

***FACTORS ASSOCIATED WITH PARTICIPATION IN A PHASE  
THREE CARDIAC REHABILITATION PROGRAMME***

By

***Mohammed Habib Noorbhai***

(NRBMOH003)

SUBMITTED TO THE UNIVERSITY OF CAPE TOWN  
in fulfilment of the requirements for the degree

**Master of Philosophy in Biokinetics  
(MPhil Biokinetics)**

UCT/MRC Research Unit for Exercise Science and Sports Medicine, Department of Human  
Biology, Faculty of Health Sciences,  
UNIVERSITY OF CAPE TOWN  
Sports Science Institute of South Africa, Boundary Road  
Newlands 7700, South Africa

**13 December 2013**

Supervisors:

Tracy Kolbe-Alexander, PhD

Catherine Elizabeth Draper, PhD



The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

***Factors associated with participation in a phase three cardiac rehabilitation programme***

***Mr. Mohammed Habib Noorbhai, BSpSc (Hons) Biokinetics***

MRC/UCT Exercise Science and Sports Medicine Research Unit  
Department of Human Biology  
Faculty of Health Sciences  
University of Cape Town

***Correspondence:***

Habib Noorbhai  
Department of Human Biology, Exercise Science and Sports Medicine Research Unit  
Faculty of Health Sciences  
University of Cape Town  
3rd Floor Sports Science Institute of South Africa  
Boundary Road  
Newlands, 7700  
Cape Town  
South Africa  
Contact: +(27) 72 4645200 (mobile)  
Email: habib.noorbhai@yahoo.com

**UCT/MRC Exercise Science and Sports Medicine Research Unit,  
Sports Science Institute of South Africa**

**MPHIL BIODYNAMICS PROGRAMME 2012-2013**

***Declaration***

I, ***Mohammed Habib Noorbhai*** hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

No part of this dissertation may be reproduced, stored in a retrieval system, or transmitted in any form or means without prior permission in writing from the author or the University of Cape Town, Department of Human Biology, Exercise Science and Sports Medicine.

**Student Name: Mohammed Habib Noorbhai**

**Student Number: NRBMOH003**

**Signature: \_\_\_\_\_**

**Date: 31 March 2014**

## Contents

Acknowledgements	8
List of Figures:	9
List of Tables:	10
List of Abbreviations and Symbols	11
Abstract	12
<hr/>	
<i>Chapter One: Literature review</i>	13
<b>1.1 Introduction</b>	14
1.1.1 Aim of literature review	16
1.1.2 Search Strategy	16
<b>1.2 Summary of literature review</b>	16
1.2.1 Cardiac rehabilitation programmes	16
1.2.2 Phases of cardiac rehabilitation programmes	19
1.2.3 Effectiveness and efficacy of cardiac rehabilitation programmes	23
1.2.4 Factors associated with participation in cardiac rehabilitation programmes	32
1.2.4.1 Factors promoting participation in cardiac rehabilitation programmes	33
1.2.4.2 Factors hindering participation in cardiac rehabilitation programmes	34
1.2.5 Rationale for study	36
<b>1.3 Research aims and objectives</b>	37
<b>1.4 Summary</b>	39
<hr/>	
<i>Chapter Two</i>	40
<b>Factors associated with participation in a phase three cardiac rehabilitation programme: A qualitative study</b>	40
<b>2.1 Background</b>	41
<b>2.2 Methods</b>	42
2.2.1 Study setting	42
2.2.2 Sample	45

2.2.3 Procedure	46
2.2.4 Qualitative data analysis	46
2.2.5 Ethical considerations	46
<b>2.3 Results</b>	<b>47</b>
2.3.1 Factors promoting participation	47
2.3.1.1 Prime Time programme participants characteristics	47
2.3.1.2 Perceptions and success of the Prime Time programme – staff	48
2.3.1.3 Job satisfaction and staff cohesiveness	48
2.3.1.4 Communication amongst staff	49
2.3.1.5 Perceptions and success of the Prime Time programme – participants	50
2.3.1.6 Health, social and psychological aspects	51
2.3.1.7 Facilities, environment and equipment	52
2.3.1.8 Monitoring and care of Prime Time participants	52
2.3.2 Factors hindering participation	53
2.3.2.1 Reasons for participants dropping out of the Prime Time programme	53
2.3.2.2 Factors reducing the effectiveness of the Prime Time programme	53
2.3.2.3 Suggestions and strategies for improvement	54
2.3.2.3.1 Assessments for Prime Time participants	54
2.3.2.3.2 Referral process and allocation of memberships	54
2.3.2.3.3 Programme structure and space for Prime Time programme	55
2.3.2.3.4 Additional activities	56
2.3.3 Summary	56
<b>2.4 Discussion</b>	<b>60</b>
<b>2.5 Strengths and limitations</b>	<b>63</b>
<b>2.6 Recommendations and implications</b>	<b>63</b>
<b>2.7 Conclusion</b>	<b>64</b>

<i>Chapter Three</i>	65
<b>A comparison of gym attendance between Prime Time and Non-Prime Time members: A case-control study</b>	65
<b>3.1 Background</b>	66
<b>3.2 Methods</b>	67
3.2.1 Study design	67
3.2.2 Participants	67
3.2.3 Measures	68
3.2.3.1 Memberships during 2011	68
3.2.3.2 Clinical and anthropometrical measurements	68
3.2.3.3 Cardiovascular disease risk factors	69
3.2.3.4 Gym attendance	69
3.2.3.5 Distance to the commercial gym	71
3.2.4 Statistical analysis	71
3.2.5 Ethical considerations	71
<b>3.3 Results</b>	71
3.3.1 Participant characteristics	71
3.3.2 Medical history	72
3.3.3 Clinical and anthropometrical measurements	72
3.3.4 Cardiovascular disease risk factors	72
3.3.5 Gym attendance	76
<b>3.4 Discussion</b>	77
<b>3.5 Strengths and limitations</b>	79
<b>3.6 Conclusion</b>	79
<hr/>	
<i>Chapter Four</i>	80
<b>Summary of Results</b>	80

<b>Reference list</b>	85
<hr/>	
<b>Appendices</b>	97
1. Pre-participation health screening (PPHS) form	98
2. Focus group discussions – Guide questions	99
3. Individual and previous participant in-depth interviews – Guide questions	100
4. Staff key-informant interviews – Guide questions	101
5. Consent form for focus group discussions and in-depth interviews	102
6. Consent to disclosure	104
7. Body fat percentage calculation utilized by the commercial gym	105
<hr/>	

## Acknowledgements

I would like to express my sincere gratitude to the following people whom have made the last two years possible and a success for me.

- Firstly to my family for their prayers and for never holding me back from pursuing my career and reaching my goals.
- To my supervisors, Tracy and Cathi, thank you for all the hard work you've put in. Thank you for the support, advice and guidance through the ups and the downs.
- To members, participants and staff involved with the Prime Time programme at the Sports Science Institute of South Africa.
- To my secret mentors, Prof Timothy Noakes and Prof Mike Lambert, for taking the time to help me become more assertive not only personally, but as a health professional and aspiring researcher.
- To the NRF for funding my studies in 2013, this opportunity would not have been possible without their help.
- To a few people for their valuable contributions and assistance during the study: Prof. Vicki Lambert, Dr Lisa Micklesfield, Dr Liberty Eaton, Dr Aslam Noorbhai, Dr Abdel Halabi, Mrs Khatija Halabi, Mr Chad Gravenorst, Mr Rob Rayner, Miss Taahira Moola and the physical activity research group at ESSM.
- Lastly to my Cape Town friends who have made these difficult years much easier for me to bear.

## List of Figures

<b>Figure 1.1:</b> <i>Prevalence of risk factors for cardiovascular diseases in South Africa</i>	15
<b>Figure 1.2:</b> <i>Components of a cardiac rehabilitation programme</i>	18
<b>Figure 1.3:</b> <i>Synopsis of the literature</i>	38
<b>Figure 2.1:</b> <i>The Prime Time programme logic model</i>	43
<b>Figure 2.2:</b> <i>Diagnoses and conditions of participants prior to joining the Prime Time programme</i>	47
<b>Figure 2.3:</b> <i>Conceptual model of the Prime Time programme</i>	58
<b>Figure 2.4:</b> <i>Improvements and influential factors associated with participation</i>	59
<b>Figure 3.1:</b> <i>Process of participant selection and record review of data</i>	71
<b>Figure 3.2:</b> <i>Medical history of members.</i>	74
<b>Figure 3.3:</b> <i>Cardiovascular disease risk factors between groups</i>	75

## List of Tables

<b>Table 1.1:</b> <i>Phases of cardiac rehabilitation programmes</i>	21
<b>Table 1.2:</b> <i>FITT Principles for each phase of cardiac rehabilitation programmes</i>	22
<b>Table 1.3:</b> <i>Peer-reviewed publications in relation to the effectiveness and efficacy of cardiac rehabilitation programmes</i>	26
<b>Table 3.1:</b> <i>Participant characteristics at baseline: Demographical and clinical results</i>	76

## **List of Abbreviations and Symbols**

CRPs = Cardiac rehabilitation programmes

CRP = Cardiac rehabilitation programmes

CR= Cardiac rehabilitation

CVDs = Cardiovascular Diseases

NCDs = Non-communicable diseases

PTP = Prime Time programme

SSISA = Sports Science Institute of South Africa

ESSM = Exercise Science and Sports Medicine

HR = Heart rate

BP = Blood pressure

SBP = Systolic blood pressure

DBP = Diastolic blood pressure

ACS = Acute coronary syndrome

MI = Myocardial infarction

CHD = Cardiac heart disease

CHF = Congestive heart failure

CAD = Coronary Artery Disease

# ABSTRACT

## Background

Patients with cardiovascular diseases (CVDs) and non-communicable diseases (NCDs) benefit from participating in cardiac rehabilitation programmes (CRPs). The aim of this research project was to evaluate the factors associated with participation in a phase three CRP, the Prime Time programme (PTP). A secondary aim was to compare attendance and baseline measures between Prime Time (PT) and non-Prime Time (NPT) members at a commercial gym.

## Methodology

The first chapter comprised of focus group discussions (n = 3) and key-informant interviews (n = 5 current members and n = 5 ex-members). Staff participants (n = 9) included the Biokineticists, programme managers and sales consultants who participated in key-informant interviews and provided their perceptions and experiences while working on the programme. Atlas.ti was used for the data analysis and a thematic coding framework was used to analyse the focus groups and interviews.

The second chapter, which was a pilot study, employed a case-control research design to compare attendance and baseline data between PT (n = 11) and NPT (n = 40) members at a commercial gym. Three age-matched controls for every case were included in this pilot study. Descriptive statistics (means and standard deviations), one-way analysis of variance (used to determine if there were any significant differences between groups at baseline for continuous variables) and Chi-square analysis (used to determine if there were any significant differences between groups at baseline for categorical variables) were performed. The level of significance was set at  $p < 0.05$ .

## Results

The results in chapter one were categorized into factors promoting and hindering participation. The main factors promoting participation were participants' improved health status and fitness levels, the PTP having qualified staff and frequent physiological measures. Additional factors included increased understanding of the importance of CRPs, gym facilities and socialization opportunities for participants. The main factors hindering participation were inappropriate referrals from other programmes to the PTP and inconsistency of follow-up assessments. Overall, the positive perceptions and experiences of the PTP outweighed the negative experiences for both the staff and participants. The results in chapter two showed that the average days of attendance per month in 2011 were not significantly different between PT ( $5.4 \pm 3.7$  days) and NPT ( $5.1 \pm 3.7$  days) members. The prevalence of cardiovascular diseases CVDs amongst both groups was 50%. Nearly 75% of both PT and NPT members were at risk for CVDs.

## Conclusion

The findings of this research study suggest that the PTP played a role in improving the health status and psychosocial factors for CRP participants. Furthermore, the additional keys to successful programme implementation lies in the referral process, consistency of follow-up assessments and improved programme structure in CRPs. The evidence presented in the second chapter does not support the original hypotheses that PT members attend gym more regularly and are at more risk for CVDs than NPT members. The implications of findings from this pilot research study are therefore limited for future research. Future research is therefore required to fully understand the differences associated with gym attendance and phase three CRPs.

Keywords: programme evaluation, qualitative research methods, quantitative research methods, factors, participation, gym attendance, phase three cardiac rehabilitation programme

*Chapter One:*  
**Literature Review**

---

## 1.1 Introduction

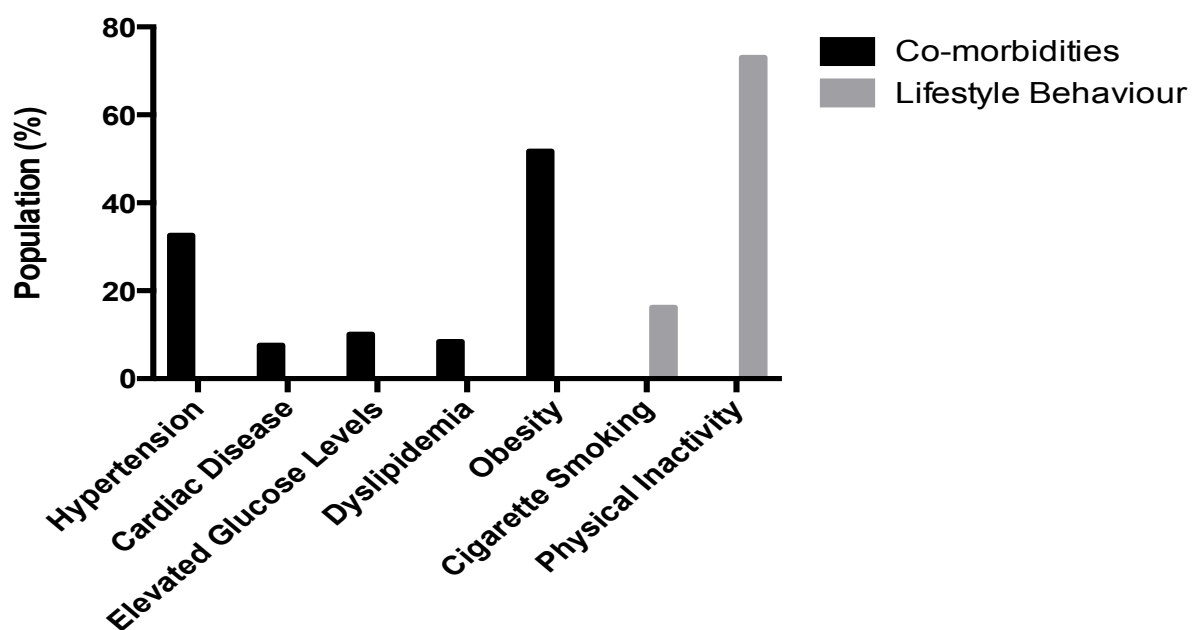
Globally, there has been a marked increase in the prevalence of cardiovascular diseases (CVDs) and other non-communicable diseases (NCDs)<sup>1</sup>. The majority of deaths attributable to NCDs (63%) are due to the high prevalence of CVDs in developing countries<sup>2,3</sup>. Sub-Saharan Africa (SSA) has a higher burden of NCDs (25%) compared to other world regions (9%)<sup>1,3,4,5</sup>. The prevalence of CVDs in South Africa (SA) is more than 50% and 20% among women and men respectively and accounted for an estimated 28% of all deaths in 2012<sup>3,6,7</sup>.

Along with the increased burden of CVDs and NCDs, there has been an increase in the prevalence of risk factors associated with these diseases<sup>7,8</sup>. In SA, nearly 60% of all adults have at least one major cardiovascular disease (CVD) risk factor including physical inactivity, obesity, hypertension and dyslipidemia<sup>9,10</sup>. These data are supported by the recent South African National Health and Nutritional Examination Survey (SANHANES-1) in which 25 532 individuals completed a self-report survey<sup>10</sup>. The prevalence of NCDs tends to increase with age in the SANHANES-1, with the lowest (2%) prevalence of cardiac disease found in Black Africans between the ages of 15-24 years. The highest prevalence (29%) was in Indian South Africans residing in the urban Free State between the ages of 55-64 years<sup>10</sup>. The most prevalent risk factors among all individuals were physical inactivity (73.1%) followed by co-morbidities, obesity (51.7%) and hypertension (32.6%)<sup>10</sup>. In comparison to the South African Demographical Health Survey (SADHS) initiated in 2003, an increasing trend has been seen in the prevalence of physical inactivity (55.5%) and hypertension (27.3%) whilst obesity amongst females (55.0%) has slightly decreased<sup>9</sup>.

Fewer respondents from the SANHANES-1 reported co-morbidities of elevated blood glucose (10.0%), dyslipidemia (8.4%), cardiac disease (myocardial infarction, angina, chest

pain; 7.6%) and the lifestyle behaviour of cigarette smoking (16.2%) (Figure 1.1)<sup>10</sup>. Increasing trends has also been seen for the prevalence of dyslipidemia (4.2%) and elevated glucose levels (6.5%) from the SADHS study<sup>9</sup>. In contrast, cigarette smoking trends have decreased by 49% from 32% in 1993 to 16% in 2012. This decreases has largely been attributed to the anti-smoking legislation, health education programmes and increased public intervention programmes<sup>10</sup>. The increasing trends of CVD risk factors suggests the need for intervention programmes to manage and prevent these risk factors and the disease itself<sup>1,3,9,10,11</sup>.

**Figure 1.1: Prevalence of risk factors for cardiovascular diseases in South African adults between the age 15-64 years residing in rural and urban areas (Source of data: South African National Health and Nutritional Examination Survey, 2013).<sup>10</sup>**



Intervention programmes such as cardiac rehabilitation programmes (CRPs) are multi-faceted and multidisciplinary interventions that are aimed at addressing CVDs and the management of risk factors for CVDs through the application of medical therapy and non-pharmacological treatment<sup>12,13</sup>. Patients that have more than one CVD risk factor and/or have been diagnosed

with CVDs are eligible to participate in these CRPs<sup>5</sup>. The effectiveness of these intervention programmes have been shown in a variety of hospital<sup>14</sup>, home<sup>15</sup> and gym-based settings<sup>16</sup>

### **1.1.1 Aim of literature review**

The aim of this review was to identify evidence to determine the effectiveness of CRPs, determine the factors linked to participation and to outline the research gaps in the literature. The scope of this literature review focuses on the effectiveness of CRPs, as well as the factors associated with participation in CRPs.

### **1.1.2 Search strategy**

Research articles were identified by searching electronic databases with the keyword searching of ‘cardiac rehabilitation programmes’, ‘participation’, ‘attendance’ and ‘factors’ and primarily focused on manuscripts and reports published between 2006 and 2013. Due to the limited scope of the review, we opted for the most recent publications, hence we only included those published in the last 7 years, as this was regarded as the most up to date information.

