own personal goals and accomplishments. Remind them of the effort they have already put in just by turning up to the class. Praise effort and accomplishments.

Physiological and affective (emotion) responses

An individual's perception of their physiological or effective response to a behaviour can influence self-efficacy. If people are unused to these responses, they may interpret them as negative and threatening, for example, during exercise, individuals' may interpret their fatigue, breathlessness and aching muscles as signs of their physical inefficiency which may lead to reduced self-efficacy. It is therefore important to educate new exercisers on the expected responses to physical activity in an effort to assure them that this is normal and in doing to reduce associated stress.

Peer Mentors should remind mentees of the recommended intensity (RPE) at which they should be working and help them feel comfortable with exercising at an effort that causes heavier breathing (remember, they should still be able to talk). Remind them that they are using muscles they may not have used for a long time and therefore they may initially experience early fatigue.

In your role as a Peer Mentor, it is important that you utilise the sources of self-efficacy to assist your mentees. Take the time to think how your own self-efficacy and what sources were important to you when you first commenced the HeartSmart programme. Share these experiences with the mentees and emphasize that it will take time to master the various exercises in the class and build exercise into their lives.

Goal Setting



A goal is a valued future state that one wishes to accomplish. Goal setting is an important strategy for effective behaviour change as it provides the individual with a focus. Prior to setting goals, it is important to self-reflect. Think about where you are not and where you wish to be in the future. Set goals that are **SMART**. **S**pecific – The goal should specify a specific action that will take place **M**easurable – It must be possible to measure if the goal has been achieved **A**ttainable – While goals should challenge a person to achieve their best, they should not be out of reach. It is important to consider barriers which may affect the attainment of goals and consider coping strategies to ensure goals are met. **R**ealistic – Ensure goals and timelines to achieve them are realistic. **T**ime bound – A set time should be given in which to achieve these goals. Attach a date. It is important to set both long- and short-term goals.

Once goals are set, commit to achieving them. Review them regularly to ensure you are on track. Adding feedback and rewards to goals helps to increase motivation as one works to achieve these goals.

Take time to think about your own goals. Are these goals different from the goals you had when you first joined HeartSmart? It is important to set short-, medium-, and long-term goals. It is essential that these goals are SMART and goal achievement is acknowledged. Encourage your mentees to set their own personal goals and work towards these.

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Appendix 20 - Peer Mentor Cue Card

(Front)

HeartSmart Peer Mentor

- ➤ Meet & greet
- > Programme logistics:
 - Parking
 - Wristband
 - Changing area/toilets/lockers
 - Signing in
 - Blood pressure
 - Class format
 - **❖** Water stations

(Back)

HeartSmart Peer Mentor

- > Benefits
- > FITT principle and RPE
- Barriers
- ➤ Self-efficacy
 - o Performance mastery
 - o Role models
 - o Verbal persuasion
 - o Physiological and affective states
- ➤ Goal setting

Appendix 21 – Peer Mentor Interim Focus Group Questions

Thank you all for taking the time to attend this focus group session today. The purpose of this session is to discuss your progress in the Peer Mentor role and offer support and assistance if required. I will lead you through a series of questions which will take approximately one hour. There are no right or wrong answers to these questions so don't feel like we are looking for a particular answer. If it is ok we will audio tape our discussion so we can go back and listen to it later. You need to know that apart from a transcriber, no one else will hear this tape and we will keep your names confidential. The information will be used purely for research purposes.

(Start tape. Start date, time, ID of focus group, recorder name and moderator name).

- 1. How are you finding the role of Peer Mentor?
- 2. Do you feel that the Peer Mentor programme is working to an extent that it is helping newcomers stick with the programme?
- 3. Do you feel supported in your role as a Peer Mentor?

Appendix 22 – Peer Mentor Final Focus Group Interview Script

Thank you all for taking the time to attend this focus group session today. The purpose of this session is to evaluate your experience of the recent peer mentoring programme. I will lead you through a series of questions which will take approximately one hour. There are no right or wrong answers to these questions so don't feel like we are looking for a particular answer. If it is ok we will audio tape our discussion so we can go back and listen to it later. You need to know that apart from a transcriber, no one else will hear this tape and we will keep your names confidential. The information will be used purely for research purposes.

(Start tape. Start date, time, ID of focus group, recorder name and moderator name).

- 1. What were your **initial thoughts** when you heard about the peer mentoring programme?
- 2. What **influenced you to apply** for the role of peer mentor?
- 3. It is good to hear both positive and negative feedback. Think back to the peer mentor training programme. What were the positive and negative aspects?
- 4. How did you feel when you initially **commenced your role** as peer mentor?
- 5. What **challenges** did you face in your role as peer mentor?
- 6. Do you think there are **any changes** that could be made to the peer mentor **training programme** to better prepare you for the role as PM?
- 7. Can you give me examples of **support** (if any) that was provided to you by the HeartSmart staff and research team that you found particularly useful in helping you to conduct your peer mentoring role?
- 8. What **changes** would you make to the Peer Mentor programme?
- 9. Do you think this the peer mentor programme can be sustained long-term?
- 10. What would be an appropriate time for a person to act as a Peer Mentor?
- 11. Would you be interested in acting as a peer mentor again in the **future**?

<u>Appendix 23 - Peer Mentor Intervention Fidelity Questionnaire</u>

Peer Mentor Post Intervention Questionnaire

1. How ma	ny Mente	ees did y	ou worl	k with?					
2. What w	as your le	evel of co	ontact w	ith each	of your	. Mentee	s? Pleas	e state	time period
you worke	you worked with them and number of interactions.								
			_		_				
3. On the	scale of 1-	·10 belov			-	lt in your	role as		
Not at all				Somewh					Extremely
confident				confider					onfident
1	2	3	4	5	6	7	8	9	10
4. What co	mnonont	c of the	Door Ma	ntor Tr	sinina di	d vou us	o in vou	rolo o	nd on the
	-				_	•	•		
sar	ne scale a	is above	, rate yo	ur conti	dence a	t utilising	g eacn co	mpon	ent?
								(Confidence
						Pleas	e circle		1 - 10
Building ra	oport/ So	cial Supp	ort			Yes	No		
Explanation	n of facilit	y layout				Yes	No		
Explanation	n of class t	format				Yes	No		
Demonstra	tion of ex	ercises				Yes	No		
Enforcing b	enefits of	f physica	l activity	,		Yes	No		
Barriers to	adherenc	e to phy	sical act	ivity		Yes	No		
Recommer	ided level	s of phys	sical acti	vity					
Fre	quency					Yes	No		
Int	ensity (RP	E / Talk	Test)			Yes	No		
Tin	ne					Yes	No		
Тур	oe .					Yes	No		
Exe	ercise Self	-Efficacy	,			Yes	No		
Go	al Setting					Yes	No		

5. What do you think was your main o	contribution to y	your Ment	ree?
6. Did you read the training booklet? If yes, was it useful?			
	Please Circle:	Yes	No
8. Was there any additional training y			

Thank you for taking the time to complete this questionnaire

Appendix 24 - Protocol for using the Actigraph Accelerometer

Using the Accelerometer

• You should wear the Accelerometer for days, starting aton
2011.
• The Accelerometer can be worn underneath or on top of your clothing (unless you
are wearing heavy clothing such as an anorak then it should go underneath). Adjust
the belt so that the Accelerometer is positioned just above the right hipbone. The
Accelerometer must fit tightly but comfortably against your body. Adjust the strap
to make a snug and comfortable fit.
• Put it on first thing in the morning as soon as you wake up or immediately after
having a shower or bath.
• Please remove the accelerometer when you are showering, having a bath,
swimming or playing contact sports Please remember to put in on again afterwards.
• If you need to remove the accelerometer for any reason (other than going to bed),
please write in the space provided: the day on which you took it off, the time you
took it off at, the time you put it back on at and the reason you took it off.
• Take off the Accelerometer before you get into bed. It's a good idea to leave it
somewhere you will easily see it first thing in the morning, like on top of your
clothes.
• The measurement period ends aton the, at which point it
may be removed.
• Please return the Accelerometer and the time sheet to the research team at your
convenience.