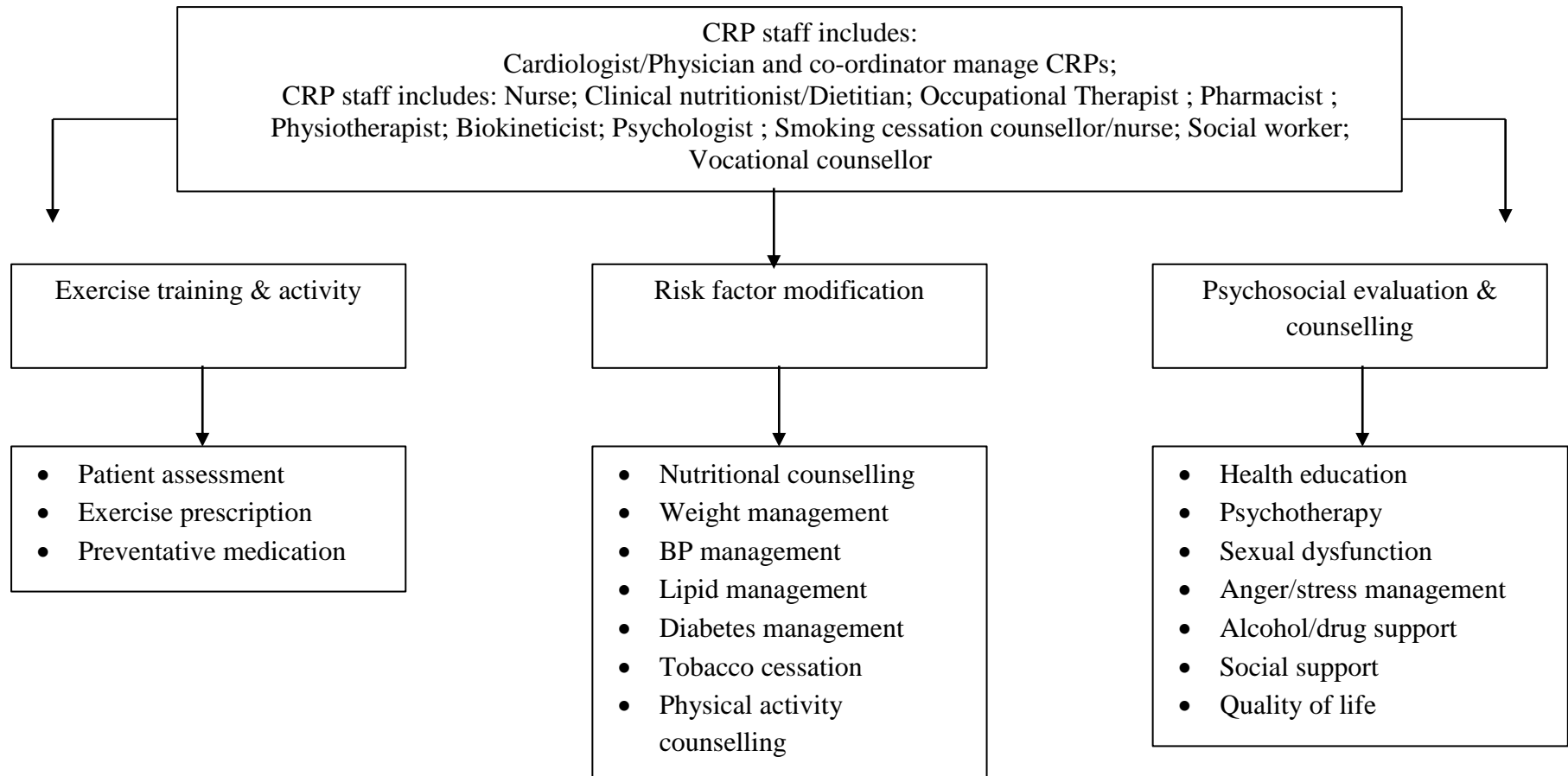
## **1.2. Summary of Literature**

### **1.2.1 Cardiac rehabilitation programmes (CRPs)**

CRPs are medically supervised intervention programmes aimed at individuals that have diagnosed CVDs and/or more than one risk factor for CVDs<sup>17</sup>. Figure 1.2 presents a summary of the components of a cardiac rehabilitation programme (CRP). A range of health professionals including nurses, cardiologists and vocational counsellors are involved in the different programme activities. The different programme activities include risk factor

modification, categories of exercise training and activity, psychosocial evaluation and counselling<sup>12,13,18,19</sup>. The main outcome of CRPs is to assist cardiac patients' in their return to an active and normal lifestyle and reduce the risk of a subsequent event<sup>20</sup>.

**Figure 1.2: Components of a cardiac rehabilitation programme**



*Adapted from Balady et al., 2007<sup>18</sup>, Mampuya, 2012<sup>25</sup>, IACR, 2007<sup>65</sup>; BP = blood pressure, CRP/CRPs = cardiac rehabilitation programme/s*

In SA, CRPs are not widely implemented in the public health care setting due to financial, ethical and practical constraints<sup>11</sup>. Currently, there are insufficient public cardiac rehabilitation (CR) services in SA and the demand for these services continues to increase as health professionals and the public are becoming more aware of the evidence of its benefits<sup>11</sup>. Many of the outpatient CRPs are implemented from private fitness centres or Biokinetic practices that serve between 10 to 100 patients per day<sup>11</sup>. Due to the limited public CR services and health professionals in SA, a minority of cardiac patients benefit from CR and manages their risk factors in private health care settings<sup>11</sup>. Research studies should thus be aimed at the private sector in order to gain insight into the understanding of CRPs.

### **1.2.2 Phases of cardiac rehabilitation programmes**

There are three broad phases of a CRP including assessments, consultations, rehabilitation, follow-up assessments, improvement and maintenance of post-cardiac rehabilitation exercises<sup>17,18</sup>. Table 1.1 presents the components of the three phases with an example of a type of intervention programme for each phase. Phase one focuses on inpatient programmes and is usually three to five days in length coinciding with being hospitalised<sup>17,21</sup>. This phase consists of obtaining the patient's medical history, investigation of co-morbidities and education to patients<sup>21</sup>.

Phase two involves outpatient programmes that take place after the patient has been discharged from the hospital<sup>22</sup>. It consists of therapeutic exercise sessions and weekly educational sessions on topics related to CVD risk factors and cardiac disease, though not all CRPs include these educational sessions<sup>23</sup>. In addition, clinicians involved in designing therapeutic exercise sessions utilise particular exercise prescriptions known as the 'FITT' principle (Frequency of exercise, Intensity of exercise, Time – duration of exercise and Type

of exercise) for patients depending on the phase of rehabilitation that applies to them<sup>24</sup> (Table 1.2).

The second phase is usually eight weeks in duration but can vary between six and 12 weeks. The duration of this phase depends on the patient's clinical needs, specific considerations for adherence to exercise prescription and the response to the exercise<sup>22,23</sup>. Clinical needs of cardiac rehabilitation patients include contra-indications and risk factors that should be considered when the Biokineticist prescribes the appropriate exercise<sup>24,25</sup>. Absolute contra-indications include the following: unstable angina, aortic stenosis and a change in electrocardiogram rest readings; whereas relative contra-indications include the following: ventricular aneurysms, coronary stenosis and NCDs<sup>24</sup>. In addition, patients in this phase of CRP are advised to continue with exercise based on the general principles of the programme, and are encouraged to increase their level of activity under the supervision of their clinician<sup>22</sup>.

Each session in phase two usually lasts between 60 and 90 minutes and includes a brief clinical assessment and a questionnaire on relevant symptoms and compliance with medical therapy<sup>17</sup>. The exercise programme includes a warm-up period, aerobic training (treadmill and arm and leg ergometers), strength training (using dumbbells, exercise balls and other strength training equipment), a cool-down period and flexibility exercises<sup>23</sup>. The intensity of this exercise programme is determined for each patient based on their exercise heart rate calculated by the Karvonen formula using the patient's demographical and clinical measures obtained from the ECG stress results<sup>24</sup>. This is complemented by the patient's rating of perceived exertion (RPE) using the Borg scale<sup>23,24</sup>.

**Table 1.1: Phases of cardiac rehabilitation programmes**

	<b>Location / duration</b>	<b>Components</b>	<b>Assessment</b>	<b>Characteristics of CRPs</b>
<b>Phase I (Inpatient)</b>	Hospital setting  (In patient stay)	<ul style="list-style-type: none"> <li>• Patient gradually introduced to CR</li> </ul>	<ul style="list-style-type: none"> <li>• Assessed every month</li> <li>• Education about cardiac event / condition</li> <li>• Risk factor modification</li> <li>• Symptom management</li> <li>• Counselling &amp; support</li> <li>• Early mobilisation</li> <li>• Referral to Phases II and III</li> </ul>	<ul style="list-style-type: none"> <li>• Tertiary care hospital</li> <li>• LVAD patients</li> <li>• 3 hours a day of comprehensive physical, occupational and speech therapy</li> <li>• Education on preventing post-operative complications from bed rest, maximizing independence in mobility and activities of daily living, with the goal for discharge<sup>66</sup></li> </ul>
<b>Phase II (Outpatient monitoring)</b>	Subsequent to patient discharged from hospital  (2-8 weeks)	<ul style="list-style-type: none"> <li>• Weekly education programmes</li> <li>• Therapeutic exercise sessions</li> <li>• Under care of GP</li> </ul>	<ul style="list-style-type: none"> <li>• Assessed every once to three months</li> <li>• Assessment of cardiac risk, physical, psychological and social needs for CR</li> <li>• Provision of lifestyle advice and psychological interventions</li> </ul>	<ul style="list-style-type: none"> <li>• Home-based CR</li> <li>• Eligible patients of acute MI discharged from hospital</li> <li>• 8-10 weeks with a class a week</li> <li>• Supported by nurse, pharmacist, psychologist and physiotherapist</li> <li>• Outcomes measured: psychological and quality of life after 9 months<sup>16</sup></li> </ul>
<b>Phase III (Outpatient Maintenance)</b>	Tertiary institutions/ private hospitals  (8 -12 weeks)	<ul style="list-style-type: none"> <li>• Maintain exercise, healthy behaviours and compliance with prescribed therapy (less monitoring)</li> <li>• Review of training</li> </ul>	<ul style="list-style-type: none"> <li>• Assessed every three to six months</li> <li>• Consultations: tertiary institutions/physical medicine &amp; rehabilitation clinics</li> </ul>	<ul style="list-style-type: none"> <li>• Diagnosed CHD patients in USA at 24 health care centres and private hospital- based CR</li> <li>• Health outcomes measured at 12 weeks and 1 year after</li> <li>• Supported by health professionals<sup>33</sup></li> </ul>

Adapted from AACRP (2004). *Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs*<sup>67</sup>; CR = cardiac rehabilitation; CRPs= cardiac rehabilitation

programmes; CHD = coronary heart disease; ECG = electrocardiogram; GP = general practitioner; LVAD = left ventricular assist device; MI = myocardial infarction

**Table 1.2: FITT principle for the phases of cardiac rehabilitation programmes**

	<b>Frequency of exercise</b>	<b>Intensity of exercise</b>	<b>Time – duration of exercise</b>	<b>Type of exercise</b>
<b>Phase I (Inpatient)</b>	<ul style="list-style-type: none"> <li>• Early mobilization: 2-4 times per day for first 3 days</li> <li>• Late mobilization: 2 times per day beginning on day 4 with exercise bouts of increased duration</li> </ul>	<ul style="list-style-type: none"> <li>• Tolerance if asymptomatic</li> <li>• RPE &lt; on scale of 6-20</li> <li>• Post MI-CHF: HR &lt; 120 beats per minute</li> <li>• Post-surgery: HR<sub>rest</sub> + 30 beats per minute</li> </ul>	<ul style="list-style-type: none"> <li>• Attempt to achieve 2:1 exercise to rest ratio</li> <li>• Beginning: Intermittent bouts lasting 3-5 minutes as tolerated</li> <li>• Rest period: slower walk</li> </ul>	<ul style="list-style-type: none"> <li>• Self-care activities</li> <li>• Arm, leg, range of motion, postural change</li> <li>• Walking</li> </ul>
<b>Phase II (Outpatient Monitoring)</b>	<ul style="list-style-type: none"> <li>• Exercise participation 4-7 days per week</li> </ul>	<ul style="list-style-type: none"> <li>• RPE of 11 to 16 on scale of 6-20</li> <li>• 40-80% of exercise capacity</li> <li>• prescribed as a HR below the ischemic threshold</li> </ul>	<ul style="list-style-type: none"> <li>• Warm up and cool down session: 5-10 minutes</li> <li>• Aerobic conditioning: 20-60 minutes</li> </ul>	<ul style="list-style-type: none"> <li>• Warm up and cool down: static and dynamic stretches</li> <li>• Aerobic: rhythmic, large muscle-group activities</li> <li>• Conditioning of upper and lower extremities</li> <li>• With exercise equipment</li> </ul>
<b>Phase III (Outpatient Maintenance)</b>	<ul style="list-style-type: none"> <li>• Stretching &amp; flexibility: 3 days a week</li> <li>• Aerobic: 3 to 4 times a week</li> </ul>	<ul style="list-style-type: none"> <li>• Stretching &amp; flexibility: Stretch to a position of mild discomfort</li> <li>• Aerobic: An RPE of 12 to 14</li> </ul>	<ul style="list-style-type: none"> <li>• Stretching &amp; flexibility: Hold each stretch for 10 to 30 seconds</li> <li>• Aerobic: 15 to 60 minutes</li> </ul>	<ul style="list-style-type: none"> <li>• Stretching &amp; flexibility</li> <li>• Aerobic exercise</li> <li>• Strength training</li> </ul>

*Adapted from Mampuya, 2012<sup>25</sup>; AACPR, 2005<sup>67</sup>; CHF = congestive heart failure; HR = heart rate; MI = Myocardial infarction; RPE = Rates of perceived exertion*

Phase three involves outpatient rehabilitation where the patient is encouraged to maintain exercise, healthy behaviours and compliance with prescribed exercises<sup>11</sup>. Follow-up assessments are conducted for patients in outpatient consultations by professionals which, take place in either tertiary institutions or the physical medicine and rehabilitation clinics<sup>24</sup>. Reassessments that include body composition, blood pressure, dyslipidemia and blood glucose, muscle strength, proprioception and flexibility are usually conducted every three to six months<sup>17,18</sup>. These assessments serve as the basis for the review of the patient's training components, especially the intensity that is required when exercising<sup>17,18</sup>.

### **1.2.3 Effectiveness and efficacy of cardiac rehabilitation programmes**

Research studies have shown a distinction between the effectiveness and efficacy of CRPs. The effectiveness of CRPs shows whether it works well in practice, whereas efficacy utilizes optimal use of resources and suggests whether the programme works well under ideal circumstances<sup>26,27</sup>. Limited research has been conducted on the effectiveness of phase three CRPs in SA. It has been observed that patients that participate in CRPs often present with a non-communicable disease (NCD) in addition to a cardiac disease. As such, a descriptive retrospective analysis was conducted to evaluate the medical records of patients who entered a phase three CRP during the period of January 1996 to August 2000<sup>11,26</sup>. Of the total study sample (n=313), 80% had documented coronary artery disease (CAD). Of the group of patients presenting with CAD, only 31% presented with CAD as the main diagnosis, CAD and other NCDs presented with 14%, whereas 26% presented with CAD and a chronic musculoskeletal injury, and a last group of 14% required rehabilitation for CAD plus another co-morbidity and a musculoskeletal injury<sup>11,26,27</sup>. The remaining 20% of the participants attended the programme for rehabilitation of another NCD including hypertension and

cancer<sup>27</sup>. The findings from this study suggest that the focus of CRPs should be shifted to NCD rehabilitation<sup>11</sup>

CRPs that focus on NCD rehabilitation have demonstrated positive physical health-outcomes. Franklin et al. (2013) has suggested that exercise-based CR is effective as a long-term disease management system similar to the one developed at the Mayo Clinic<sup>28</sup>. This system included a personalized written care plan, education in self-management targeted towards the individual, monitoring of outcomes, adherence to treatment and targeted use of specialist consultation or referral which was conducted over three years in patients with coronary heart disease (CHD) (n=503) at an outpatient CRP<sup>28</sup>. The system was found not only to be effective but feasible in achieving and maintaining secondary-prevention goals. In addition, the effectiveness of exercise-based CR have been reported in systematic reviews to effectively reduce hospital admissions, reduce cardiac mortality rates in patients with myocardial infarction (MI) and re-infarction post MI<sup>16,29</sup>. However, the results from the systematic reviews were limited predominantly to males with the female group under-represented reflecting a bias finding<sup>16,29</sup>.

Exercise-based CR can also be conducted within the home setting or at gym centres. Home-based CR was found to be equally effective as centre-based CR where patient's self-efficacy increased with home-based CR<sup>30,31</sup>. Table 1.3 presents the findings from peer-reviewed publications in relation to the outcomes of phase three CRPs.

CRPs are effective at addressing risk factors that can lead to CHD, acute coronary syndrome (ACS) and other cardiac diseases<sup>16,32</sup>. Fewer patients on the "Choice of Health Options in Prevention of Cardiovascular Events" (CHOICE) programme (21%) had three or more risk

factors above widely recommended levels than controls (72%) ( $p < 0.001$ )<sup>32</sup>. The CHOICE programme was a single-blind randomized controlled trial for ACS patients. The CHOICE group ( $n=72$ ) underwent clinical visits, telephonic support, mandatory cholesterol and tailored preferential risk modification whilst the control group participated in continually conventional care without centrally co-ordinated secondary prevention<sup>32</sup>. Secondary prevention of CHD has also shown to reduce health-related outcomes in total cholesterol ( $p < 0.001$ ), low-density lipoprotein ( $p < 0.001$ ), high-density lipoprotein ( $p < 0.001$ ) and increased left ventricular function ( $p < 0.01$ ) after 12 months in patients receiving rehabilitation in another study<sup>14</sup>. This prospective study took place in a controlled environment with control patients receiving medical care ( $n=679$ ) and patients receiving rehabilitation ( $n=795$ ). This trial however limits the generalisability of its results as the intervention was conducted at a single centre<sup>14</sup>.

Whilst the above results were conducted at a single centre, Silberman et al. (2010) aimed to test both the effectiveness and efficacy of CRPs from 1998 to 2009 at 24 hospital sites<sup>33</sup>. The intervention programme analysed the effectiveness and efficacy of CVD risk factors after attendance at CRPs around the United States (US). The intervention programme consisted of four components (healthy diet, moderate physical activity, psychosocial group support and stress management techniques) targeted at both the clinical and the community setting. Data was collected from participants ( $n=2974$ ) for physical health-related outcomes including blood glucose and blood pressure, whilst exercising, dietary fat and cholesterol intake and psychosocial measures were self-reported. All CVD risk factors were significantly decreased in patients at 12 weeks and one year ( $p < 0.005$ ). Depressive symptoms, however showed an increase at one year ([11.4 (9.1) vs. 6.0 (5.8),  $p < 0.005$  vs. 6.3 (6.4)]<sup>33</sup>. The results though positive, were subject to bias, as depressive symptom data were self-reported.