<u>Appendix 25 - Actigraph Accelerometer Record Sheet</u>

Accelerometer Record Sheet

Name:		 	
Accelero	meter Number : _	 	_

Date	Time taken	Time put	Reason for taking off
	off	back on	

Appendix 26 – International Physical Activity Questionnaire

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the <u>last 7 days</u>. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the <u>last 7</u> <u>days</u>. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1.	Do yo	ou currently have a job or	do any unpaid v	vork outside your h	iome?
		Yes			
		No -		Skip to PART 2	2: TRANSPORTATION
		stions are about all the peaid or unpaid work. This			
2.	activit as pa	ng the last 7 days , on ho ies like heavy lifting, digg rt of your work? Think a least 10 minutes at a tim	ging, heavy cons about only those	truction, or climbing	g up stairs
		_ days per week			
		No vigorous job-related	d physical activity	→	Skip to question
3. ph		much time did you usually ctivities as part of your w	•	of those days doing	g vigorous
		hours per day			
		minutes per day			

me	Again, think about only those physical activities that you did for at least 10 nutes at a time. During the last 7 days , on how many days did you do oderate physical activities like carrying light loads as part of your work ? ease do not include walking.
	days per week
	No moderate job-related physical activity Skip to question
5.	How much time did you usually spend on one of those days doing moderate physical activities as part of your work?
	hours per day
	minutes per day
6.	During the last 7 days , on how many days did you walk for at least 10 minutes at a time as part of your work ? Please do not count any walking you did to travel to or from work.
	days per week
	No job-related walking Skip to PART 2: TRANSPORTATION
7. of	How much time did you usually spend on one of those days walking as part your work?
	hours per day
	minutes per day
PART	2: TRANSPORTATION PHYSICAL ACTIVITY
	e questions are about how you traveled from place to place, including to s like work, stores, movies, and so on.
8. ve	During the last 7 days , on how many days did you travel in a motor hicle like a train, bus, car, or tram?
	days per week
	No traveling in a motor vehicle Skip to question 1
9.	How much time did you usually spend on one of those days traveling in a train, bus, car, tram, or other kind of motor vehicle?
	hours per day

	minutes per day		
	w think only about the bicycling and walking of the from work, to do errands, or to go from place		
10.	During the last 7 days , on how many days diminutes at a time to go from place to place?		
	days per week		
	No bicycling from place to place	Skip to questio	n
11.	How much time did you usually spend on one place to place?	e of those days to bicycle from	
	hours per day		
	minutes per day		
12.	During the last 7 days , on how many days diminutes at a time to go from place to place?		
	days per week		
	-	No walking from place to place Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY	
13.	How much time did you usually spend on one	e of those days walking from	
	place to place?		
	hours per day		
	minutes per day		

12

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

	days per week
	No vigorous activity in garden or yard Skip to question 16
15.	How much time did you usually spend on one of those days doing vigorous physical activities in the garden or yard?
	hours per day
	minutes per day
16.	Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days , on how many days did you do moderate activities like carrying light loads, sweeping, washing windows, and raking in the garden or yard ?
	days per week
	No moderate activity in garden or yard Skip to question 18
17.	How much time did you usually spend on one of those days doing moderate physical activities in the garden or yard?
	hours per day
	minutes per day
18.	Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days , on how many days did you do moderate activities like carrying light loads, washing windows, scrubbing floors and sweeping inside your home ?
	days per week
	No moderate activity inside home Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY

19. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

	hours per day
	minutes per day
PART 4: R	RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY
for recreati	n is about all the physical activities that you did in the last 7 days solely on, sport, exercise or leisure. Please do not include any activities you dy mentioned.
day	counting any walking you have already mentioned, during the last 7 vs, on how many days did you walk for at least 10 minutes at a time in ur leisure time?
	days per week
	No walking in leisure time Skip to question 22
21. Hov leisure t	w much time did you usually spend on one of those days walking in your ime?
	hours per day
	minutes per day
at a phy	nk about only those physical activities that you did for at least 10 minutes a time. During the last 7 days , on how many days did you do vigorous resical activities like aerobics, running, fast bicycling, or fast swimming in ur leisure time ?
	days per week
	No vigorous activity in leisure time Skip to question 24
	w much time did you usually spend on one of those days doing vigorous sical activities in your leisure time?
	hours per day
	minutes per day
•	ain, think about only those physical activities that you did for at least 10 outes at a time. During the last 7 days , on how many days did you do

	moderate physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis in your leisure time ?
	days per week
	No moderate activity in leisure time Skip to PART 5: TIME SPENT SITTING
25.	How much time did you usually spend on one of those days doing moderate physical activities in your leisure time?
	hours per day
	minutes per day
at a de include about.	loing course work and during leisure time. This may include time spent sitting isk, visiting friends, reading or sitting or lying down to watch television. Do not any time spent sitting in a motor vehicle that you have already told me During the last 7 days, how much time did you usually spend sitting on a ekday?
wee	rady!
	hours per day
	minutes per day
27.	During the last 7 days , how much time did you usually spend sitting on a weekend day ?
	hours per day
	minutes per day

This is the end of the questionnaire, thank you for participating.

Appendix 27 - Plain language statement for Mentees

Plain Language Statement for Mentees

PROJECT TITLE: Examination of the effects of the introduction of Peer Mentoring in a Phase IV Community-Based Cardiac Rehabilitation Programme.

The study will be undertaken at Dublin City University.

PRINCIPAL INVESTIGATORS:

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Introduction to research

The purpose of this study is to examine the effects of the introduction of Peer Mentors on retention and participation rates of participants in a Phase IV community-based cardiac rehabilitation programme (HeartSmart). Current long-term adherers of the HeartSmart programme will be recruited and trained as Peer Mentors. They will then, under the supervision of the research team and the HeartSmart team, mentor newcomers to the HeartSmart programme over a 6 week period.

Involvement in this research study will involve the following:

In addition to the usual assessments undertaken by all newcomers to the HeartSmart programme, you will be required to complete additional questionnaires concerning exercise

self-efficacy, health related quality of life and physical activity levels. Physical activity

levels will also be measured objectively pre and post study using a small device that measures how quickly and often you move for a period of 7 days. This device is about the

size of a match box and will be worn around your waist.

Confidentiality

The confidentiality of subjects will be respected at all stages of the research study.

Each subject will be assigned an identification number under which all your details

will be stored in a secure file and saved in a passport protected file in a computer at

DCU. Only the investigators working on this research project will have access to

this file. However, confidentiality of information provided can only be protected

within the limitations of the law. It is possible for the data to be subject to subpoena,

freedom of information claim or mandated reporting by some profession.

Data Storage

All data collected will be stored on the DCU campus for 5 years following the

completion of the research study, in line with regulations. The principal investigator

will then destroy the data.

Voluntary participation

Involvement in this research study is on a completely voluntary basis. Withdrawal at

any time will be accepted and there will be no penalty should you wish to do so.

If you have any queries regarding the conduct of this project you can contact:

The Secretary, Research Ethics Committee, Office of the Vice-President for

Research, Dublin City University,

Tel: 01-7008000, Fax: 01-7008002

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Appendix 28 - Informed consent form for Mentees

PROJECT TITLE: Examination of the effects of the introduction of Peer

Mentoring in a Phase IV Community-Based Cardiac Rehabilitation

Programme.

The study will be undertaken at Dublin City University.

PRINCIPAL INVESTIGATORS:

Dr. Catherine Woods Phone: 01 7008008 Email: catherine.woods@dcu.ie

Ms. Antonia Martin Phone: 087-1254709 Email:

antonia.martin35@mail.dcu.ie

I am being asked to participate in this research study. The study has the

following purpose:

To examine the effects of the introduction of Peer Mentors on retention and participation rates of participants in a Phase IV community-based cardiac rehabilitation programme (HeartSmart). Current long-term adherers of the HeartSmart programme will be recruited and trained as Peer Mentors. They will

learisman programme will be recruited and trained as reel Mentols. They will

then, under the supervision of the research team and the HeartSmart team, mentor

newcomers to the HeartSmart programme over a 6 week period.