**Table 1.3: Peer-reviewed publications in relation to the effectiveness and efficacy of cardiac rehabilitation programmes**

<b>Author and Country</b>	<b>Design of programme</b>	<b>Cardiac condition and Sample size</b>	<b>Outcomes</b>	<b>Summary</b>
<i>Redfern et al., 2009</i> <sup>23</sup>  <i>Australia</i>	Single-blind randomized controlled trial	<ul style="list-style-type: none"> <li>• Tertiary referral hospital of ACS survivors</li> <li>• CHOICE programme (n=67) vs control group (standard CR) (n=69)</li> <li>• Baseline vs 12 months vs 1 year assessments</li> </ul>	Baseline vs 12 months (CHOICE) mean (SEM): TC - 4.0 (0.1) vs 4.7 (0.1) mmol/l, p<0.001, SBP - 131.6 (1.8) vs 143.9 (2.3) mm Hg, p<0.001, BMI - 28.9 (0.7) vs 31.2 (0.7) kg/m <sup>2</sup> , p=0.025 and physical activity - 1369.1 (167.2) vs 715.1 (103.5) METS/kg/min, p=0.001  CHOICE (21%) had three or more risk factors above widely recommended levels then controls (72%) (p<0.001)	Decrease in all measures after CHOICE programme participation after 12 months
<i>Silberman et al., 2010</i> <sup>33</sup>  <i>USA</i>	Non-experimental prospective time series	<ul style="list-style-type: none"> <li>• Diagnosed CHD ( n = 2974) from 24 public hospital sites</li> <li>• Baseline vs 12 weeks vs 1 year</li> </ul>	Baseline vs 12 weeks vs 1 year (SD (mean)) BMI: 32.0 (7.1) vs 29.9 (6.3), p<0.005 vs 29.5 (8.3) kg/m <sup>2</sup> TC: 186.8 (45.7) vs 158.9 (40.5), p<0.005 vs 175.3 (43.4), p<0.005, mg/dL SBP: 132.7 (17.4) vs 121.1 (14.7), p<0.005 vs 126.4 (16.6), p<0.005, mmHg DBP: 79.0 (10.3) vs 72.3 (8.7), p<0.005 vs 75.2 (9.8), p<0.005, mmHg Hostility (Cook Medley Hostility Scale): 7.8 (4.7) vs 6.3 (4.3), p<0.005 vs 6.0 (4.2), p<0.05 Depression (CES-D): 11.4 (9.1) vs 6.0 (5.8), p<0.005 vs	Non-experimental study showed a decrease in all measures at 12 weeks and 1 year except for increase in depression rates at 1 year

			6.3 (6.4), $p>0.005$	
<i>Goel et al., 2011</i> <sup>68</sup>  <i>USA</i>	Retrospective analysis	<ul style="list-style-type: none"> <li>n=2395 patients with PCI from 1994 – 2008</li> </ul>	Participation in CR, noted in 40% (964 of 2395) of the cohort, was associated with a significant decrease in all-cause mortality ( $p<0.001$ )	Decrease in all-cause mortality rates after participation in CR
<i>Milani et al., 2011</i> <sup>42</sup>  <i>USA</i>	Questionnaires	<ul style="list-style-type: none"> <li>n=151</li> <li>CHF patients</li> <li>Baseline vs after exercise training</li> </ul>	Baseline vs post Depressive symptoms: 22% vs 13%, $p<0.0001$ Mortality: 43% vs 11%, $p<0.005$	Decrease in depressive symptoms and mortality rates after exercise training
<i>Jelinek et al., 2012</i> <sup>45</sup>  <i>Australia</i>	Telephone delivered coaching programme	<ul style="list-style-type: none"> <li>COACH programme (n=5544)</li> <li>Entry vs exit</li> </ul>	Entry vs exit: median levels (interquartile levels) TC: 4.3(3.6–5.2) vs 3.6 (3.2 – 4.1) mmol/l, $p<0.0001$ TG: 1.4 (1.0 – 2.0) vs 1.2 (0.9 – 1.6) mmol/l, $p<0.0001$ LDL: 2.4 (1.8 – 3.2) vs 1.8 (1.5 – 2.1) mmol/l, $p<0.0001$ HDL: 1.1 (0.9 – 1.3) vs 1.1 (1.0 – 1.4) mmol.l, $p<0.0001$ SBP: 125 (118 – 134) vs 121 (116 – 129) mmHg, $p<0.0001$ DBP: 72 (68 – 80) vs 70 (68 – 77), mmHg, $p<0.0001$	Decrease in all measures on COACH programme
<i>Joubert et al., 2013</i> <sup>41</sup> <i>Australia</i>	Repeated measures & mixed methods with a combination of questionnaires and semi-structured interviews	<ul style="list-style-type: none"> <li>n=30</li> <li>MI patients</li> </ul>	Relationship between depression and other psychosocial factors: Depression vs mood = 0.892 ( $p<0.01$ ) Depression vs sleep = 0.802 ( $p<0.01$ ) Depression vs inactivity = 0.911 ( $p<0.01$ ) Depression vs cognition = 0.729 ( $p<0.01$ )	Positive relationship between depression and other psychosocial factors Need to decrease depressive symptoms
<i>Parswani et al., 2013</i> <sup>40</sup> <i>India</i>	Randomized control design	<ul style="list-style-type: none"> <li>MBSR group (n=12) vs treatment-as-usual (TAU) group (n=5)</li> </ul>	MBSR vs TAU: (Pre vs post: SD (Mean)) Anxiety symptoms: [7.87 (3.31) vs 3.27 (1.27), $p<0.001$ ]	Decrease in anxiety and depressive symptoms as well as SBP and BMI compared to control group

		<ul style="list-style-type: none"> <li>• Pre vs post</li> </ul>	<p>vs [7.67 (3.65) vs 7.53 (3.33)]</p> <p>Depressive symptoms: [6.13 (2.03) vs 3.33 (1.59), p&lt;0.001] vs [4.93 (2.49) vs 5.47 (2.39)]</p> <p>SBP: [135.67 (13.39) vs 124.47 (8.97), p&lt;0.001] vs 125.33 (32.47) vs 135.47 (8.70)]</p> <p>BMI: [24.36 (14.13) vs 23.77 (13.68), p&lt;0.05] vs 25.61 (13.03) vs 25.26 (12.30)]</p>	
<i>Heran et al, 2011<sup>16</sup> USA</i>	Cochrane systematic review and meta analyses	<ul style="list-style-type: none"> <li>• 47 RCTs (n=10794)</li> <li>• CHF patients</li> <li>• Exercise based CR vs usual care</li> </ul>	<p>12 vs &gt;12 months follow up: exercise-based CR</p> <p>reduced overall mortality: [RR 0.87 (95% CI 0.75, 0.99)]</p> <p>cardiovascular mortality: [RR 0.74 (95% CI 0.63, 0.87)]</p> <p>hospital admissions [RR 0.69 (95% CI 0.51, 0.93)]</p>	Reduced cardiac and all-cause mortality rates and hospital admissions
<i>Lawler et al, 2011<sup>29</sup> USA</i>	Meta-analysis & systematic review: Efficacy of exercise-based CR Randomized controlled trials	<ul style="list-style-type: none"> <li>• 34 RCTs (n=6111)</li> <li>• Post-MI patients</li> </ul>	<p>Lower risk of re-infarction (OR: 0.53, [95% CI - 0.38-0.76]), cardiac mortality (OR: 0.64, [95%CI - 0.46-0.88]), and all-cause mortality (OR: 0.74, [95%CI - 0.58-0.95])</p>	Lower risk of re-infarction, cardiac and all-cause mortality with exercise-based CR

*ACS = acute coronary syndrome; BMI = body mass index; CHD = cardiac heart disease; CHF = chronic heart failure; CI = confidence interval; CR =cardiac rehabilitation; CHOICE = choice of health options in prevention of CR events; COACH = Coaching patients On Achieving Cardiovascular Health; DBP = diastolic blood pressure, MBSR - Mindfulness based Stress Reduction; MI = myocardial infarction; OR = odds ratio; RCTs = random controlled trials; SD = standard deviation; SBP = systolic blood pressure; TC = total cholesterol; TG = triglycerides*

Other limitations included that some patients lost their insurance coverage and were not able to attend programme-related hospital visits for testing at one year<sup>33</sup>.

Furthermore, it has been shown that patients' psychosocial status could play a role in improving their physical health-related outcomes in CRPs. It was concluded from a study of patients with acute MI (n=1847) that their psychosocial status was more influential than their medical history and the type of treatment<sup>34</sup>. This finding is supported by Shen et al.(2006) who investigated the influence of depression to post-rehabilitation quality of life in patients with CHD (n=138 men) after a six-week CRP<sup>35</sup>. Baseline and post-rehabilitation quality of life were examined using structured equation modeling analyses with age, education and severity of illness controlled for in the study sample. It was found that quality of life outcomes post-rehabilitation was predicted and influenced by baseline depressive symptom severity<sup>35</sup>. This finding provides evidence for detecting high-risk psychosocial characteristic patients who may experience a complicated course of recovery because of depression as it poses obstacles for rehabilitation and exacerbates their illness. It is highly recommended that intervention programmes include ways to establish and enhance a support system, behavioural modification and strategies to prevent depression<sup>35</sup>.

Similarly, another six-week CRP was found to be beneficial in improving quality of life, physical activity status, anxiety and depression<sup>36</sup>. This intervention consisted of a comprehensive CRP on physical activity, psychological well-being and quality of life in patients with CHD (n=147). Repeated measures were conducted after 12 months through the Hospital and Anxiety Depression Scale, the physical activity energy expenditure (seven-day recall activity) and the MacNew Heart Disease Health-Related Quality of Life. Measures were taken at six weeks, 12 weeks, six months and 12 months and were found to be

significant at each measure ( $p < 0.05$ ) when compared to baseline<sup>36</sup>. This evidence suggests that psychological functioning, including the presence of anxiety and depression has an impact on the prevalence and progression of CVDs through cardiac events<sup>36,37</sup>.

Increased psychosocial functioning conducted among CRP patients in Europe have also showed decreased employment-related stress<sup>38</sup>, increase physical functioning status<sup>38</sup> and enjoyment of leisure time<sup>38,39</sup>. A pilot randomized controlled trial conducted in India assessed the effectiveness of the Mindfulness Based Stress Reduction (MBSR) programme on reducing the effects of stress, anxiety and physical health-related outcomes<sup>40</sup>. This meditation programme coupled with an eight weekly health education sessions was part of a CRP targeted for CHD patients ( $n=15$ ) and a control group ( $n=15$ ) that received a single health education session programme. Anxiety and depressive symptoms were measured using the Hospital and Anxiety Depression Scale. Results from this study showed a decrease in systolic blood pressure ([135.67 (13.39) vs. 124.47 (8.97),  $p < 0.001$ ]) but not diastolic blood pressure ([84.16 (5.48) vs. 81.60 (5.19)]) between the MBSR and control group ([125.33 (32.47) vs. 135.47 (8.70)]; [85.47 (5.73) vs. 83.87 (5.26)], respectively)<sup>40</sup>. Body mass index was significantly lower in the MBSR group ([24.36 (14.13) vs. 23.77 (13.68),  $p < 0.05$ ]) than the control group<sup>40</sup>. The scores of the MBSR group on anxiety and depression were significantly lower than the control group ( $p=0.001$  and  $p=0.01$ ), respectively<sup>40</sup>. Findings from this study revealed that mindfulness meditation was effective in decreasing physiological sensations of anxiety and depression by cognitive restructuring<sup>40</sup>.

Improvements in depressive symptoms could be correlated with improvements in general health as reported by Joubert et al. (2013)<sup>41</sup>. This study aimed to identify the contribution of complex psychosocial factors through questionnaires and interviews for patients recovering

from a MI (n=30 males)<sup>41</sup>. It was found that the patient's level of emotional recovery could predict the interventions necessary to manage essential lifestyle changes for effective secondary risk prevention<sup>41</sup>. Similarly, exercise training can be effective in decreasing depressive symptoms as seen in a study conducted on patients with CHD (n=189) from January 2000 to December 2008<sup>42</sup>. Depressive symptoms were assessed by a standard questionnaire at baseline and after ET. The prevalence of depressive symptoms decreased by 40% after ET, from 22% to 13% (p <0.0001)<sup>42</sup>. This finding demonstrates the impact of structured ET shown to positively decrease severe depressive symptoms in patients with CHD<sup>42</sup>.

Aside from the health-related outcomes of CRPs, it has been reported that increased duration at a CRP is more beneficial for the patient. Additionally, patients who participate in CR have a better chance of saving economically in the long term as opposed to spending money in the short term<sup>33,43</sup>. Patients on memberships such as the Discovery Health Medical Aid, benefit more as they save money in the short term<sup>44</sup>. In addition to economic benefits, previous research analysing social aspects associated with CRPs indicated that patients have a better understanding of cardiac disease and treatment recommendations<sup>39</sup>. Patients have a more positive attitude towards their health, body concept, self-concept and progress towards goals because of the inclusion of education within CRPs.

A systematic Cochrane review analysed the effectiveness of 13 randomized controlled trials primarily aimed at an education intervention on mortality, morbidity, health-related quality of life, and healthcare costs in people with CHD (n=68 556)<sup>39</sup>. Educational interventions ranged from two visits to a four-week residential stay with 11 months of reinforcement sessions. There was insufficient evidence to support a statistically significant reduction on all-cause

cardiac morbidity, mortality or hospitalization at a median of 18 months follow-up in people with CHD compared to usual care but improvements in health-related quality of life were shown by reducing downstream healthcare utilization, which may reduce healthcare costs<sup>39</sup>. This was due to the limitation of two methodological issues which led to the over-estimation of true intervention effects in previous studies which included studies with multimodality interventions (education and psychological or exercise) and secondly the inclusion of non-randomized studies<sup>39</sup>. Further research is required within the community setting to determine statistically significant conclusions. The Coaching patients On Achieving Cardiovascular Health (COACH) programme in contrast, educates patients through telephonic conversations<sup>45</sup>. This study assessed patients with ACS (n=5544) and showed an increase in physical health-related outcomes such as total cholesterol (p<0.001), triglycerides (p<0.001) and systolic and diastolic blood pressure (p<0.001) after the intervention<sup>45</sup>. These findings suggest that educational interventions should be delivered as part of a comprehensive CRP that includes exercise and psychosocial support to reap the full benefits of CRPs.

Furthermore, additional research is needed to analyse the putative role in reducing adverse outcomes over the long-term and to establish a road map for future research to enhance CR. Currently, there is limited evidence demonstrating CR efficacy and availability of outpatient CR programmes. There is consensus that CR is effective and essential in the CVD population. Efforts are therefore needed to continue CR research in order to facilitate more meaningful implementations and understanding.

#### **1.2.4 Factors associated with participation in cardiac rehabilitation programmes**

Despite the effectiveness of CR, up to 50% of participants drop out of CRPs and do not reach required levels for physical activity recommended by health professionals<sup>46</sup>. A

comprehensive literature review was conducted by the Australian Institute of Health and Welfare (AIHW) which assessed CVDs and attendance rates in CRPs. The results showed variable participation rates ranging from 11% to 35%<sup>47</sup>. Deaths of 50 000 were attributable to CVDs in 2008, which was responsible for more deaths than any other disease group. In addition, CVDs was the main cause of 475 000 hospitalisations making this disease group the most expensive in Australia. Similarly, it was found that 72 % of patients admitted for cardiac bypass surgery attended outpatient rehabilitation with females less likely to attend CRPs than male participants<sup>47</sup>. Of the 2359 stroke patients studied, 2% of patients were referred to an outpatient or community-based rehabilitation programme<sup>47</sup>. Due to limited South African literature and data, future research is required to explore participation and attendance rates in cardiac rehabilitation programmes<sup>11</sup>.

Participation rates in phase three cardiac rehabilitation programmes range between 30-50% of eligible patients and this presents one of several challenges for future cardiac rehabilitation research along with assessment of long-term cardiac rehabilitation outcomes and cardiovascular disease risk factors. It is therefore imperative to understand and implement how these participation rates can be improved and tailored in order to minimize the current barriers faced among cardiac rehabilitation research. It is also important for health care professionals to understand the factors related to programme participation rates, if they are to encourage patients to participate in cardiac rehabilitation programmes<sup>26,37,48,49,50,51</sup>. These factors can be further categorized as factors promoting and hindering participation.

#### **1.2.4.1 Factors promoting participation in cardiac rehabilitation programmes**

Factors promoting participation in CRPs include positive perceptions of exercise, perceived benefits of CR, health knowledge, employment, early history of MI or cardiac

disease<sup>35,52,53,54</sup>. A prospective longitudinal five-site study surveyed patients (n=1172) with MI after CR by means of a questionnaire to analyse the influences of attending CR. Age, employment and earlier history of MI was revealed by multivariate analyses to be significant predictors of intention to attend CR (84%), but contributed only to a small proportion of the variance<sup>55</sup>.

Patients' perceptions of health, social acceptance and safety in a CR environment may contribute to exercise participation and exercise maintenance<sup>18,53</sup>. In a study analysing safety and adherence rates to CRPs for older women with congestive heart failure (CHF) showed an adherence rate of 87%<sup>53</sup>. Participants in this study were required to complete the Minnesota Living with Heart Failure Questionnaire as well as other tests in a pre-trial data collection session. RPE was used to quantify a subject's perception of exertion during an exercise session which was concluded to be safe for them from these data. Research suggests that focusing on comprehensive strategies for safety in future CR research could offer insights into the reasons participants do not maintain an exercise routine in currently structured CRPs<sup>53</sup>. Furthermore, increased participation rates for CR can be improved through socially differentiated offers and motivational tools. CRPs that cater for religious and cultural needs can also act as motivational tools. These intervention programmes should be addressed in a culturally relevant and sensitive manner to enhance the uptake and efficacy of CR<sup>51</sup>.

#### **1.2.4.2 Factors hindering participation in cardiac rehabilitation programmes**

A meta-synthesis of qualitative data (n=34 papers) to improve understanding of the reasons for poor participation by Neubeck et al. (2012) revealed that factors hindering participation in CRPs include system level barriers and personal barriers<sup>56</sup>. Study methodology included interviews (n=25), focus groups (n=5), and mixed-methods (n=4)<sup>56</sup>. System level barriers

include the increased distance from patient's homes to CR centres, lack of transport, lack of time and lack of referrals from clinicians, incorrect screenings of patients and inadequate interactions with the healthcare team. Personal barriers include language, lower socioeconomic status, ethnicity, female gender, older age, lack of social support and lack of knowledge of health and CR<sup>56,67</sup>. The main reasons given for not intending to attend CR in a study by Mckee et al. (2013) were lack of interest and perceptions that the programme would not be beneficial<sup>52</sup>. Both these categories of barriers proved to be potentially modifiable with the correct motivational tool such as the positive health-related outcomes after CR<sup>26,56</sup>. Whilst there is a vast amount of research in this area, there is a need to understand them and implement strategies to overcome these known barriers<sup>56</sup>.

Referrals patterns as assessed by McDonall et al. (2013) suggest that increased referral rate increases participation<sup>49</sup>. Research has shown that age is the main factor of adherence to CRPs. The youngest age group (< 40 years of age) and oldest age group (> 70 years of age) have been shown to be the least compliant and less likely to exercise regularly<sup>37</sup>. This finding was attributable mostly to the younger patients' because of their busier lifestyles<sup>52</sup>. Older people were less likely to attend CRPs due to their fragile condition and the perception that it is only exercised-based CR, it is an inconvenience and they lacked the family support<sup>49,53</sup>. Future studies should be targeted at similar age group samples to establish the factors as well as strategies between CR participants and general gym members. These studies would effectively aim to increase participation and provide further insight into various gym programmes<sup>26</sup>.

Regardless of whether a patient will or will not attend CRPs, it is ethically and clinically correct to refer them<sup>53</sup>. Strategies to increase participation that are passive such as those that

rely on guidelines or research evidence are unlikely to be successful, even in the presence of large trials as most research do not influence practice. The use of electronic and automatic referral therefore proves to be most effective<sup>28,53</sup>. To increase referral rates and ultimately participation rates, health professionals should be involved in the referral process<sup>57,58,59</sup>. Nurses are not part of the referral process as physicians are the gate keepers of referral and therefore other health professionals should also be encouraged to refer cardiac patients as it is also within their professional capabilities<sup>45,57,60,61</sup>. Research should be conducted to understand whether nurses are part of the referral process to CRPs in SA.

Aside from the importance of appropriate referral, a recent cross-sectional study by Shanmugasagarem et al. (2013) assessing socioeconomic barriers to attending CRPs, concluded that there are greater barriers found among rural inhabitants than urban ( $p < 0.01$ )<sup>62</sup>. Participants ( $n=215$ ) completed a socio-demographic survey, which included the MacArthur Scale of Subjective Social Status. Some of these barriers for participation in CRPs, included increased cost, severe weather and family responsibilities<sup>62</sup>. People living in rural areas were also less likely to be referred than urban people because of these barriers ( $p < 0.01$ )<sup>62</sup>. Alternative models should be utilised such as home-based CR and telephonic communication as well as regular visits from the nurse to overcome these barriers<sup>62,63</sup>. These models are present and have shown to be effective but there is failure to implement them<sup>62,63</sup>.