This is what will happen during the research study:

1. I will be required to attend DCU for initial assessments. This will include a

questionnaires regarding exercise self-efficacy, health related quality of life,

and my current level of physical activity. My physical activity level will also

be measured objectively using a motion sensor (a small instrument the size of

a matchbox). I will be required to wear this on my waist for 7 days to count

the number of steps I take each day.

2. I will repeat the above assessments after 6-weeks if I am still attending the

HeartSmart programme.

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Confirmation of particular requirements:

Participant, please complete the following (Circle Yes or No for each question)

Have you read or had read to you the Plain Language Statement?

Yes / No
Do you understand the information provided?

Yes / No
Have you had an opportunity to ask questions and discuss this study?

Yes / No

Have you received satisfactory answers to all your questions? Yes / No

<u>VOLUNTARY STATUS</u>: Involvement in this research study is on a completely voluntary basis. While you are encouraged to complete the study, withdrawal at any time will be accepted and there will be no penalty should you wish to do so

CONFIDENTIALITY: The confidentiality of subjects will be respected at all stages of the research project. Each subject will be assigned an identification number under which all their details will be stored in a secure file and saved in a passport protected file in a computer at DCU. Only the investigators working on this research project will have access to this file. However, confidentiality of information provided can only be protected within the limitations of the law. It is possible for the data to be subject to subpoena, freedom of information claim or mandated reporting by some profession.

Signature:

I have read and understood the information in this form. My questions and concerns have been answered by the researchers and I have a copy of this consent form. Therefore, I consent to take part in this research project.

Participant Signature:		
Name in BLOCK CAPITALS:	 	
Witness:	 	
Date:		

Appendix 29 - Post Intervention Mentee Exit Interview Questions

Mentee Post-Intervention Interview Questions

Thank you for agreeing to meet with me. I am looking for some feedback on your experience of the HeartSmart programme in general and specifically with your Peer Mentor. As you know, the Peer Mentor programme is a new addition to HeartSmart and we would like your assistance with our evaluation of it to see if it is working or how it could be improved. All information you give me is confidential.

- 1. Tell me about your experience of the HeartSmart Programme.
- 2. Did your Peer Mentor provide any assistance?
- 3. Did having a Peer Mentor influence your attendance at HeartSmart?
- 4. Did you think 6-weeks was an appropriate time scale to be matched with a Peer Mentor?
- 5. What aspect(s) of HeartSmart did you find the most challenging?
- 6. Was there any additional support you did not receive that would have been helpful?

Appendix 30 - Dropout Mentee Interview Questions

Dropout Questions

Hi, this is Antonia from the HeartSmart Programme. We've noticed that you are no longer attending HeartSmart and were wondering if you could spare 10 minutes to tell me about your experience? We are aiming to improve the programme so your input would be helpful.

Anything you say will be confidential; it will be used to try to improve the programme. You are under no obligation to answer the questions etc.

- 1. Can you share with me the reason you did not stick with the HeartSmart programme? (prompt for the main reason).
- 2. Was there anything in particular you did not like about HeartSmart?
- 3. You were paired with a Mentor, how did this go? (prompt helpful/unhelpful etc.)
- 4. Is there anything that could be changed with the programme to make it more suited to your needs?
- 5. Would you consider returning?
- 6. Are you making any efforts at the moment to be physically active?