### **1.2.5 Rationale for study**

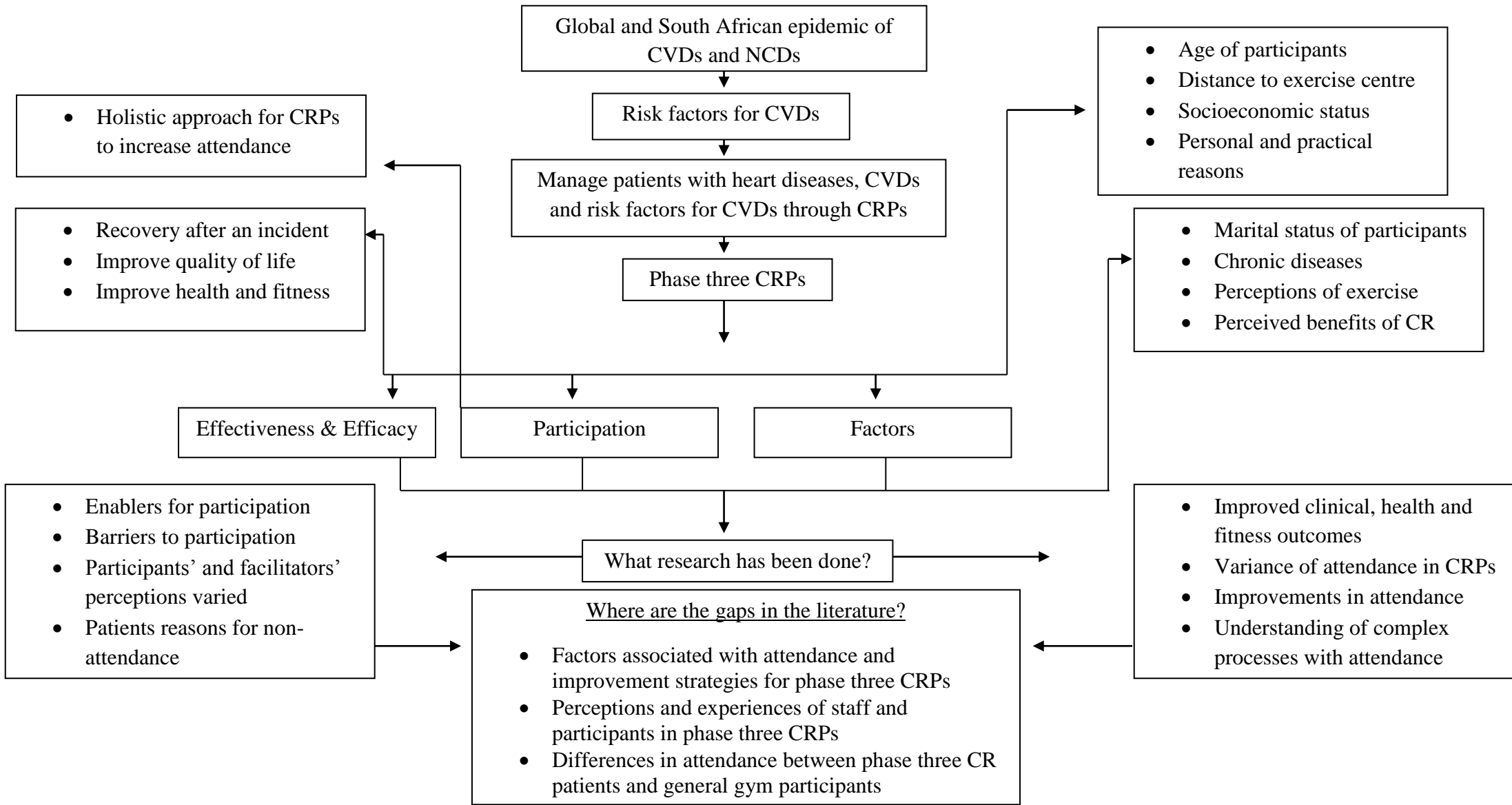
Research has shown the effectiveness of CRPs, but fails to convey long-term commitment and implementation from staff for sustained improvement<sup>64</sup>. While existing research has identified the factors that promote participation, further research is required to understand the complex processes that may influence participation<sup>26,56</sup> (Figure 1.3). Due to fluctuations of

participation experienced in CR, it is suggested that participation rates of different programmes be compared. This would aid in streamlining the best possible way to overcome poor participation rates. To the best of the researchers' knowledge, minimal studies have investigated comparisons of participation and CVD risk factors between apparently healthy and cardiac rehabilitation participants.

### **1.3 Research aims and objectives**

The aim of this research study was to firstly gain insight and understanding associated with the factors promoting and hindering participation in a phase three CRP. The first objective was to determine the factors associated with participation in phase three CRPs by evaluation of staff and cardiac patients' perceptions and experiences of a phase three CRP. The second aim was, to conduct a pilot study to compare attendance between CR participants and general gym members at a commercial gym setting. The secondary objective was to compare baseline cardiovascular risk factors of participants and their attendance of two different programmes. We hypothesized that CR participants (moderate-high risk members) would attend gym more regularly and would have more CVD risk factors than general gym members (low-risk members). It is important to note that although signs and symptoms for anxiety and depression are an important component of CRP and provides understanding and insight to the reader, investigating mental health indicators was however, beyond the scope of this study.

**Figure 1.3: Synopsis of the literature**



## 1.4 Summary

Globally there has been an increase in CVDs and the risk factors associated with this disease. In South Africa, the majority of deaths in 2012 were due to CVDs. CRPs are examples of intervention programmes that have been shown to be effective in reducing CVD risk factors and CVDs in a variety of settings. Whilst much research has been conducted, there has been a paucity in understanding the complex processes associated with the factors influencing participation in phase three CRPs as well as comparing attendance between CR participants and general gym participants.

---

## *Chapter 2:*

# **Factors associated with participation in a phase three cardiac rehabilitation programme - the Prime Time programme: a qualitative study**

---

## Background

The prevalence of cardiovascular diseases (CVDs) in South Africa is more than 50% among women and 20% in men<sup>1</sup>. Both hypertensive and inflammatory heart diseases and myocardial infarctions accounted to 15% among South Africans<sup>2</sup>. Furthermore, nearly 60% of all South African adults have at least one major risk factor for CVDs<sup>1,11</sup>. Risk factors for CVDs include age, family history, cigarette smoking, a sedentary lifestyle, obesity, hypertension, dyslipidemia, physical inactivity and elevated glucose levels<sup>17</sup>. Patients who present with CVD risk factors or who have had a cardiac event qualify for participating in cardiac rehabilitation programmes (CRPs)<sup>17,69</sup>. CRPs are medically supervised programmes that help improve the health and well-being of people with diagnosed CVDs or have been identified as being at increased risk for these diseases<sup>11</sup>. CRPs have been shown to be effective in a variety of settings, including the hospital, tertiary institutions, gym-based and home-based rehabilitation settings<sup>11,15,70,71</sup>.

In CRPs, patients experience health improvements and opportunities for socialization, which are important as they are being moved from one phase of rehabilitation to the next<sup>72</sup>. In addition, patients have shared positive perceptions regarding their health, self-esteem and progress towards personal goals in CRPs<sup>70,72</sup>. Between 75 - 80% of patients attending CRPs experienced improved psychosocial functioning associated with decreased work-related stress, enjoyment of leisure time and increased physical activity<sup>70,73,74</sup>. Previous studies have also shown that 70 - 74% of CR patients have a better understanding of cardiac disease and treatment recommendations as they progress from one phase of rehabilitation to the next<sup>73,74</sup>. These experiences and improvements have contributed to the maintenance of participation through each phase of cardiac rehabilitation<sup>73,75</sup>.

Studies have shown that feeling healthy, being socially accepted and feeling safe in one's cardiac rehabilitation environment may contribute to programme participation and exercise maintenance<sup>53,70</sup>. Focusing on safety, enhancing the structure of CRPs, conducting evidence-based exercises and using reliable equipment and facilities are additional factors that may improve attendance in CRPs<sup>56,76</sup>. Despite the benefits of cardiac rehabilitation, up to 50% of participants do not participate in CRPs and do not maintain required levels of physical activity recommended by health professionals<sup>48,77</sup>. These required levels of physical activity are defined as attending exercise sessions at least three times a week for 150 minutes of moderate-intensity activity per week over a period of 12 months<sup>24,78</sup>. Consequently, patients who do not attend adequate amounts of sessions will not experience the health benefits achieved when participating in cardiac rehabilitation<sup>78</sup>.

Existing research has identified factors that could predict participation. However, these factors have not increased our understanding of the complex processes that may influence participation<sup>79</sup>. Qualitative research could provide insight into these processes and associated factors and is particularly useful for exploring the social context within CRPs<sup>56,72,75,79</sup>.

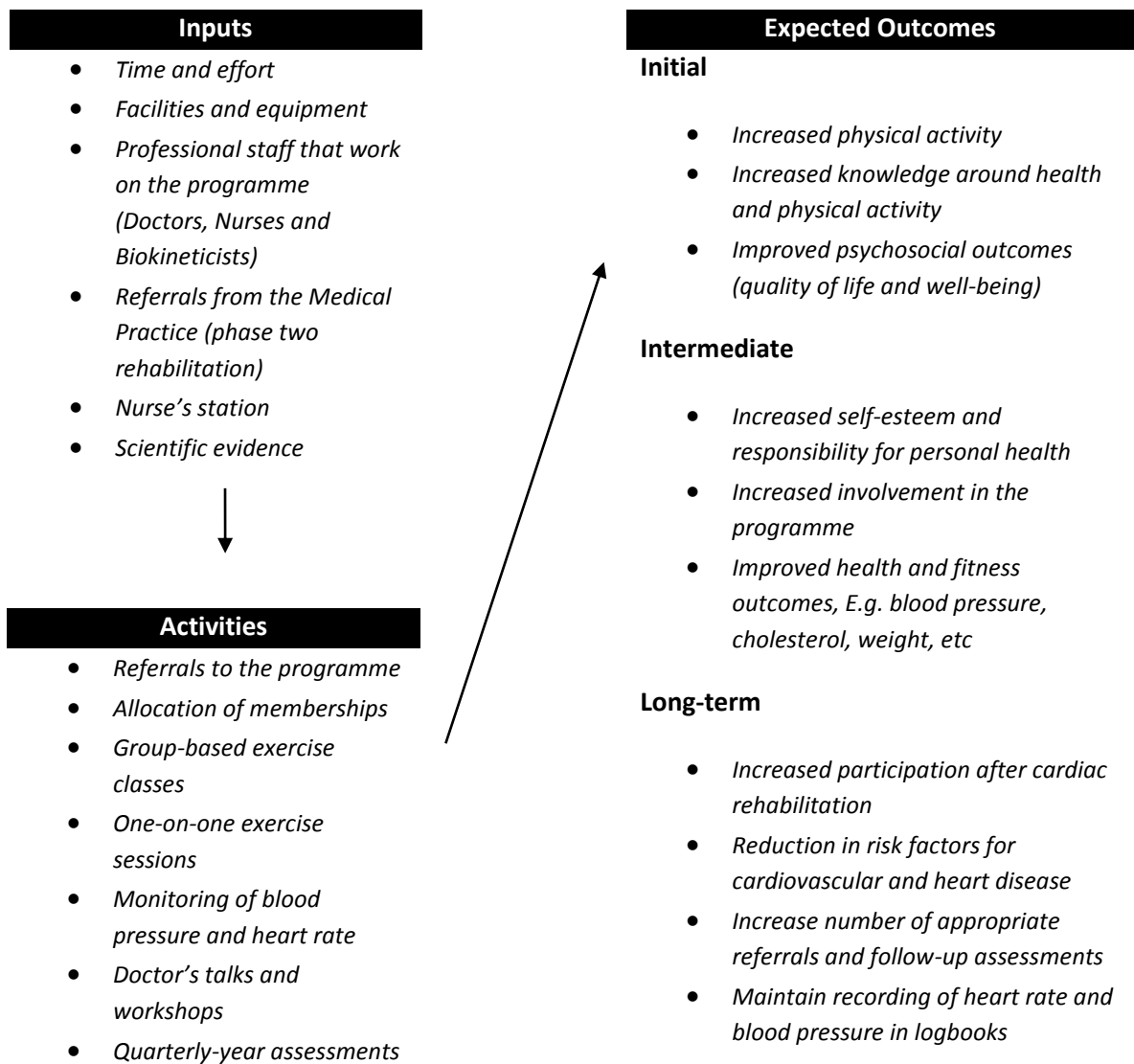
Therefore the aim of this research study was to evaluate staff and participants' perceptions and experiences of a phase three CRP in order to understand factors associated with participation in the Prime Time programme.

## **Methods**

### **Study setting**

The Prime Time programme (PTP) is an evidence-based phase three cardiac rehabilitation programme based at a commercial gym. The logic model in Figure 2.1 demonstrates the inputs, activities and the expected outcomes of the PTP<sup>80</sup>.

**Figure 2.1: The Prime Time programme Logic Model<sup>80</sup>**



Members who join the fitness centre are stratified according to their health risks and medical history through a pre-participation health screening (PPHS) form (Appendix 1). Self-reported health risks and medical history recorded on the PPHS form include diseases, orthopaedic limitations, injuries and surgeries. If a member has been identified as being at increased risk for CVDs, they are immediately referred to the phase two CRP where medical clearance is done before participating. If a member is classified as being at moderate based on the ACSM criteria<sup>24</sup>, and they receive medical clearance from the phase two CRP, they are eligible to participate in the PTP.

Annual, quarterly and monthly cardiorespiratory, health and fitness assessments are conducted in addition to an annual stress electrocardiogram test in order to determine if their health status or risk profile has changed. These results are then sent to the PTP manager who uses the information when prescribing the exercise programme. Members on the PTP are advised to attend exercise sessions at least three times a week and are further advised to ‘check-in’ with the healthcare staff before and after each session to have their blood pressure and heart rate monitored. Every member is advised to train with a heart rate monitor. Any information or measurements performed on any member is recorded in their logbook.

An important feature of the PTP is that it is managed and facilitated by registered biokineticists who are exercise specialists that function in professional alliance to health and medicine. Group-based exercise sessions are led by two biokineticists per exercise session. This gives a ratio of 10 to 12 class members being supervised by every one biokineticist. The exercise classes include a warm-up and stretching, light resistance training, cardio-respiratory training, abdominal strength and core-stability exercises, and a cool-down section. The exercises are adapted for members who have had previous surgeries, orthopaedic limitations and health risk factors.

Additional PTP staff include doctors, qualified nurses and sales consultants. The doctors are responsible for monitoring members, are present in case of an emergency and provide educational workshops for both the staff team and members. The nurses are based in a designated area in the gym called the ‘Nurses Station’, and are responsible for monitoring members’ clinical measures including heart rate and blood pressure. The sales consultants sell memberships and encourage members to renew their contracts on an annual basis.

### **Sample**

Of the 171 patients on the PTP database, there were 80 attendees (participants who attend the programme currently) and 91 previous participants (participants who have left the programme, excluding seven who had subsequently passed away) all of whom were eligible for the research study. For the purpose of this study, current PTP members were categorised as either group class participants (n=25) who attend group-based exercise sessions regularly, or independent participants (n=55) who exercised on their own while still being monitored by nurses before and after each exercise session. This study used a purposive sampling technique where class participants were invited to attend focus group discussions (FGDs). Three semi-structured focus groups were conducted (n=18, six participants per group)<sup>81</sup>. Independent and previous programme participants were invited via email and telephone to participate in FGDs. FGDs could not be conducted due to limited participants. Therefore of these participants, five of both independent and class participants agreed to have an individual in-depth interview.

Nine of the 10 staff members invited to the key-informant interviews agreed to participate in the research study. The staff members included biokineticists (n=5), programme managers (n=2), sales consultants (n=2) and a nurse (n=1).

## **Procedure**

Each focus group lasted between 30 and 40 minutes while the interviews were 10 to 15 minutes in duration. Similar guide questions were used for both focus groups and interviews. These questions aimed to elicit staff and participant's perceptions, experiences, factors promoting and hindering participation in the PTP, and general views about the programme.

The guide questions covered the following topics (Appendix 2, 3 and 4):

- General views about the programme
- Perceptions of programme success
- Experiences of being involved in the programme
- Factors influencing the effectiveness of the programme
- Aspects of the programme that need improvement

## **Qualitative Data Analysis**

All focus groups and interviews were audio recorded and transcribed verbatim by a third party, external to the programme. Atlas.ti Qualitative Data Analysis Software (Scientific Software Development GmbH, Berlin and Germany) was used for the data analysis. Transcriptions were coded using the thematic coding framework. These codes were formulated from the guide questions that participants were asked. A thematic coding framework was used to analyse the data.

## **Ethical Considerations**

All participants provided written consent prior to participation (Appendix 5). Ethical approval for the study was obtained from the Human Research Ethics Committee of the Faculty of Health Sciences at the University of Cape Town (HREC/REF: 169/2012).

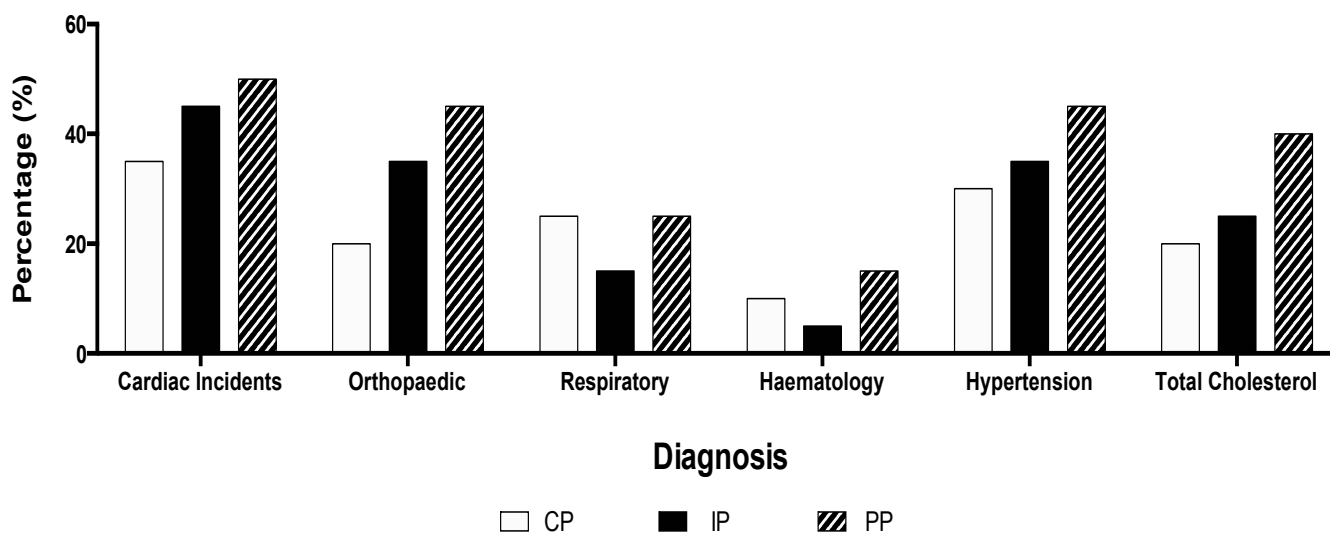
# Results

## Factors promoting participation

### Prime Time Programme Participants characteristics

The average ages of class participants, independent participants and previous participants were  $75.7 \pm 11.3$ ,  $65.7 \pm 9.29$  and  $63.7 \pm 13.3$  years respectively. There were an equal number of men and women in both the independent and previous participants, whereas class participants comprised of 80% males and 20% females. The majority of class participants (45%) primary diagnosis was previous myocardial infarction and the most frequently prescribed medications were for blood pressure (channel blockers; 52%) and blood clotting (salicylates, 40%). The independent participants (60%) and previous participants (80%) reported that their primary diagnosis was coronary artery diseases and arthritis respectively. The majority of independent and previous participants also reported that they were currently taking medication for hypertension (channel blockers; independent: 80%, previous: 80%) and dyslipidemia (statins; independent: 60%, previous: 80%). Additional diagnoses prior to joining the PTP are illustrated in Figure 2.2.

**Figure 2.2: Diagnoses and conditions of participants prior to joining the PTP**



Members on the Prime Time programme had attended the programme for a variety of years ranging from six months to 17 years. All the participants shared common reasons for joining which included to improve their health and to get back into a daily exercise routine. Most participants joined the Prime Time programme to attend the exercise sessions. Participants realised the importance of cardiac rehabilitation and physical activity after sustaining their cardiac events and from completing their initial phases of cardiac rehabilitation.

Participants reported that the programme provides them with greater understanding of their health which encouraged them to adopt healthier lifestyles. Participants indicated that they find the programme mentally-stimulating and they appreciate that it is medically-directed, yet it has a personalised approach with attention to the individual's specific goals. Class participants reported that the Prime Time programme is a professional and evidence-based programme, and this gives them the inspiration to continue with the exercises. Some independent participants were positive about the programme when they initially joined, and this perception of the programme has remained unchanged.

### **Health, social and psychological aspects**

More than half of the participants identified health as the most important factor in their life and necessary actions such as exercising need to be implemented in order for them to maintain a healthy lifestyle and improve their health status. Most of the participants were aware of their family history of cardiovascular diseases and illnesses and therefore they understood the need to take the initiative to look after their health. Many of the participants echoed the staffs' views regarding their improvements in health status and fitness since joining the Prime Time programme, as evidenced by improved clinical measures such as blood pressure, body mass index and lipid profiles.

*“I started in the rehabilitation program about 2 years ago so I’ve been doing the group work for about 18 months, about 6 months is rehab. I think the highlight for me is still to be here after 18 months. I mean I spent my whole life paying gyms not to attend and so the fact that this institution has been able to maintain ones motivation to the way they do the exercises is a highlight.” (Focus group discussion 2, Class participant – Health)*

Participants found the programme enjoyable and reported that they benefited both socially and emotionally which provided improvements in their self-esteem and self-efficacy. Based on participants’ responses, their best experiences since joining the Prime Time programme include the social aspects, such as the camaraderie in classes and interacting with different personalities. These appear to contribute to their participation in the programme. Class participants commented on some participants’ who were not present at previous classes and this concern which was raised by the class participants motivated the absent class participants to attend regularly. This kind of motivation illustrates the social support in classes as well as participants taking accountability for missed exercise sessions. Independent participants felt that the programme enabled them to cope on their own with physical activity without having supervision from biokineticists.

### **Facilities, environment and equipment**

Participants felt that the gym has a positive reputation and has been recognised globally by the FIFA (Fédération Internationale de Football Association) as a Centre of Excellence, thereby contributing to their perception that it is a reputable facility and programme. The facilities at the commercial gym were perceived to be user-friendly. In addition, the facilities were safe and first aid equipment was readily available. All participants developed an increasing familiarity with the gym equipment and preferred using the free weights. Class participants reported that the gym environment is more comfortable than other commercial

gyms or clubs. Participants indicated that if they had a choice between a different commercial club and the current gym, they would only choose the latter.

*“The reputation of the institute is known for that, that yes, that if you have a condition that this is the place that you can come and you can actually come and do your training and that its sort of a safe environment (Interview 5, independent participant – Perception: Facilities and environment, half of the participants shared similar views and statements).”*

### **Monitoring and care of Prime Time Participants**

Participants reported that they felt reassured to know that their health and fitness was monitored periodically by health professionals. Some class participants indicated that *“if you can measure outcomes, you can manage outcomes”*. Both class participants and independent participants indicated that the Nurses Station is effective at monitoring their blood pressure and heart rate.

*“They measure your blood pressure before and after and that was a big bonus for me, they’d do random checks almost like where they’d just come and do a little bit of exercise, just to check what your level is and I found that quite good because a lot of times when you go to the gym then it just gets very boring and you know you sort of just get lost in the numbers, so I found that to be quite good (Interview 4, independent participant – Perception: Effectiveness and benefits ,many of the participants shared similar views and statements)”*

Participants reported that staff are friendly, caring, professional, experiences and helpful. These staff characteristics, in addition to staff’s knowledge, expertise, professionalism and opinions were invaluable to participants encouraging them to be more committed to the programme. In addition, class participants appreciate that the staff have patience with elderly PTP participants.

## **Perceptions and Success of the Prime Time Programme - Staff**

According to the staff, the success of the programme is determined by improvements in participants' health outcomes and participating in the Prime Time programme.

The biokineticists have witnessed both health and fitness related improvements among PTP participants. These included a reduction in the dosage and number of prescribed medications over time as well as improvements in cardiovascular fitness and the results gathered from their re-assessments. Moreover, the biokineticists have seen the participants' self-confidence improve, which had been adversely affected after sustaining a traumatic event or life-threatening illness.

*“I think success would be determined by achieving their individual goals and then for us success is to see them develop into a routine and a change in lifestyle where they are able to participate in the programme and able to form relationships with other people going through the same things that they are going through” (Key-informant interview 6 – Definition of success, most of the staff shared similar views and statements)*

## **Job satisfaction and staff cohesiveness**

The staff indicated that their job satisfaction lies in their specific roles in the programme which includes leading exercise classes, conducting assessments, providing individual cardiac rehabilitation and setting goals for participants.

*“I would say is the relationship firstly, building with the cardiac patients and then as well as seeing the progression of the patients from when they start to where they are now.” (Key-informant interview 5 – Best experiences, few of the staff shared similar views and statements)*

Staff perceived that they have grown as a unit and are a diligent team. Where necessary, there is assistance from the floor supervisors who are responsible for assisting all gym members by ensuring that each member uses the gym equipment correctly and thereby minimising the risk of injury. The biokineticists mentioned that the Nurses are the ‘unsung heroes’ of the programme and they work effectively with participants. The doctors’ talks are perceived to be fruitful and beneficial to both the staff and PTP participants. Overall, the staff felt that they are an important component of the programme and it is a pleasure to work on the Prime Time programme.

### **Communication amongst staff**

Staff explained that the link between the Prime Time programme and the tertiary academic institution is imperative as it creates a foundation where the staff can communicate evidence-based research to improve the Prime Time programme. Some of the staff felt that efficient communication among the biokineticists makes it easier to work at the commercial gym. The staff felt that communication with participants through newsletters, emails and notices is exceptionally important, as it is viewed as useful forms of communication between the participants and staff.

*“Communication is a very strong factor, I think if we go to another facility you might have a discrepancy between the staff members, but we are all on the same page here and we’re all at the same level of education which helps.”(Key-informant interview 2 – Factors: communication, few of the staff shared similar views and statements)*

## **Factors Hindering Participation**

### **Reasons for participants dropping out of the PTP**

Participants' responses suggested that reasons for failing to renew the Prime Time programme memberships were largely due to logistical, practical and financial constraints. Other reasons included work-related travel commitments or living too far from the gym making it difficult to attend regularly.

*“I work on a project in the Seychelles a lot, so I'm away a lot, so that's one of the reasons I stopped, but it's just a practical reason (Interview 3, previous participant – Reasons for joining/dropping out, half of the participants shared similar views and statements)”*

Other non-attendees reported that they dropped out due to other competing demands such as family responsibilities. They found it difficult to prioritise their gym schedule, even though they were aware of its importance for their health. A few participants who dropped out of the programme found the commercial gym to be financially motivated.

Similar reasons for participants dropping out of the programme were confirmed in the key-informant interviews in addition to other reasons which were distance to travel to the centre and financial constraints.

### **Factors reducing the effectiveness of the PTP**

The staff expressed their view that for some participants', their intrinsic motivation to participate in the Prime Time programme is poor. Participants might not take initiative to ensure that they have follow-up assessments booked. The staff highlighted that they were sometimes unable to remind the Prime Time programme participants of these assessments.

*“Some of them don't always take the necessary responsibility for their health and when you say, oh, when last have you been to the, oh ja, no, I went about 6 months ago and you know, that's why we remind them, every year on renewal, you need to have gone to the doctor,*

*where's your medical report, or I'll get it for you, that's what I had to do" (Key-informant interview 3 – Factors: monitoring members, all the sales staff shared similar views and statements)*

An additional concern not highlighted by the staff was raised by participants. The Prime Time programme requires that all participants should wear a red 'uniform-bib' so that they can be easily identified by staff. This is worn for safety reasons so that staff can pay particular attention to them while they are exercising among non-Prime Time programme gym members. However, this requirement made the participants feel uncomfortable and stigmatized.

*"The only thing I remember was when we used to all wear bibs, so that everyone in the whole gym knew that you'd had a heart attack or that you sort of stood out, I didn't like that, I remember" (Interview 4 – Perceptions: Programme, few of the participants shared similar views and statements)*

## **Suggestions and strategies for improvement**

### **Assessments for Prime Time Participants**

The staff suggested that the Prime Time programme would benefit from more frequent monitoring and facilitating re-testing after four to eight weeks as some members have missed their re-assessments. The biokineticists have suggested additional evidence-based assessments that can be introduced to the Prime Time programme which include additional fitness and strength tests such as the Bruce protocol cycle test<sup>82</sup>, step tests, strength and endurance tests, grip strength tests and sub-maximal strength tests. In addition, functional assessments for proprioception would be appropriate as elderly individuals sometimes suffer from vertigo and struggle with balance.

Although some of the above-mentioned assessments are currently being utilised in the programme, it would be ideal to formally integrate these into the updated assessments so that biokineticists can evaluate the progress of participants across all assessment domains.

### **Referral process and allocation of memberships**

According to the staff, the allocation of participants by sales consultants to incorrect programmes at the fitness centre was one of the other factors hindering participation. The staff expressed that it is important for the sales consultants to have a clear understanding of the referral procedure before selling Prime Time programme memberships. This finding is supported by Prime Time programme members where they have reported that they were referred to incorrect programmes. One of the main reasons for dropout in the programme was participants' dissatisfaction of the services. Participants have mentioned that the sales and administration department need to be more diligent in the work that they perform on a daily basis.

*“The sales consultants are not trained in a medical capacity for that matter, they don't realize the severity of their actions and the only time we basically know that somebody is supposed to be on prime time is if one of us have assessed them and put them on prime time, but if somebody else is assessing them, it might not be picked up” (Key-informant interview 4 – Improvements: referral process, less than half of the staff shared similar views and statements)*

The staff suggested a better referral of participants from the phase two cardiac rehabilitation programme. This is important as there are still some participants being incorrectly referred to the Prime Time programme before there is a sufficient reduction in their cardiovascular

disease risk factors. The staff suggested that all doctors (external to the programme) who refer patients to the Prime Time programme need to understand the difference between the Prime Time programme and the phase two cardiac rehabilitation programme. This might affect programme delivery, participant safety and ethical procedures as these programmes focus on different phases of cardiac rehabilitation.

*“If we allow someone in here who is not supposed to be in there, that’s malpractice and if that happens, it falls on everyone’s head, so again it just comes down to the understanding of what the process flow actually is.”(Key-informant interview 1 – Improvements: Referral process, few of the staff shared similar views and statements)*

### **Programme structure and space for the Prime Time Programme**

The staff mentioned that the structure of classes is vital for participants’ rehabilitation and therefore improvements in managing the noise disturbances from other gym programmes, limited space and equipment and class plans are important. Some staff expressed concerns regarding the waiting time to use some of the exercise machines during exercise classes. This is usually due to staff being unable to pre-book equipment, since it needs to be freely available for all the gyms’ other members. A suggestion from some of the staff participants is that instructors can divide the class into groups of two or three, utilise an alternative venue and have an additional biokineticist assisting so that there is adequate space and structure. In addition, all participants indicated that the lack of parking space at the gym contributed to their frustration when arriving at the Prime Time programme.

*“What we find the problem with that was either the space, there wasn’t enough space for us to conduct the exercise, or the equipment, the equipment was limited. Key-informant interview 6 – Improvements: space, half of the staff shared similar views and statements)*

### **Additional activities**

There were a few additional activities that both the staff and participants have suggested as a means of contributing to the improvement of the overall programme. For example, staff suggested having a 'Prime Time Workshop' for the staff that could improve understanding of referrals, programme structure and awareness and knowledge of the Prime Time programme. This would allow the programme to be more efficient by having these workshops for the staff. In addition, some participants suggested that aqua aerobics and Tai Chi classes could be reinstated as this fosters more variety in the exercise sessions.

### **Summary**

Factors promoting or hindering participation in the Prime Time programme based on the focus groups, interviews and key-informant responses are illustrated in the conceptual model in Figure 2.3. The conceptual model should be viewed as starting with the Prime Time programme, which links to factors promoting and hindering participation. Improvement strategies with its influential factors are related to factors hindering participation (Refer to Figure 2.4).

Figure 2.3: Conceptual model of the Prime Time programme<sup>80</sup>

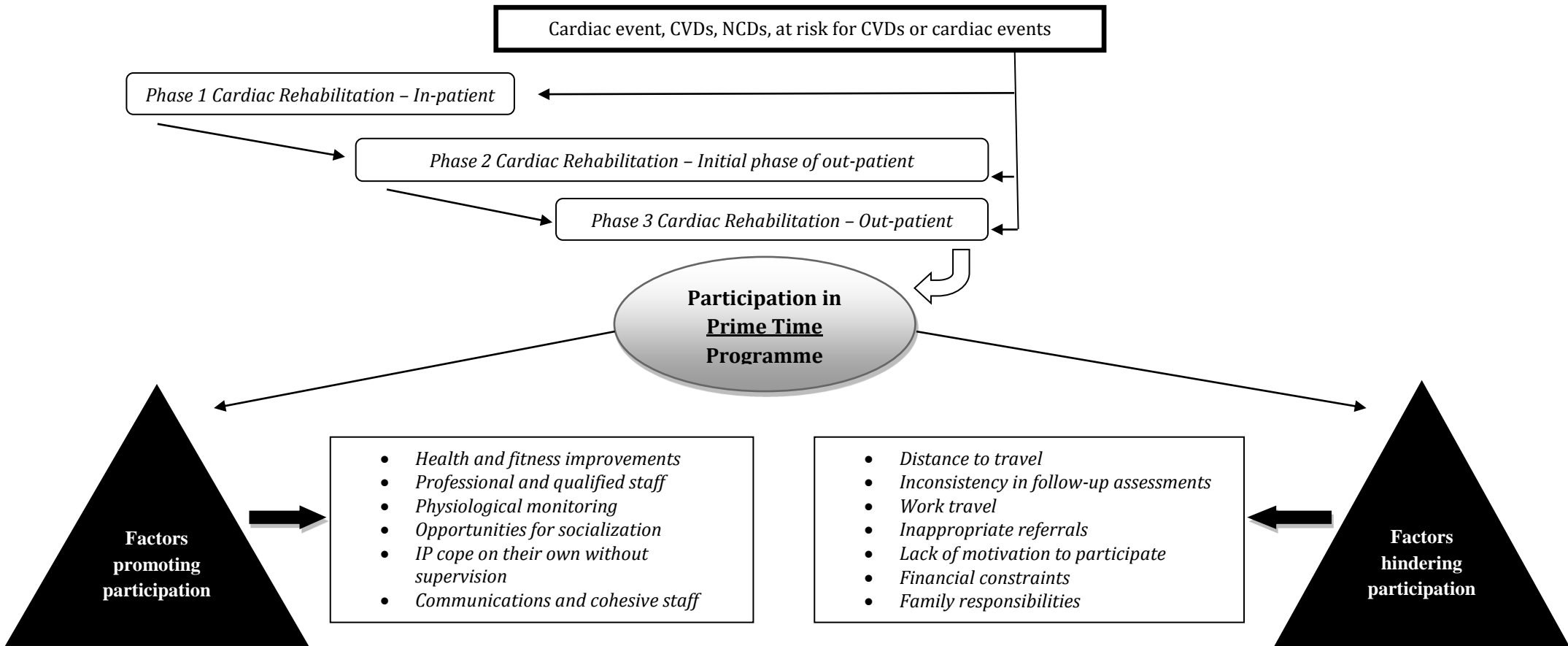
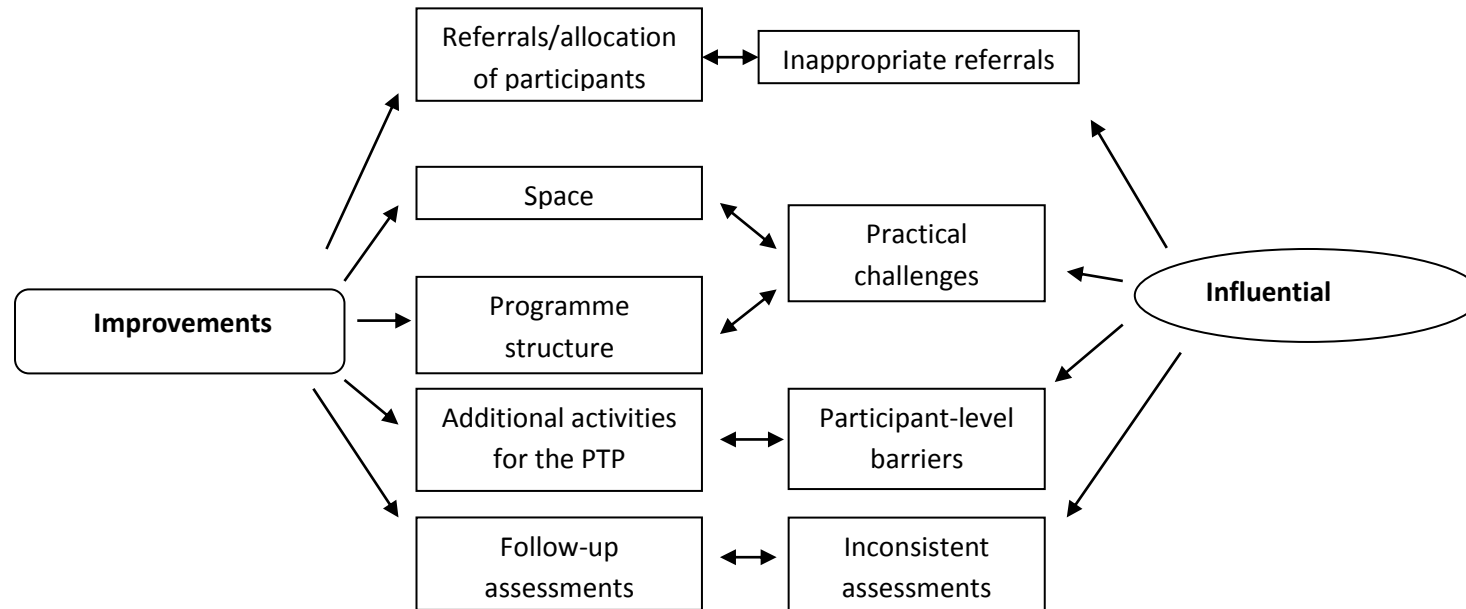


Figure 2.4: Improvements and influential factors associated with participation in the Prime Time programme



## Discussion

The findings from this study highlighted not only the factors associated but also the barriers involved in phase three CRPs such as the PTP. Participants within this phase three CRP displayed a high level of understanding regarding their health, exercise routine and the importance of cardiac rehabilitation after sustaining a traumatic event such as myocardial infarctions. Factors promoting and hindering participation in the PTP are further discussed.

According to the majority of participants, the main factors promoting participation in the PTP were improvements in health and fitness, professional and qualified staff working on the PTP, physiological monitoring performed by the nurses and opportunities for socialization. Similar studies highlighted the need for future CRPs to conduct physiological monitoring prior and after each exercise session as there are limited CRPs which provide this monitoring<sup>6</sup>. In addition, this finding is supported by previous research in which the influence of such a wide range of factors including the interaction and professionalism of healthcare providers, opportunities for socialization and health improvements were common in CRP settings<sup>56,72</sup>. These studies focused on cardiac patients in multidisciplinary settings and are similar to the role and structures of the PTP.

Factors that contributed to effective programme delivery was the care displayed by the staff towards all participants on the programme and the reputable facilities and gym environment that the participants were exposed to within. Due to the PTP being evidence-based, it has facilitated components of increasing safety for participants as part of its reputable facilities to perform the correct exercises and increasing the variety of exercises. Similarly, research conducted by Banerjee et al. (2010) on the cultural factors influencing CRP participation suggests that feeling safe, physically well and socially accepted in one's cardiac rehabilitation environment may contribute to programme participation and exercise maintenance<sup>51</sup>. In

addition, alongside the PTP, research by Azad et al. (2012) on the safety and predictors associated with participation amongst elderly women with chronic heart failure has shown that variation in exercises and executing adequate exercise techniques contributes to participation among participants in CRPs<sup>53</sup>. Such exercises and adequate techniques are also maintained on the PTP.

Staff members on the programme perceived factors promoting participation in the PTP including the communication and cohesiveness of staff members which underlined their satisfaction in their work and consequently lead to more effective programme delivery. Previous research conducted in a variety of cardiac rehabilitation settings such as in the hospital and at home has shown that a cohesive cardiac rehabilitation team contributes to participation and positive experiences for participants in CRPs which compliments the findings in the PTP<sup>56,75</sup>. Therefore, a cohesive CR team proves to be positive for participants involved in CRPs.