<u>Appendix 31 - Self-Regulation Questionnaire - Exercise</u>

Motivation for Exercise

There are a variety of reasons why people exercise regularly. Please indicate how true each of these reasons is for why you exercise regularly. The scale is:

1		2	3	4	5	6	7
no	t at	all true	S	somewhat tru	е	very	true
l tr	y to	exercise on a	regular basis:				
	1.	Because I would	d feel bad abo	ut myself if I did	d not.		
	2.	Because others	s would be ang	ry at me if I did	not.		
	3.	Because I enjo	y exercising.				
	4.	Because I would	ld feel like a fai	lure if I did not.			
	5.	Because I feel	like it's the bes	t way to help m	nyself.		
	6.	Because peopl	e would think I'	m a weak pers	on if I did not.		
	7.	Because I feel	like I have no c	choice about ex	ercising;		
		others make m	ne do it.				
	8.	Because it is a	challenge to a	ccomplish my g	joal.		
	9.	Because I belie	eve exercise he	lps me feel bet	ter.		
	10.	Because it's fur	ո.				
	11.	Because I worr	y that I would g	get in trouble wi	ith others if I did	not	
	12.	Because it feels	s important to r	me personally to	o accomplish th	is goal	-
	13.	Because I feel	guilty if I do not	t exercise regul	larly.		
	14.	Because I want	t others to ackr	nowledge that I	am doing what		
		I have been tole	d I should do.				
	15.	Because it is in	teresting to see	e my own impro	ovement.		
	16	. Because feelin	g healthier is a	n important val	ue for me.		

Appendix 32 - Exercise Enjoyment Questionnaire

Exercise Enjoyment

For each of the following, please tell me how you feel while you are exercising. Rate your answer on the 5 point scale below the question:

1.	. How much do you enjoy exercising while you are doing it?					
	1 I hate it	2	3	4	5 I enjoy it	
2.	How much a it?	re you interes	ted by physica	al activity	while you are doing	
	1	2	3	4	5	
	I feel interested I feel bored					
3.	How fun is p	hysical activity	y while you ar	e doing it	?	
	1	2	3	4	5	
	No fun at all				A lot of fun	
4.	How pleasar	nt is physical a	activity for you	while yo	u are doing it?	
	1	2	3	4	5	
	Very pleasar	nt		١	ery unpleasant	
5.	How do you	feel while you	are doing phy	ysical ac	tivity?	
	1	2	3	4	5	
	I feel good p	hysically		I	feel bad physically	

<u>Appendix 33 - Exercise Self-Efficacy Questionnaire</u>

Certain barriers make it hard to begin exercising. How sure are you that you can begin exercising/attending HeartSmart regularly? I am sure that.

Tam sare that				
	Not at all true	Barely True	Mostly True	Exactly True
I can change to a physically active lifestyle	□1	□2	□3	□4
I can be physically active once a week.	□1	□2	□3	□4
I can be physically active at least 3 times	□1	□2	□3	□4
a week for 30 minutes.				
It is always hard to get started. How sure are you that you	can <i>start</i> exercising /at	ttending HeartSmart re	gularly?	
I am sure that				
	Not at all true	Barely True	Mostly True	Exactly True
I can attend HeartSmart once a week	□1	□2	□3	□4
I can attend HeartSmart twice a week.	□1	□2	□3	□4
I am sure I can start (being physically active /attending Hea	rtSmart) immediately,	even if		
	Not at all true	Barely True	Mostly True	Exactly True
I initially have to reconsider my views on physical activity	□1	□2	□3	□4
The planning for this is very laborious	□1	□2	□3	□4
I have to force myself to start immediately	□1	□2	□3	□4
I have to push myself	□1	□2	□3	□4

It is important to stay physically active. Are you confident you can manage that? I am sure I can keep (being physically active/ attending HeartSmart) regularly, even if.....

	Not at all true	Barely True	Mostly True	Exactly True
It takes a long time to make it a habit	\Box 1	□2	□3	□4
I am worried and troubled	\Box 1	□2	□3	□4
I don't see improvements in fitness immediately	\Box 1	□2	□3	□4
I am tired	\Box 1	□2	□3	□4
I am stressed out	\Box 1	□2	□3	□4
I feel tense	\Box 1	□2	□3	□4
My blood pressure doesn't improve immediately	\Box 1	□2	□3	□4
I don't feel part of the group/make friends immediately	\Box 1	□2	□3	□4
I have to start all over again several times until I succeed	\Box 1	□2	□3	□4
My partner/family isn't physically active	\Box 1	□2	□3	□4
My cholesterol doesn't improve immediately	\Box 1	□2	□3	□4
My weight doesn't improve immediately	\Box 1	□2	□3	□4
I am bored with the activities	\Box 1	□2	□3	□4
I have other more interesting things to do	\Box 1	□2	□3	□4
Have demands at home or work	\Box 1	□2	□3	□4
The weather is bad	\Box 1	□2	□3	□4
I feel discomfort when engaging in physical activity	\Box 1	□2	□3	□4

I feel depressed	\Box 1	□2	□3	□4
I find it very time-consuming	□1	□2	□3	□4
In spite of good intentions, small or large relapses may	occur. Imagine you stoppe	ed exercising for some ti	me. How confident are	e you about restarting
exercises /re-joining HeartSmart?				
I am sure I can be physically active/ attend HeartSmart	again regularly, even if			
	Not at all true	Barely True	Mostly True	Exactly True
I postpone my plans several times	□1	□2	□3	□4
I am not able to pull myself together sometimes	□1	□2	□3	□4
I have already paused for/missed several weeks	□1	□2	□3	□4
I have been feeling unwell	□1	□2	□3	□4

Appendix 34 - 12-Item Short Form Health Survey (SF-12)

The following questions ask for your views about your health, how you feel and how well you are able to do your usual activities

1. **In general,** would you say your health is: (*Please tick one box*)

Excellent 😘	Very good 😘	Good 😘	Fair 😘	Poor 😘
-------------	-------------	--------	--------	--------

HEALTH AND DAILY ACTIVITIES

2. The following questions are about activities you might do during a typical day.

Does your health limit you in these activities? If so, how much? (*Please tick one*

		Yes, Limited a lot	Yes, limited a little	No, not limited at all
i)	Moderate activities, such as moving a table,			
	pushing a vacuum, bowling or playing golf.			
ii)	Climbing several flights of stairs			

box on each line)

3. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**? (*Please answer Yes or No to each question*)

		Yes	No
i)	Accomplished less than you would like		
ii)	Were limited in the kind of work or other activities		

4. During the **past 4 weeks**, have you had any of the following problems with your work or other regular activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

(Please answer **Yes** or **No** to each question)

		Yes	No
i)	Accomplished less than you would like		
ii)	Didn't do work or other activities as carefully as usual		

5. During the **past 4 weeks** how much did **pain** interfere with your normal work (including work both outside the home and housework)? (*Please tick one box*)

110t at an	A fittle oft	Wioderatery	Quite a oit	LAUCINCIY
Not at all	A little bit	Moderately	Ouite a bit	Extremely

YOUR FEELINGS

6. These questions are about how you feel and how things have been with you **during the past month.** For each question, please indicate the one answer that comes closest to the way you have been feeling.

(Please tick **one** box on each line)

How much time during the last month		All of the time	A good bit of the time	Some of the time	None of the time
i)	Have you felt calm and peaceful?				
ii)	Did you have a lot of energy?				
iii)	Have you felt downhearted and low?				
iv)	Has your health limited your social activities (like visiting friends or close relatives)?				

Appendix 35 - Expectations Regarding Aging Survey (ERA-12)

EXPECTATIONS REGARDING AGING

- This survey has questions about what you expect about aging.
- Please check the ONE box to the right of the statement that best corresponds with how you feel about the statement. If you are not sure, go ahead and check the box that you think BEST corresponds with your feelings.

	True	Somewhat True	False	False
When people get older, they need to lower their expectations of how healthy they can be.				
The human body is like a car: when it gets old, it gets worn out.				
Having more aches and pains is an accepted part of aging.				
Every year that people age, their energy levels go down a little more.				
I expect that as I get older I will spend less time with friends and family.				
6. Being lonely is just something that happens when people get old.				
7. Quality of life declines as people age.				
It's normal to be depressed when you are old.				
9. I expect that as I get older I will become more forgetful.				

	Definitely True	Somewhat True	Somewhat False	Definitely False
10. It's an accepted part of aging to have trouble remembering names.				
11. Forgetfulness is a natural occurrence just from growing old.				
 It is impossible to escape the mental slowness that happens with aging. 				