The PTP also encourages members to cope on their own with physical activity without having supervision from a staff member on the healthcare team at all times. This is a positive finding as studies found that patients from similar gym-based settings were embarrassed to participate on their own after referral<sup>83,84</sup>, and some patients believed that they could handle their own health problems which later resulted in them dropping out of their CRP<sup>85,86</sup>. This shows that the PTP encourages members to exercise independently without additional assistance. Research has shown that there are limited CRPs which nurture patients to cope on their own with their rehabilitative exercise sessions<sup>79</sup>. CRPs encouraging members to cope on their own after supervision is therefore an integral component for maintaining and improving participation, such as the PTP.

While the literature has investigated factors that have been effective for CRPs, research has also showed that there are a number of reasons negatively affecting the decisions to attend cardiac rehabilitation<sup>56,76</sup>. The main factors negatively associated with participation in the PTP were the practical barriers such as distance to travel, service level barriers such as incorrect referrals and inconsistent assessments; and personal barriers such as family responsibilities and priorities. These factors are also supported by DeAngelis et al. (2008) where participants were dissatisfied with services; distance to the commercial gym was far and financial constraints<sup>86</sup>.

Higgins et al. (2008) found that participants who attended a CRP had a shorter travel time than the participants who did not attend<sup>87</sup>. Other studies also indicated that distance to rehabilitation centres are barriers for attending CRPs<sup>64,87</sup>. Distance was mentioned as a barrier in this chapter and will be further analysed in the next chapter.

In most CRP settings, referrals can either precede or terminate one's cardiac rehabilitation journey if they are inappropriately referred to CRPs<sup>88,89</sup>. A lesson learnt from this study were the incorrect referrals on the PTP which is an important factor affecting participation. A study conducted on the potential of electronic health records investigated the impact of working collaboratively on participation among patients in CRPs. The outcomes of this study showed that working collaboratively ensures that consistent service is given across the healthcare team and that physicians recommend cardiac rehabilitation to all eligible participants<sup>89</sup>. From a different view, two studies conducted among phase three CRP patients suggest that using automatic referral systems to cardiac rehabilitation may increase participation and this might be a possible strategy to include on the PTP<sup>85,88</sup>. In the PTP's context, addressing the issues of inappropriate referrals and maintaining the cohesion among the PTP staff would ensure

that patients are correctly referred to the programmes which suggest that it would increase participation.

### **Limitations and Strengths**

A key strength of this research study is that there was good representation from CP in addition to obtaining insights from the PTP staff. However, one of the limitations of this study was the difficulty in recruiting and the relatively low response rates among IP and PP. The researchers tried to increase the response rates by contacting eligible participants telephonically, especially for recruiting IP and PP if they did not respond to the emails. Another possible limitation is that this study focused on one, small-scale programme and the findings may not be applicable to non-commercial CRPs. Despite this limitation, these might inform similar CRPs where programme managers might be interested in promoting participation in their CRPs.

### **Recommendations and Implications**

Participants should have the opportunity to discuss their expectations of CRPs with staff and facilitators, as such views provide useful feedback regarding improvements of a CRP, and can ultimately improve participation. It is imperative that staff working on phase three CRPs ensure that programme delivery, level of service and continued education regarding cardiac rehabilitation are enhanced and consistently maintained. Furthermore, additional activities and improvements surrounding space and programme structure would motivate participants to continue and would enhance the experience of their rehabilitation. There might be less generalisability for programmes based in the public sector. However, the lessons gained from this study can provide insights into participation which could be useful to those working in similar CRPs based in the private sector.

## Conclusion

The findings of this evaluation suggest that the PTP plays a role in understanding factors associated with participation in phase three CRPs. The main factors promoting participation were improvements in participants health and fitness levels, the professional and qualified staff working on the PTP, physiological monitoring performed by the nurses and opportunities for socialization. The main factors hindering participation were the practical barriers such as distance to travel; service level barriers such as incorrect referrals and inconsistent assessments; and personal barriers such as family responsibilities and priorities. This study has found that the additional keys to successful programme implementation and participation lies in the process flow of referral, consistency in conducting follow-up assessments and programme structure in CRPs.

---

## *Chapter 3:*

# **A comparison of gym attendance between Prime Time and non-Prime Time members: a case-control study**

---

## Background

The Prime Time programme (PTP) is a phase three cardiac rehabilitation programme (CRP) based at a commercial gym as described in Chapter 2. The main findings in Chapter 2 suggested that this programme plays a role in understanding the factors associated with participation in a phase three cardiac rehabilitation programme (CRP).

Factors which promoted participation in the PTP included improvements in participants' health and fitness levels, the professional and qualified staff working on the programme, the physiological monitoring performed by the nurses and the opportunities for socialization (See Chapter 2). Practical barriers such as distance to travel, services offered by the gym such as assessments and referrals to programmes, and personal barriers were factors hindering participation in the PTP. Based on the above-mentioned factors, it could be postulated that members participating in CRPs would be more motivated to improve and maintain their health status than members attending general gym-based programmes (GGPs)<sup>90</sup>. However, there has been limited research aimed at comparing gym attendance and baseline measures between members attending CRPs and general gym-based programmes in a commercial gym-setting<sup>91</sup>.

Both CRPs and general gym-based programmes appear to be equally effective and safe in improving the clinical, fitness and health-related quality of life outcomes in cardiac patients, as well as the apparently healthy<sup>15,27,92</sup>. In addition, members who attend general gym-based programmes are more likely to have fewer risk factors for cardiovascular diseases (CVDs) and more positive perceptions of their health<sup>27,93,94</sup>. Furthermore, the monitoring of vital signs, care displayed by staff, and participants' feeling a sense of belonging around support groups motivates participants to attend the Prime Time Programme.

Previous research has shown that patients' feelings of health, social acceptance and safety in a CR environment may contribute to exercise attendance<sup>37,53</sup>. These are some of the factors associated with participation in both CRPs and GGPs<sup>56,90,92</sup>.

In the qualitative research study, the perceptions of staff and participants involved in the CRP were discussed. In this chapter the aim was to compare baseline number of risk factors between the CRP and the general gym-based programme. The secondary aim was to compare the differences in attendance between members within the PTP and apparently healthy members in the commercial gym. For the purpose of this study, apparently healthy members will be referred to as non-Prime Time (NPT) members.

One of the main findings from the qualitative research was that the PTP members highlighted the importance of being aware of their health status and the importance of attending cardiac rehabilitation programmes. Indeed the PTP members reported that they experienced health benefits since joining the PTP. Based on these findings, and the fact that the PTP is aimed at person at increased risk for cardiovascular disease we hypothesized that Prime Time (PT) members would attend gym more frequently than NPT members. In addition, we hypothesized that the PT members (high-moderate risk members) would have more total CVD risk factors than NPT members (low risk members) when joining the gym.

## **Methods**

### **Study Design**

This pilot study used a case-control research design to compare gym attendance and baseline measures between PT and NPT members who joined the commercial gym between January and December 2011.

## **Participants**

Data for PT and NPT members' were extracted from the programme records by the manager of the commercial gym. Pre-participation health screening forms (PPHS) were completed when members joined the commercial gym (Appendix 5) (See Chapter 2 under 'study setting'). Three age-matched controls were selected for every case (PT member) and were included in this pilot study<sup>93</sup>. For example: of all PT members that joined during 2011, nine controls were needed to be obtained for April if three cases had joined in the same month. In some cases, there were insufficient controls for a particular month that a PT member joined. Therefore, controls were matched one month preceding or one month after a case had joined. For example: if a member joined in May, controls were either matched for April or June if there were insufficient controls for the month of May.

## **Measures**

### *Memberships during 2011:*

The average number of members joining for each month was extracted between January and December 2011.

### *Clinical and anthropometrical measurements:*

#### *Clinical Measurements:*

A manual blood pressure cuff, sphygmometer and stethoscope were used to take blood pressure which was not at a scheduled time and was during the participant's time of arrival at the commercial gym (® Medline MDS2001, USA)<sup>95</sup>. Blood pressure was measured once, following five minutes of sitting<sup>95</sup>. The AccuChek (® Roche Diagnostics, USA) machine and appropriately coded cholesterol strips were used to test total blood cholesterol once (non-fasting), via a finger prick test. Total blood cholesterol (1.5ml of blood) was tested on a

members' finger using a lancet and recorded after three minutes using the AccuChek machine (® Roche Diagnostics, USA)<sup>24</sup>.

*Anthropometric Measurements:*

Height was measured in meters (m) using an upright Seca stadiometer (Seca, USA). Participants stood barefoot with their heels and head in contact with the wall and arms at their side<sup>95</sup>. Weight was measured in kilograms (kg) using a Clover Scale (Model TCS-A300; Clover Scale, SA), with the value rounded to the nearest 100<sup>th</sup>gram (g). Body Mass Index (BMI) was calculated using the equation:  $BMI = \text{weight (kg)} / \text{height (m}^2\text{)}$ <sup>95</sup>.

Four different skinfold sites were used to measure body fat percentage (%), this included: the biceps, triceps, subscapular and suprailiac regions using Harpenden skinfold callipers (Baty International, UK). Four site skinfolds provide an increase in accuracy compared to equations using 7,9 or 11 anthropometrical sites to calculate body fat percentage<sup>96</sup>. In addition, the commercial gym in which this study took place uses this protocol to calculate body fat percentage (Appendix 7).

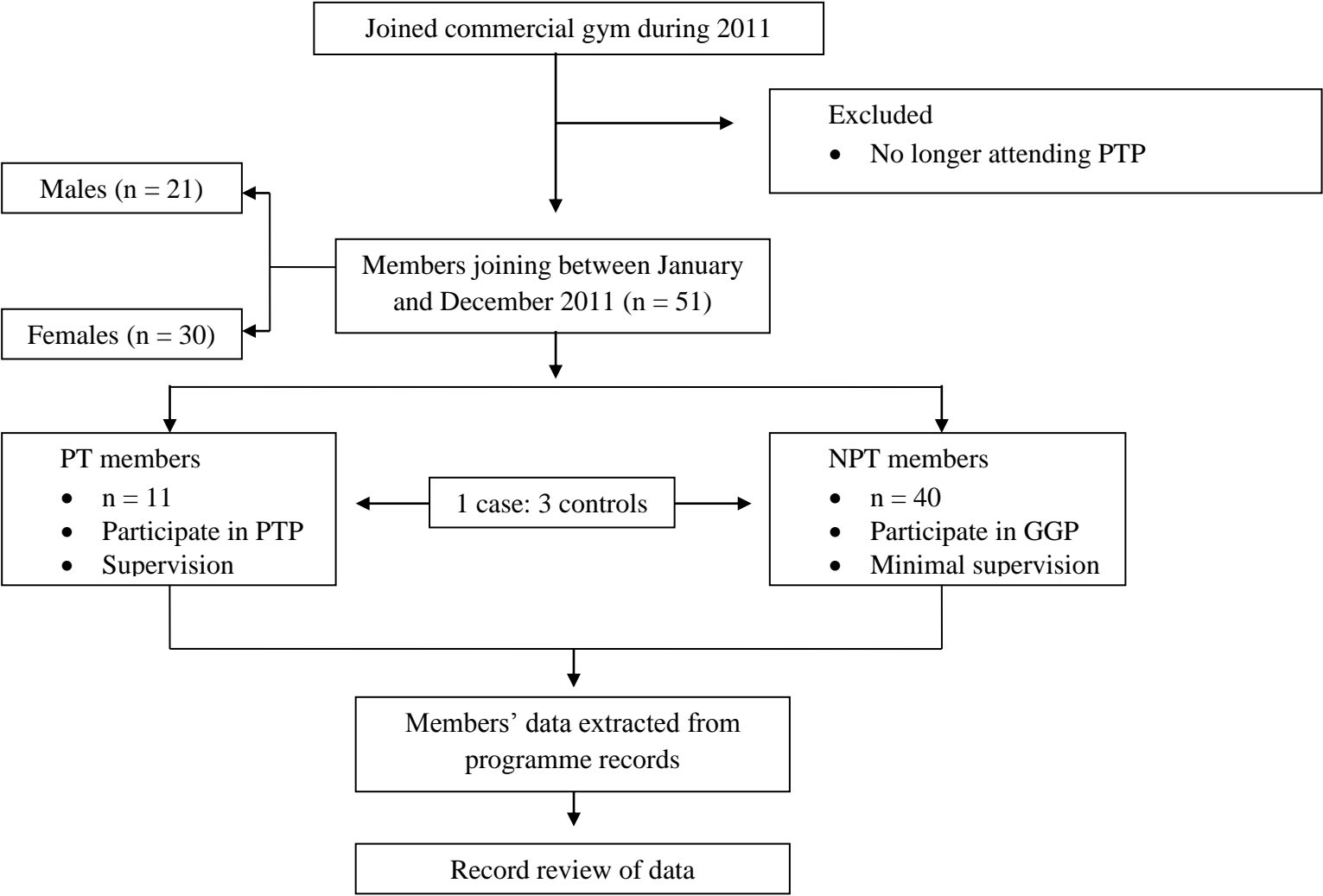
*Cardiovascular disease risk factors:*

The average number of CVD risk factors was calculated by the presence of the following five risk factors: Age to gender (Male>45; Female>55), co-morbidities such as hypertension (systolic blood pressure: >140m.Hg; diastolic blood pressure: >90mm.Hg); dyslipidemia (>5.2mmol<sup>-1</sup>); BMI (>25kg.m<sup>-2</sup>) and lifestyle behaviours such as cigarette smoking<sup>24,93</sup>. Members were categorized 'at risk' by having more than two of the above five CVD risk factors<sup>24</sup>. These five CVD risk factors were used in the calculation as we aimed to determine and address the common potential risk factors for CVD and cardiac disease<sup>93</sup>.

*Gym Attendance:*

Attendance and baseline data were obtained from PT (n = 11) and NPT (n = 40) members' (Three age-matched controls were selected for every PT member, as suggested by Niven et al. (2012) for case control studies to control for known potential confounding variables<sup>93</sup>.) programme records who joined the commercial gym between January and December 2011 (Figure 3.1). Exercise attendance was calculated based on members' average monthly attendance between January and December 2011. This was done by viewing the month the member joined followed by adding the number of months for which they attended in the same year. Attendance was then assessed between joining and attending in 2011 then divided by their eligible months. For example: if a member joined in June 2011 and attended until December 2011, attendance is calculated from June until December. Therefore, a member's overall attendance is added and then divisible by seven eligible months.

Figure 3.1: Process of participant selection and record review of data



### *Distance to the commercial gym*

The distance from members' street addresses to the commercial gym was calculated in kilometres (km). Data for these was obtained from programme records and the online search engine Google Maps™ (2013) was utilized to calculate the distance.

### **Statistical Analysis**

STATISTICA 11 (Stasoft Inc., Tulsa OK, USA) was used for all statistical analyses. The continuous data were normally distributed and were described in terms of means and standard deviations (SD). One-way analyses of variance (ANOVA) while co-varying for gender were used to determine if there were any significant differences between groups at baseline for continuous variables. Chi-square analyses were used to determine if there were any significant differences between groups at baseline for categorical variables such as CVD risk factors. Level of significance for all analyses was set at  $p < 0.05$ .

### **Ethical Considerations**

Ethical approval for the study was obtained from the Human Research Ethics Committee of the Faculty of Health Sciences at the University of Cape Town (HREC/REF: 169/2012). The data obtained for the analysis was coded and had no personal identifiers. Therefore the researchers were unable to identify the participants or link results to specific participants (Appendix 6).

## **Results**

### *Participants Characteristics:*

The mean ages of men ( $58.5 \pm 8.1$  years) and women ( $57.6 \pm 8.3$  years) were not significantly different. The PT members ( $n = 11$ ) comprises of 8 males (73%) and 3 females (27%)

whereas NPT members comprises of 13 males (32%) and 27 females (68%). The average distance from members' houses to the commercial gym was  $6\pm 5.8$ km, and were similar for both groups (PT:  $7.3\pm 5.2$ km; NPT:  $5.6\pm 5.9$ km).

*Medical history:*

PT members had a higher prevalence of diagnosed CVDs than NPT members ( $p < 0.05$ ) (Figure 3.2). Both type 1 and type 2 Diabetes accounted for 9% of the total medical conditions among PT members while chronic respiratory disease was 7.5% amongst NPT members. There were less than 50% of surgeries and injuries in the upper and lower extremities for both groups. Other medical conditions (anaemia, kidney disease, arthritis and gout) were less than 20%.

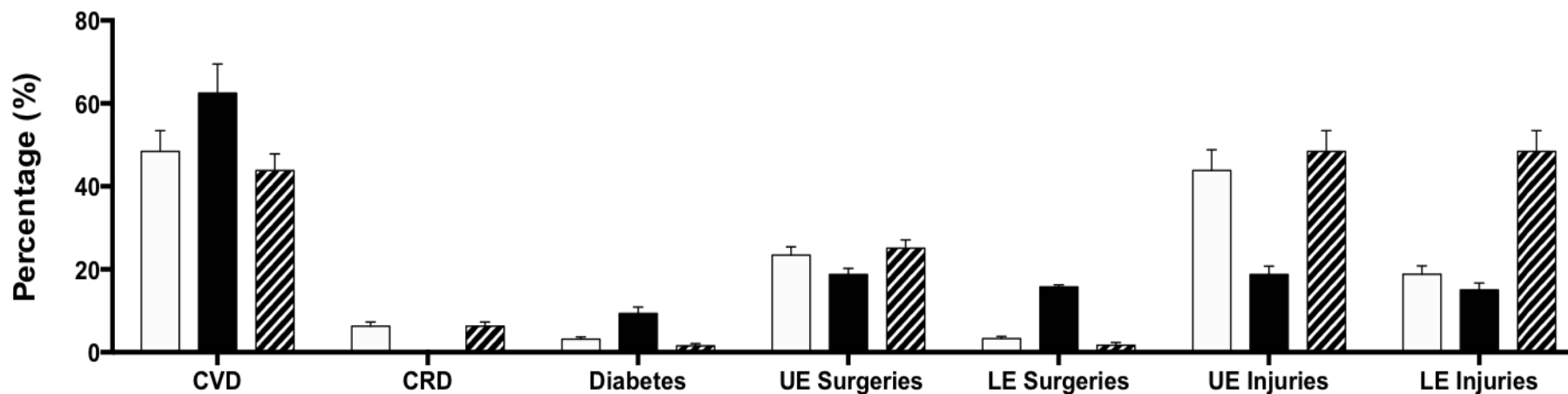
*Clinical and Anthropometrical Measurements:*

Systolic blood pressure was significantly lower among apparently healthy NPT members compared to PT members ( $p = 0.01$ ). BMI, body fat %, diastolic BP and dyslipidemia were similar for the two groups (Table 3.1).

*Cardiovascular disease risk factors:*

The prevalence of total CVD risk factors for PT and NPT members is represented in Figure 3.3. Three quarters (73%) of PT members and nearly half (43%) of NPT members had dyslipidemia and more than 60% of all members were obese. Nearly 75% of both PT and NPT members were at risk for CVDs. The average sum of all risk factors for CVDs per member were  $2\pm 0.7$  and  $1.8\pm 0.8$  for the PT and NPT groups respectively ( $\chi^2 = 2.01$ ,  $p = 0.7$ ) (Table 3.1).

Figure 3.2. Medical history of members



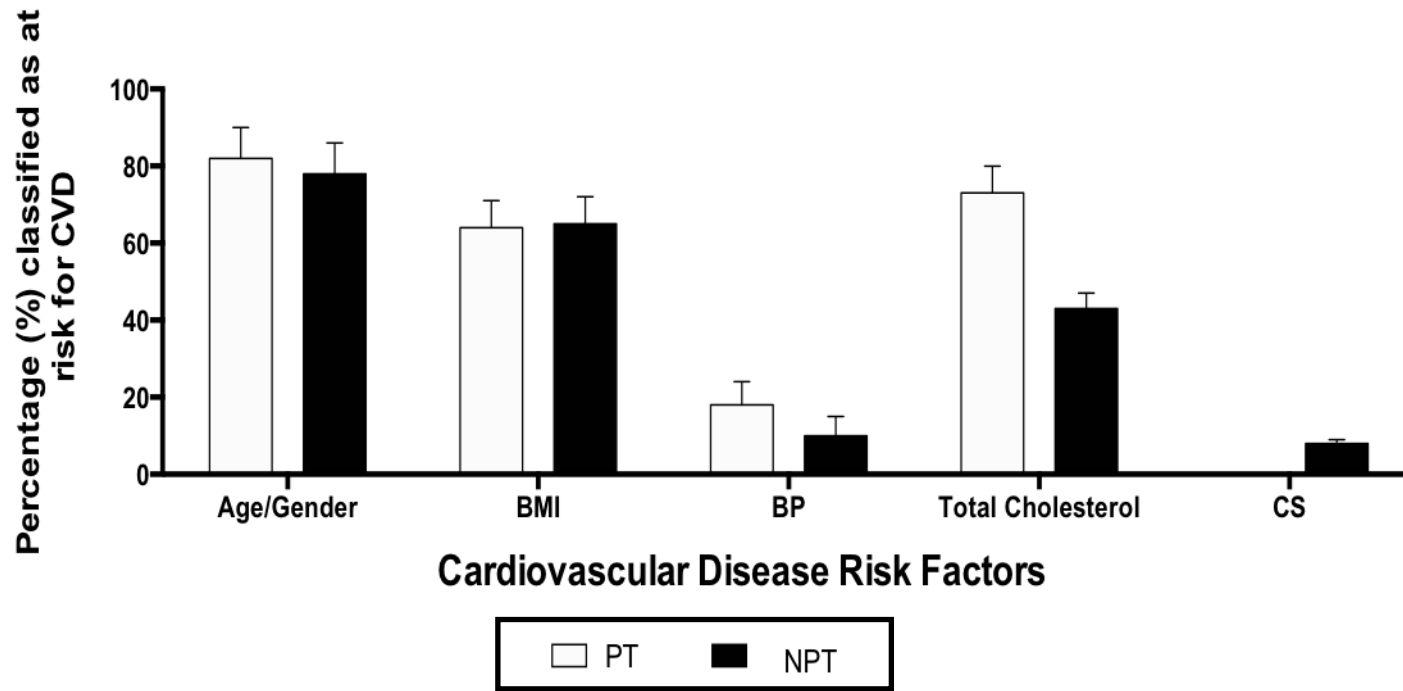
### Prevalence of Diagnoses



Legend:

CRD = Cardio-respiratory disease, CVD = Cardiovascular disease, LE = Lower extremity, UE = Upper extremity

Figure 3.3. Cardiovascular disease risk factors between groups



Legend: BP = Blood pressure, BMI = Body mass index, CS = Cigarette smoking, CVD = Cardiovascular disease

**Table 3.1: Participant Characteristics at Baseline: Demographical and Clinical Results. [mean±(SD)]**

	Total	PT members	NPT members	p-value
	n=51	n=11	n=40	
Age at January 2011 (years)	57.80 (8.10)	59.60 (8.30)	57.50 (6.90)	0.40
BMI (kg.m <sup>-2</sup> )	27.90(6.50)	27.30 (6.80)	28.10 (6.50)	0.70
Body fat (%)	32.10 (6.50)	28.60 (9.10)	33.10 (5.40)	0.40
Systolic Blood Pressure (mmHg)	122.30 (14.70)*	131.30 (12.80)	119.80 (14.40)	0.01*
Diastolic Blood Pressure (mmHg)	75.50 (9.30)	77.50 (11.30)	75.00 (8.80)	0.40
Cholesterol (m.mol <sup>-1</sup> )	5.30 (1.10)	5.40 (1.20)	5.30 (1.10)	0.90
Average CVD risk factors per member	1.90 (0.80)	2.00 (0.70)	1.80 (0.80)	0.70

*BMI = Body Mass Index, CVD = Cardiovascular Disease*

*\*p<0.05 = significant difference*

### *Gym attendance:*

There were no significant differences in gym attendance between PT ( $5.4 \pm 3.7$  days) and NPT ( $5.1 \pm 3.7$  days) members during 2011. The highest average monthly attendance for PT and NPT members were 11 and nine days per month respectively.

## **Discussion**

One of the main findings of this pilot research study showed that there were no significant differences between monthly attendance for PT and NPT members. This does not support our hypothesis that PT members would have a higher average monthly attendance than NPT members. In 2010, health clubs in the United States of America reported a median of 54 visits per year from gym members, which averaged to only four to five visits per month<sup>94</sup>. This pilot research study only found days of attendance and not minutes per exercise session. This limitation is acknowledged and therefore, the attendance reported in this study is not in line with current physical activity recommendations of three days per week<sup>24</sup>.

As such, studies which investigated the association of participation and medical costs among members of a South African health insurance company showed that engagement in an incentive-based wellness programme was associated with increased gym participation. The odds of joining were 13% lower for two additional gym visits per week<sup>97,98</sup>. Relating to the low attendance rate in this study, it has been suggested that older adults suffering from CVDs in Africa and the United Kingdom do not attend the gym because they either do not enjoy attending or they do not achieve the results they aim for<sup>99,100,101,102</sup>. In addition, international studies have also shown that attendance among both cardiac patients and general gym members vary due to a variety of factors such as residence location, distance to the gym and health status<sup>55,87</sup>.

A finding from this study to help understand the attendance trend showed that the average distance from home to the gym is not significantly different. Previous research has shown that members residing in urban areas and locations less than a 10km distance to the commercial gym can contribute to increased gym attendance<sup>64,86</sup>. However, in this study, an average distance of 6km to the commercial gym failed to justify the reason the attendance rates amongst both groups of members did not meet prescribed physical activity recommendations. Future research is therefore required to determine distance as a predictor of attendance<sup>86,87</sup>.

Another main finding of this study was to compare baseline clinical measurements between PT and NPT members. Although there were significant differences found in systolic blood pressure between both groups in the current study, the hypothesis that PT members would present with a higher total number of CVD risk factors could not be fully supported. In contrast, other studies have shown distinct differences in baseline clinical measures between apparently healthy members and individuals with NCDs such as hypertension, dyslipidemia and diabetes<sup>26,103</sup>. Individuals participating in a chronic disease management programme had higher BP, body fat % and body weight values at baseline compared to apparently healthy members<sup>26,49</sup>.

A possible explanation for the insignificant differences in this study could be the use of medications by PT members prior to the assessments, which could have assisted in the maintenance of clinical measurements between its cut-off points<sup>95</sup>. Both groups of members had an average of two out of the five CVD risk factors measured, with the only variances shown in hypertension, dyslipidemia and cigarette smoking. In addition, both groups of members also had surgeries and injuries in both extremities and 60% of members were clinically obese. Furthermore, the gender imbalance could have also contributed to the

indifferences between both groups. This gender imbalance can also relate to the referral limitations in the PTP as discussed in Chapter 2. Previous studies conducted on GGPs showed that gender differences between two groups play a role in maintaining attendance and that males were more likely to attend the programme than females<sup>90,93</sup>. In this pilot study, there were a higher percentage of males than females in the PT group and more females than males in the NPT group, which fails to elucidate any differences in attendance.

### **Strengths and Limitations**

A strength of this study was that participants exercised in the same environment and in the same month which limited a seasonal effect. Clinical measures were also obtained objectively and were not self-reported. A limitation of this pilot study was that it was performed in one facility over one year and there were a limited number of participants. Another limitation was that it was not possible to match participants for gender due to the variability of males and females joining every month during 2011. The finger prick method is recognized as a sensitive screening tool to assess whether a lipogram is needed<sup>24,95</sup>. However, a limitation of using the finger prick method is that it does not provide specific lipid results such as low-density lipoprotein (LDL), high-density lipoprotein (HDL) and triglyceride readings that a full blood count would provide<sup>24,95</sup>.

### **Conclusion**

Programmes within commercial gym-settings play a role in improving the health and clinical outcomes of cardiac rehabilitation and apparently healthy members. Based on this pilot study, the evidence did not support the original hypothesis of PT members attending more than NPT members. Longitudinal studies could provide further insight and understanding for long-term compliance to physically active lifestyles. Future research is required to fully understand the differences associated with gym attendance and phase three CRPs.

*Chapter 4:*

## **Summary of Results**

---

## **Rationale**

Participation rates among cardiac rehabilitation (CR) have been shown to range between 30-50% of eligible patients<sup>49</sup>. This finding presents one of several challenges for future CR research along with assessment of long-term CR outcomes and cardiovascular disease (CVD) risk factors. Currently, there is limited evidence demonstrating CR efficacy and availability of outpatient CR programmes.

Due to the fluctuations in cardiac rehabilitation participation, it is advisable to compare participation rates for different programmes in order to streamline an effective way to resolve poor participation rates. To the best of the researchers' knowledge, minimal studies compared programme attendance between an apparently healthy population and cardiac rehabilitation participants.

## **Aims and Objectives**

The aim of this research study was to firstly gain insight and understanding associated with the factors promoting and hindering participation in a phase three cardiac rehabilitation programme (CRP). A secondary aim was to conduct a pilot study to compare attendance between CR participants and general gym members at a commercial gym setting.

## **Research Design**

The Prime Time programme (PTP) is an evidence-based phase three cardiac rehabilitation programme based at a commercial gym. This was a mixed-methods research study employing both quantitative and qualitative research methods. The qualitative study comprised of focus group discussions (n=3) and key-informant interviews (n=5 current members and n=5 ex-members). Staff participants (n=9) included the Biokineticists, programme managers and sales consultants who participated in key-informant interviews and provided their perceptions and experiences while working on the programme. The quantitative study, which was a pilot

study, employed a case-control research design to compare attendance and baseline data between Prime Time (PT) (n=11) and non-Prime Time (NPT) (n=40) members at a commercial gym. Three age-matched controls for every case were included in this pilot study.

### **Research Findings**

The findings from the qualitative study were categorized into factors promoting and hindering participation. The main factors promoting participation were participants' improved health status and fitness levels, the PTP having qualified staff and frequent physiological measures. Additional factors included increased understanding of the importance of CRPs, gym facilities and socialization opportunities for participants. The main factors hindering participation were inappropriate referrals from other programmes to the PTP and inconsistency of follow-up assessments. Overall, the positive perceptions and experiences of the PTP outweighed the negative experiences for both the staff and participants. Based on these findings, we hypothesized that PT members would attend gym more regularly and have more CVD risk factors than NPT members on a general gym-based programme.

The quantitative study aimed to compare attendance and baseline data between PT and NPT members. Findings from this study showed that the average days of attendance per month in 2011 were not significantly different between PT ( $5.4 \pm 3.7$  days) and NPT ( $5.1 \pm 3.7$  days) members. The prevalence of CVDs amongst both groups was 50%. Nearly 75% of both PT and NPT members were at risk for CVDs. A possible explanation for the insignificant differences in this study could be the use of medications by PT members prior to the assessments, which could have assisted in the maintenance of clinical measurements between its cut-off points. Both groups of members had an average of two out of the five CVD risk

factors measured, with the only variances shown in hypertension, dyslipidemia and cigarette smoking. Although there were significant differences found in systolic blood pressure between both groups in the current study, the hypothesis that PT members would present with a higher total number of CVD risk factors could not be fully supported.

### **Limitations**

The limitation from the qualitative study was the difficulty in recruiting participants and the relatively low response rates among independent and previous participants. The researchers tried to increase the response rates by contacting eligible participants telephonically, especially for recruiting IP and PP if they did not respond to the emails. Another possible limitation is that this study focused on one, small-scale programme and the findings may not be applicable to non-commercial CRPs.

A limitation of the quantitative pilot study was that it was also performed in one facility over one year and there were a limited number of participants. Another limitation was that it was not possible to match participants for gender due to the variability of males and females joining every month during 2011.

Despite the above limitations, these might inform similar CRPs where programme managers might be interested in promoting participation in their CRPs and to possibly abstain from these voids in future research. In addition, ensuring that the strengths of the study are maintained will help minimize the risk of such limitations which are commonly experienced in qualitative and quantitative research.

## **Strengths**

A key strength of the qualitative study was that there was a good representation from current class participants and the PTP staff. In the quantitative study, clinical measures were obtained objectively and were not self-reported which was strength. An additional strength was that participants exercised in the same environment and in the same month which limited a seasonal effect.

## **Future research and implications for public health**

The current study, although on a small-scale, has provided some understanding of the factors associated with participation in a phase three CRP. With the current limited cardiac rehabilitation research conducted in South Africa, this study can provide value into structuring interventions to increase participation rates and attendance. Gathering additional participant and staff perceptions from cardiac rehabilitation programmes would provide more diverse and holistic input which could be beneficial in making cardiac rehabilitation programmes more effective. The effectiveness of these programmes can provide strategies for improving components of cardiac rehabilitation programmes, referral barriers and the overall structure of programmes. Further studies are required to fully understand the difference associated with cardiac outcomes, gym attendance and phase three CRPs, and to improve the overall participation rates among cardiac rehabilitation programmes.

---

## Reference list

---

1. Mayosi BM, Flisher AJ, Lalloo UG. The burden of non-communicable diseases in South Africa. *The Lancet*, 2009; 374 (9693): 934 – 947.
2. Hunter DJ, Reddy KS. Global health: Non-communicable Diseases. *The New England Journal of Medicine*. 2013; 369: 1336-1343.
3. WHO (2012) World Health Statistics 2012. Accessed 15 September 2013, [http://www.who.int/gho/publications/world\\_health\\_statistics/2012/en/](http://www.who.int/gho/publications/world_health_statistics/2012/en/).
4. Young F, Critchley, J, Johnstone L, Unwin, L. Globalization and the dual disease burden in sub-saharan Africa. *Diabetes Voice*, 2010; 55(1): 29- 32.
5. Dalel S, Beunza JJ, Volmink J, et al. Non-communicable diseases in sub-Saharan Africa: what we know now. *International Journal of Epidemiology*, 2011; 40: 885–901.
6. Bradshaw D, Groenewald P, Laubscher R, et al. Initial Burden of Disease Estimates for South Africa, 2000. Cape Town: South African Medical Research Council, 2003.
7. Bradshaw D. What do we know about the burden of cardiovascular disease in South Africa. *Cardiovascular Journal of South Africa*, 2005; 16(3): 140–141.
8. Lim SS, Vos, T, Flaxman AD, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *The Lancet*, 2012; 380: 2224–2260.
9. South African Democratic Health Survey (SADHS) 2008. Available from: <http://www.info.gov.za/view/DownloadFileAction?id=90143>. Accessed on: 18 March 2012.
10. Shisana O, Labadarios D, Rehle T, et al. South African National Health and Nutrition Examination Survey (SANHANES-1), 2013. Cape Town: HSRC Press.
11. Derman. W.E. Cardiac Rehabilitation: South Africa: Cardiovascular Prevention and Rehabilitation. 2007; I: 44-47.

12. Wenger NK, Froelicher ES, Smith LK, et al. Cardiac Rehabilitation: Clinical Practice Guideline No. 17. Rockville, Md: US Dept of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, National Heart, Lung, and Blood Institute; October 1995. AHCPR publication No. 96-0672.
13. Davies P, Taylor F, Beswick A, et al. Promoting patient uptake and adherence in cardiac rehabilitation. *Cochrane Database of Systematic Reviews* 2010, Issue 7. Art.No.:CD007131. DOI: 10.1002/14651858.CD007131.pub2.
14. Schwaab B, Waldmaan A, Katalinic A, et al. In-patient cardiac rehabilitation versus medical care - a prospective multicenter controlled 12 months follow-up in patients with coronary heart disease. *European Journal of Cardiovascular Prevention & Rehabilitation*. 2011; 18(4): 581 – 586.
15. Dalal HM, Zawada A, Jolly K, et al. Home based versus centre based cardiac rehabilitation: Cochrane systematic review and meta-analysis. *British Journal Medical Journal*. 2010; 340: b5631.
16. Heran BS, Chen JMH, Ebrahim S, et al. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database of Systematic Reviews* 2011, Issue 7. Art. No.:CD001800.pub2. DOI: 10.1002/14651858.CD001800.pub2.
17. Durstine, JL (2009). *ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities*. 3<sup>rd</sup> ed. Human Kinetics: USA.
18. Balady G, Williams MA, Ades PA, et al. Core components of cardiac rehabilitation/secondary prevention programs: 2007 update. A Scientific Statement From the American Heart Association Exercise, Cardiac Rehabilitation, and Prevention Committee, the Council on Clinical Cardiology, Councils on Cardiovascular Nursing, Epidemiology and Prevention and Nutrition, Physical Activity, and Metabolism; and the American Association of Cardiovascular and Pulmonary Rehabilitation. *Circulation*. 2007; 115: 2675-2682.

19. Mensah GA. Global burden of cardiovascular disease: Ischaemic heart disease in Africa. *Heart*. 2008; 94: 836-843.
20. Brukner P, Khan K (2012). *Clinical Sports Medicine*, revised 4<sup>th</sup> ed. New York: The McGraw Hill Company.
21. Janssen V, De Gucht V, van Excel H, et al. Self-regulation lifestyle program for post-cardiac rehabilitation patients has long-term effects on exercise adherence. *Journal of Behavioural Medicine*. 2013.
22. Compostella L, Russo N, Setzu T, et al. Exercise Performance of Chronic Heart Failure Patients in the Early Period of Support by an Axial-Flow Left Ventricular Assist Device as Destination Therapy. *Artificial Organs*. 2013; 1- 8.
23. Kim SY, Oh JK, Youn JH, et al. The Effect of Cardiac Rehabilitation I Phase Program on Physical Capacity after Coronary Artery Bypass Graft Surgery. *The Korean Journal of Sports Medicine*. 2012; 30(2): 85-91.
24. Thompson, W.R. (2010). *ACSM's Guidelines for Exercise Testing and Prescription*. 8<sup>th</sup> Ed. Lippincott Williams& Wilkins: ACSM, USA.
25. Mampuya WM. Cardiac rehabilitation past, present and future: an overview. *Cardiovascular Diagnosis and Therapy*. 2012; 2(1): 38-49.
26. Rossouw F, Du Plessis R, Reynecke F. Exercise compliance and health outcome in a chronic disease management programme. *African Journal for Physical, Health Education, Recreation and Dance*. 2012; 77 – 89.
27. Dreyer L, Schwellnus M, Noakes TD, et al. Physiological and medical considerations of patients attending cardiac rehab programmes: implications for staffing and equipment. *Medicine & Science in Sports Exercise*. 2001; 33 (5, Suppl); S320.
28. Franklin BA, Lavie CJ, Squires RW, et al. Exercise-Based Cardiac Rehabilitation and Improvements in Cardiorespiratory Fitness: Implications Regarding Patient Benefit. *Mayo Clinic Proceedings*. 2013; 88(5): 431-437.

29. Lawler PR, Filion KB, Eisenberg MJ, et al. Efficacy of exercise-based cardiac rehabilitation post–myocardial infarction: A systematic review and meta-analysis of randomized controlled trials. *American Heart Journal*. 2011;1 62:571-584.
30. Dalal HM, Zawada A, Jolly K, et al. Home based versus centre based cardiac rehabilitation: Cochrane systematic review and meta-analysis. *British Medical Journal*. 2010; 340: b5631.
31. Poortaghi S, Baghernia A, Golzar SEJ, et al. The effect of home-based cardiac rehabilitation program on self-efficacy of patients referred to cardiac rehabilitation center. *BMC Research Notes* 2013, 6:287.
32. Redfern J, Briffa T, Ellis E, et al. Choice of secondary prevention improves risk factors after acute coronary syndrome: 1-year follow-up of the CHOICE (Choice of Health Options In prevention Cardiovascular Events) randomized controlled trial *Heart*. 2009; 95: 468-475.
33. Silberman A, Banthia R, Estay IS. The effectiveness and efficacy of an intensive cardiac rehabilitation programme in 24 sites. *American Journal of Health Promotion*. 2010; 24 (4): 260 – 266.
34. Barry LC, Lichtman JH, Spertus JA, et al. Patient satisfaction with treatment after myocardial infarction: Role of psychosocial factors. *Psychosomatic Medicine*. 2007; 69(2): 115–123.
35. Shen, BJ, Myers HF, McCreary CP. Psychosocial predictors of cardiac rehabilitation quality-of-life outcomes. *Journal of Psychosomatic Research*. 2006; 60: 3–11.
36. Yohannes AM, Doherty P, Bundy C, et al. The long-term benefits of cardiac rehabilitation on depression, anxiety, physical activity and quality of life. *Journal of Clinical Nursing*. 2010; 19: 2806–2813.

37. Foxwell R, Morley C, Frizelle D. Illness perceptions, mood and quality of life: A systematic review of coronary heart disease patients. *Journal of Psychosomatic Research*. 2013; 75: 211–222
38. Sawatzky JA, Christie S, Singal RK. Exploring outcomes of a nurse practitioner-managed cardiac surgery follow-up intervention: a randomized trial. *Journal of Advanced Nursing*. 2013; 69(9): 2076–2087.
39. Brown JPR, Clark AM, Dalal H et al. Effect of patient education in the management of coronary heart disease: a systematic review and meta-analysis of randomised controlled trials. *European Journal of Preventive Cardiology*. 2012; DOI: 10.1177/2047487312449308.
40. Parswani MJ, Sharma MP, Lyengar SS. Mindfulness-based stress reduction program in coronary heart disease: A randomized control trial. *International Journal of Yoga*. 2013; 6(2): 111–117.
41. Joubert L, Holland L, Maturano A, et al. The contribution of psychosocial factors to secondary risk prevention for myocardial infarction in young adults. *Social Work in Health Care*. 2013; 52(2-3): 191-206.
42. Milani RV, Lavie CJ, Mehra MR, et al. Impact of exercise training and depression on survival in heart failure due to coronary heart disease. *American Journal of Cardiology*. 2011;107: 64–68.
43. Shanks LC, Moore SM, Zeller RA. Predictors of cardiac rehabilitation. *Rehabilitation Nursing*. 2007; 32(4): 152 – 157.
44. Noakes T. Proof of vitality. *Discovery Magazine*. 2004; 56-73.
45. Jelinek MV, Santamaria JD, Thompson DR, et al. 'FIT FOR PURPOSE'. The COACH programme improves lifestyle and biomedical cardiac risk factors. *Heart*. 2012; 98: 1608.
46. Rutledge T, Redwine LS, Linke SE, et al. A meta-analysis of mental health treatments and cardiac rehabilitation for improving clinical outcomes and depression among patients with

- coronary heart disease. *Psychosomatic Medicine*. 2013; 75: 335-349.
47. Australian Institute of Health and Welfare 2011. Cardiovascular disease: Australian facts 2011. Cardiovascular disease series. Cat. no. CVD 53. Canberra: AIHW.
  48. Wittmer M, Volpatti M, Piazzalonga S. Expectations, satisfaction and predictors of dropout in cardiac rehabilitation. *European Journal of Prevention Cardiology*. 2012; 19(5): 1082 – 1088.
  49. McDonall J, Botti M, Redley B, Wood B. Patient participation in a cardiac rehabilitation programme. *Journal of Cardiopulmonary Rehabilitation Prevention*. 2013; 33(3): 185-188.
  50. Rodgers WM, Selzler AM, Haennel RG, et al. An experimental assessment of the influence of exercise versus social implementation intentions on physical activity during and following pulmonary rehabilitation. *Journal of Behavioural Medicine*. 2013. 10.1007/s10865-013-9503-z.
  51. Banerjee AT, Grace SL, Thomas SG, et al. Cultural factors facilitating cardiac rehabilitation participation among Canadian South Asians: a qualitative study. *Heart-Lung*. 2010; 39(6): 494–503.
  52. Mckee G, Biddle M, O'Donnell S, et al. Cardiac rehabilitation after myocardial infarction: What influences patients' intentions to attend? *European Journal of Cardiovascular Nursing*. 2013; 0(0): 1-9.
  53. Azad NA, Bouchord K, Mayhew A. Safety and predictors of participation of a new rehabilitation programme for older women with chronic heart failure. *Journal of Geriatric Cardiology*. 2012; 9: 243 – 246.
  54. Clark RA, Conway A, Poulsen V, et al. Alternative models of cardiac rehabilitation: a systematic review. *European Journal of Preventive Cardiology*. 2013; 1–40.
  55. Jackson L, Leclerc J, Erskine Y, et al. Getting the most out of cardiac rehabilitation: a review of referral and adherence predictors. *Heart*. 2005; 91(1): 10 – 14.
  56. Neubeck L, Freedman SB, Clark AM, et al. Participating in cardiac rehabilitation: a

- systematic review and meta-synthesis of qualitative data. *European Journal of Preventive Cardiology*. 2012; 19: 494 – 503.
57. Scott LB, Gravely S, Sexton TR, et al. Examining the effect of a patient navigation intervention on outpatient cardiac rehabilitation awareness and enrollment 2013; DOI: 10.1097/HCR.0b013e3182972dd6.
58. Swardfager W, Herrmann N, Marzolini S, et al. Major depressive disorder predicts completion, adherence and outcomes in cardiac rehabilitation: A prospective cohort of study of 195 patients with coronary artery disease. *Journal of Clinical Psychiatry*. 2011; 72(9): 1181 – 1188.
59. Ghisis GLM, Polyzotis P, Oh P, et al. Physician factors affecting cardiac rehabilitation referral and patient enrolment: A systematic review. *Clinical Cardiology*. 2013; 36(6): 323–335.
60. Galdas, PM, Ratner PA, Oliffe JL. A narrative review of South Asian patients' experience of cardiac rehabilitation. *Journal of Clinical Nursing*, 2011; 21: 149–159.
61. Clark AM, King-Shier KM, Duncan A, et al. Factors influencing referral to cardiac rehabilitation and secondary prevention programs: a systematic review. *European Journal of Preventive Cardiology*. 2013; 20: 692 – 700.
62. Shanmugasagarem S, Oh P, Reid RD, et al. Cardiac rehabilitation barriers by rurality and socioeconomic status: a cross-sectional study. *International Journal for Equity in Health*. 2013; 12:72.
63. Clark AM, Redfern J, Briffa T. Cardiac rehabilitation: fit to face the future? *Heart*. 2013; 0:1–2. doi:10.1136/heartjnl-2013-304407.
64. Sangster J, Furber S, Phongsavan P, et al. Where you live matters: Challenges and opportunities to address the urban–rural divide through innovative secondary cardiac rehabilitation programs. *Australian Journal of Rural Health*. 2013; 21: 170–177.

65. Irish Association of Cardiac Rehabilitation (IACR) Guidelines 2007. Available at: <http://www.iacr.info/page11.htm>. Accessed on 15 September 2013.
66. Nguyen E & Stein J. Functional outcomes of adults with left ventricular assist devices receiving inpatient rehabilitation. *Physical Medicine and Rehabilitation*. 2013; 5: 99-103.
67. American Association of Cardiovascular and Pulmonary Rehabilitation. Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs-4th Edition 2004. Champaign, Ill: Human Kinetics.
68. Goel K, Lennon RJ, Tilbury RT, et al. Impact of cardiac rehabilitation on mortality and cardiovascular events after percutaneous coronary intervention in the community. *Circulation*. 2011; 123: 2344 – 2352.
69. Oldridge NB, Guyatt GH, Fischer ME, et al. Cardiac rehabilitation after myocardial infarction: combined experience of randomized clinical trials. *Journal of the American Medical Association*. 1988; 260: 945 – 950.
70. Sutton EJ, Rolfe DE, Landry M. Cardiac rehabilitation and the therapeutic environment: the importance of physical, social, and symbolic safety for programme participation among women. *Journal of Advanced Nursing*. 2012; 68(8): 1834 – 1846.
71. Ali M, Qadir F, Javed S, et al. Factors affecting outpatient cardiac rehabilitation attendance after acute myocardial infarction and coronary revascularization - a local experience. *Journal of Pakistan Medical Association*. 2012; 62(4):347 – 351.
72. Meillier CK, Nielsen KM, Larsen FB. Socially differentiated cardiac rehabilitation: Can we improve referral, attendance and participation among patients with first myocardial infarction? *Scandinavian Journal of Public Health*. 2012; 40: 286 – 293.
73. Davidson P, DiGiacomo M, Zecchin R. A cardiac rehabilitation program to improve psychosocial outcomes of women with heart disease. *Journal of Womens Health*. 2008;17:123 – 134.

74. Bandura A. Health promotion by social cognitive means. *Health Education Behaviour*. 2004; 31(2): 143 – 164.
75. Fix GM & Bokhour G. Understanding the context of patient experiences in order to explore participation to secondary prevention guidelines after heart surgery. *Chronic Illness*. 2012; 8(4): 265 – 277.
76. Daly J, Sindone AP, Thompson DR. Barriers to participation in and participation to cardiac rehabilitation programs: a critical literature review. *Progressive Cardiovascular Nursing*. 2002; 17(1): 8–17.
77. Wittmer M, Volpatti M, Piazzalonga S. Expectations, satisfaction and predictors of dropout in cardiac rehabilitation. *European Journal of Preventative Cardiology*. 2012; 19(5): 1082 – 1088.
78. US Surgeon General Physical Activity Guidelines (Accessed on: 13 June 2013) (<http://www.health.gov/paguidelines/pdf/paguide.pdf>).
79. Clark AM, King-Shier KM, Thompson DR. A qualitative systematic review of influences on attendance at cardiac rehabilitation programmes after referral. *American Heart Journal*, 2012; 164: 835 – 845.
80. Greca IM, Moreira MA. Mental models, conceptual models, and modeling. *International Journal of Science Education*. 2000; 22(1): 1 – 11.
81. Kitzinger J. (1994). The methodology of focus groups: The importance of interaction between research participants. *Sociology of Health & Illness*. 16 (1): 103 – 121.
82. Kaminsky LA & Whaley MH. Evaluation of a new standardized ramp protocol: The BSU/Bruce Ramp Protocol. *Journal of Cardiopulmonary Rehabilitation*. 1998; 18(6): 438 – 444.
83. Olga C & Heather MA. Determinants of referral to cardiac rehabilitation programs in patients with coronary artery disease: a systematic review. *American Heart Journal*. 2006; 151(2): 249–256.

84. Yohannes AM, Yalfani A, Doherty P, et al. Predictors of drop-out from an outpatient cardiac rehabilitation programme. *Clinical Rehabilitation*. 2007; 21(3): 222–229
85. Fischer JP. Automatic referral to cardiac rehabilitation. *Journal of Cardiovascular Nursing*. 2008; 23(6): 474– 479.
86. DeAngelis C, Bunker S, Schoo A. Exploring the barriers and enablers to attendance at rural cardiac rehabilitation programs. *Australian Journal of Rural Health*. 2008; 16:137 – 142.
87. Higgins RO, Murphy BM, Goble AJ. Cardiac rehabilitation program attendance after coronary artery bypass surgery: overcoming the barriers. *Medical Journal of Australia*. 2008; 188(12): 712– 714.
88. Grace SL, Evindar A, Kung T, et al. Increasing access to cardiac rehabilitation: automatic referral to the program nearest home. *Journal of Cardiopulmonary Rehabilitation Prevention*. 2004; 24(3): 171–174.
89. Pagliari C, Detmer D & Singleton P. Potential of electronic personal health records. *British Medical Journal*. 2007; 335 (7615): 330 – 333.
90. Gallagher R, McKinley S & Dracup K. Predictors of women’s attendance at cardiac rehabilitation programmes. *Progress in Cardiovascular Nursing*. 2003; 18: 121–126.
91. Kalapura T, Lavie CJ, Jaffrani, W. Effects of cardiac rehabilitation and exercise training on indexes of dispersion of ventricular repolarisation in patients after acute myocardial infarction. *American Journal of Cardiology*. 2003; 92: 292 – 294.
92. King KM, Humen DP, Smith HL, et al. Predicting and explaining cardiac rehabilitation attendance. *Canadian Journal of Cardiology*. 2001; 17: 291–296.
93. Niven, DJ, Berthiaume, LR, Laupland, KB, et al. Matched case- control studies: a review of reported statistical methodology. *Clinical Epidemiology*. 2012; 4: 99 – 110.
94. Centre of Disease Control (Accessed on: 30 September 2013) (<http://www.cdc.gov/nchs/fastats/exercise.htm>).

95. Fox EL, Kefeyian SJ (1998). Fox's physiological basis for exercise and sport. 6<sup>th</sup> Ed. McGraw Hill (Boston Mass).
  96. Brozek J, Grande F, Keys A. Densitometric analysis of body composition: revision of some quantitative assumptions. *Annals of New York*. 1963; 110: 113 – 140
  97. Patel D, Lambert EV, da Silva R. The association between medical costs and participation in the vitality health promotion programme among 948,974 members of a South African health insurance company. *American Journal of Health Promotion*. 2010; 24(3): 199 – 204.
  98. Patel D, Lambert EV, da Silva R. Participation in fitness-related activities of an incentive-based health promotion programme and hospital costs: a retrospective longitudinal study. *American Journal of Health Promotion*. 2011; 25(5): 341 –348.
  99. Philip A, Ades PA. Cardiac rehabilitation and secondary prevention of coronary heart disease. *New England Journal of Medicine*. 2001; 345:892-902.
  100. Peltzer K, Phaswana-Mafuya N. Hypertension and associated risk factors in older adults in South Africa. *Cardiovascular Journal of Africa*. 2013; 24(3): 66 – 69.
  101. Cooper AF, Jackson G, Weinman J, et al. Factors associated with cardiac rehabilitation attendance: A systematic review of the literature. *Clinical Rehabilitation*. 2002; 16: 541–552.
  102. Kerins M, McKee G & Bennett K. Contributing factors to patient non-attendance at and non-completion of phase III cardiac rehabilitation. *European Journal of Cardiovascular Nursing*. 2011; 10: 31–36.
  103. Baigi A, Bering C, Hildingh C, et al. Non-attendees' attitudes to the design of a cardiac rehabilitation programme focused on information of risk factors and professional involvement. *European Journal of Cardiovascular Nursing*. 2009; 8: 62–66.
-

# Appendices

---



## Appendix 2

### Prime Time Programme **Focus Group Discussions** - Guide Questions

Perceptions and experiences of the Prime Time Programme:

- If someone mentions the Prime Time programme, what immediately comes to mind?
- What did you like best about the programme?
- What did you like least about the programme?
- What do you think about the group classes that happen 3 times a week?

Effectiveness of the Prime Time Programme:

- What do you think you have gained or benefited from the programme?
- What was the most important aspect that you received from the programme?
- What aspects of the Prime Time programme could be improved or implemented?
- What aspects of the Prime Time programme do you think should not be changed?
- Would you recommend the programme for other Prime Time members or cardiac patients who are in the same situation as you?
- If you have been on any previous cardiac rehabilitation programme, how would you compare it to the Prime Time programme and why?
- How would you define 'success' in the context of the Prime Time programme?
- What would you say are the key indicators of success for the Prime Time programme?

Factors contributing to the Prime Time programme:

- How has the Prime Time programme benefited your health, lifestyle and conditions?
- What do you think about the Facilitators / Biokineticists on the programme?
- What factors do you think contribute to the effectiveness of the Prime Time programme? (individuals, activities, facilities, etc).
- Is there anything else that you would like to mention about the Prime Time Programme?

## Appendix 3

### Prime Time programme **Individual and Previous Participants** - Guide Questions

#### Perceptions and experiences of the Prime Time Programme:

- If someone mentions the Prime Time programme, what immediately comes to mind?
- What did you like best about the programme?
- What did you like least about the programme?
- Why did you leave the programme?

#### Effectiveness of the Prime Time Programme:

- What do you think you have gained or benefited from the programme?
- What was the most important aspect that you received from the programme?
- What aspects of the Prime Time programme could be improved or implemented?
- What aspects of the Prime Time programme do you think should not be changed?
- Would you recommend the programme for other Prime Time members or cardiac patients who are in the same situation as you?
- If you have been on any previous cardiac rehabilitation programme, how would you compare it to the Prime Time programme and why?
- How would you define 'success' in the context of the Prime Time programme?
- What would you say are the key indicators of success for the Prime Time programme?

#### Factors contributing to the Prime Time programme:

- How has the Prime Time programme benefited your health, lifestyle and conditions?
- What do you think about the Facilitators / Biokineticists on the programme?
- What factors do you think contribute to the effectiveness of the Prime Time programme? (individuals, activities, facilities, etc).
- Is there anything else that you would like to mention about the Prime Time Programme?

## Appendix 4

### Prime Time programme **Staff** Individual Interviews – Guide questions

- How long have you worked on the Prime Time programme and what are your impressions of the programme?
- How would you define success in the context of the Prime Time programme?
- What would you say are the key indicators contributing towards the success of the programme?
- What factors do you think contribute to the effectiveness of the programme?
- Over the years, some of the members have left the program, what do you think are the reasons for this?
- As a Biokineticist, what can you see be improved or implemented on the programme?
- As a sales consultant, what influences the sale of choice regarding Prime Time versus any other memberships, for example the healthy weights and general memberships?
- What specific information and criteria is there that you need to follow with regards to allocating a member to a Prime Time programme?
- Are there any changes to the programme, marketing or sales that you would like to see or be implemented?
- Is there anything else that you'd like to mention about the Prime Time programme?

## **Appendix 5: Consent form – Focus group discussions and in-depth interviews**

Dear participant

The Sports Science Institute of South Africa and the University of Cape Town is conducting a study titled “Evaluating the Effectiveness of the Prime Time programme”. This study aims to investigate the effectiveness of the Prime Time cardiac rehabilitation programme at the Sports Science Institute of South Africa.

Based on the findings in our investigation, we hope to implement possible better strategies for the programme, eliminate any gaps in the programme which could be detrimental to Prime Time members and to analyse the current success of the programme. This will help us to ultimately develop a system that will be beneficial to both members and staff on the programme.

The purpose of this focus group/interview is to learn more about your perceptions and experiences of the programme, and any input on recommendations to improve the programme.

There is no right or wrong answers to the questions you will be asked, and it is important for you to answer these questions as honestly as possible so that your views can be accurately represented. This focus group discussion/interview will be audio recorded. Although the person conducting the focus group/interview may know your name, your name will not be used when reporting on this study and your name will not be connected to your responses in this focus group. We are unfortunately not able to ensure the confidentiality of the focus group discussions/interviews, but will encourage other focus group/interview participants not to share the identities of other participants with those outside the focus group/interview.

We understand that your participation in this focus group/interview is voluntary. You are able to withdraw from this focus group/interview at any time. If you choose not to be involved in this study, there will be no negative consequences for you (e.g. withdrawal from the Prime Time programme).

The information that we will get from this study will be very helpful to the Sports Science Institute of South Africa, and will positively influence further strategies aimed at improving the programme.

If you agree to participate in this study, please could you sign in the space below. If you have any queries, please contact any of the investigators:

Mr. Habib Noorbhai  
072 464 5200  
habib.noorbhai@yahoo.com

Dr. Tracy Kolbe-Alexander  
(021) 650 5126  
Tracy.Kolbe-Alexander@uct.ac.za

Dr. Catherine Draper  
(021) 650 4570  
catherine.draper@uct.ac.za

---

Signature of participant: \_\_\_\_\_

Date: \_\_\_\_\_

Name of investigator: \_\_\_\_\_

Signature of investigator: \_\_\_\_\_

Date: \_\_\_\_\_

Should you have any queries regarding your rights and welfare as a research participant, please contact:

Prof. Marc Blockman  
Chairperson  
Health Science Faculty Research Ethics Committee  
021 406 6492  
E52-24 Groote Schuur Hospital Old Main Building  
Observatory, 7925

## **Appendix 6: Consent to disclosure**

*'By signing this contract, the MEMBER acknowledges the Sports Science Institute of South Africa (SSISA), in conjunction with the University of Cape Town (UCT), conducts research for scientific purposes. The Member hereby consents to SSISA making available all test results which may be carried out on the Member to UCT for such purposes. SSISA undertakes that all test results will remain anonymous and confidential.'*

