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Report

for

Medway Community Healthcare

Cardiac Rehabilitation Team (MCHCRT)

11th November 2016

Authors: Dr Steve Meadows & Karthik Muthumayandi

Address for correspondence:
Dr Steve Meadows
School of Sport & Exercise Sciences
The Medway Building
Chatham Maritime
Kent ME4 4AG

s.meadows@Kent.ac.uk

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Introduction

Cardiac rehabilitation (CR) is a fundamental and important part of the treatment pathway for a patient with cardiac–related problems. Evaluating patient profiles and outcomes should be routine following any medical or therapeutic intervention service, to identify any gaps in current provision and to ensure service effectiveness. It can form part of a service audit, or more formal statistical testing.

A data set was created by Medway Community Healthcare Cardiac Rehabilitation Team (MCHCRT) and passed to the School of Sport & Exercise Sciences, University of Kent. Ethical approval was granted from the faculty of Science Research Ethics Advisory Group at the University of Kent (Ref: DN/ARC/0061314) to use anonymised patient information who had accessed the services provided by MCHCRT in Medway and Swale areas of Kent. The following report provides details of a preliminary analysis of this data, with valuable descriptive information on patient profiles (Sections 1 – 3) and statistical analysis of key patient outcome data (Section 4). Wherever possible, alignment of information with the National Audit of Cardiac Rehabilitation (NACR) has been made.

Summary of Key Findings

The predominant population that used MCHCRT services was white, older males (mean age ±standard deviation = 63.37±14.45 years). This is not surprising, as it reflects the normal demographic profile of the disease condition. However, an important implication would be that when women experience coronary heart disease (CHD) in Medway and Swale it is usually at an older age (68.94±14.03) and are likely to present with more co-morbidities, comorbidity index: Male 1.86±1.27 and female 2.20 ±1.28) , and consequently possibly more barriers to exercise training. The ethnic group distribution has very small numbers from ethnic minority groups, particularly a high risk South-East Asian group. The mean (±standard deviation) age of the white population is 65.52± 14.02 years and Other Ethnic groups is 59.32±14.55 years, suggesting Other Ethnic groups experience problems at a younger age. Language should not present a barrier to CR access, but there may be other socio-cultural barriers that prevent these groups from accessing MCHCRT services. In terms of the demographic profile of patients accessing, or not accessing CR services, it is important that those populations who may be in most need of CR (typically older, females, ethnic minorities), and who may have more to gain from engaging with CR, may be 'slipping through the net'.

Interestingly approximately 25% of patients were not interested or refused to participate in Phase III CR. This suggests the need for a culture shift in care – in other words CR becoming an integral and normal part of the care pathway, not an optional extra. This may require buy-in from other clinicians and healthcare providers to endorse CR at every opportunity, to secure the best possible outcome for patients and through lifestyle change, an important secondary prevention measure.

The post-MI population makes up approximately 50% of the patient group, with the angioplasty and PCI the next highest (16.3%). Surprisingly, there seems to be low numbers (N=199 or 12.39%) in the more complex patient groups (congenital, ICD, cardiac arrest, heart failure and pacemaker). There may be good reasons for these groups not finding their way into CR, but it is also important to ensure they are catered for and not deemed or labelled as 'not suitable' for CR. They may be those who have the lowest physical capacity levels, but also have more to potentially gain by undertaking some form of exercise training in CR (possibly seated exercise).

The following outcome measures were found to be statistically significant:

- anxiety measure on the HAD,
- depression scale on the HAD; and perhaps most significantly,
- patients were walking further in the 6 minute shuttle walking test.

Exercise training is a key part of CR intervention at Phase III and the patients are gaining significant improvement in the distance covered during this test. One key question to answer is whether patients who are tested on the walking shuttle test are only those who attend Phase III CR exercise intervention, or whether this may also include those who did not get a Phase III exercise intervention? Regardless, the data would suggest an improvement in physical capacity, through increased walking speed and / or a reduced need to rest. Combined with the statistically significant reductions in HAD anxiety and depression scores, CR seems to promote an improved sense of patient wellbeing. It is not clear whether the improvement in physical fitness is linked to the improved psycho-biological outcomes reported in the HAD scores – research would suggest this, but it would be difficult to prove a cause and effect relationship.

1 CR Participant Demographic

The average age of the CR participant is approximately 65 years (Table 1) and are presenting with an average of two co-morbidities (Table 1). This will obviously present its challenges to CR staff. Nearly three quarters of participants are males (Table 2). Females represented 28.5% of the CR participants, which is better than other services which recruit less than 20% females (NACR, 2015).

Table 1. Age Demographic of CR Participants (N=number of CR participants)

	N	Mean±SD
Age (Years)	1601	64.96±14.55
Comorbidity Index	1557	1.95±1.28
Missing data	5	
Total	1606	

Table 2. Sex of CR Participants

Sex	N	Percent
Male	1149	71.5
Female	457	28.5
Total	1606	100.0

It was reported in the NACR (2015) that overall uptake to CR was 47% of eligible patients. It would be interesting to establish what percentage these MCHCRT participants represent of the total patients using cardiology services in Medway and Swale. This would provide insight into the effectiveness in the patient journey from clinical intervention (e.g. MI, PCI, pacemaker insertion, etc.) to CR and how many patients may be 'slipping through the CR net'.

1.1 Ethnic Group Distribution

The ethnicity profile of participants accessing MCHCRT services in shown in Table 3 and Figure 1. The majority of the population (89.6%) in Medway are classified as 'White', which seems to be reflected in the CR participant profile for White British (Table 3). The next largest ethnic group in Medway is Asian, or Asian British (5.2%) including Chinese. These

ethic groups total 3.5% in the CR ethnic profile (Table 3). Medway population profile data obtained from: http://medwayjsna.info/ua/011.html

Table 3. Ethnic Profile of CR Participants

	N	Percent
White (British)	1443	89.9
White (Irish)	13	0.8
Mixed White / Asian	2	0.1
Indian	28	1.7
Pakistani	10	0.6
Bangladeshi	5	0.3
Other Asian	10	0.6
Black Caribbean	1	0.1
Chinese	3	0.2
Other Ethnic Group	6	0.4
Not stated	49	3.1
Missing	36	2.2
Total	1606	100

Whilst female gender appears to be better represented in MCHCRT participants than reported in the NACR (2015) it is also important to consider whether females are under-represented in service uptake across ethnicity categories. Tables 4 and 5 provide a breakdown of ethnic and gender groups.

Table 4. Ethnic and Sex Profile of CR Participants

	Male Count	Percentage	Female	Percentage
White(british)	1031	91.90%	412	92.00%
White (Irish)	9	0.80%	4	0.90%
Mixed White/ Asian	1	0.10%	1	0.20%
Indian	18	1.60%	10	2.20%
Pakistani	8	0.70%	2	0.40%
Bangaldeshi	5	0.40%	0	0.00%
Other Asian	10	0.90%	0	0.00%
Black Caribbean	1	0.10%	0	0.00%
Chinese	1	0.10%	2	0.40%
Other Ethinic Group	6	0.50%	0	0.00%
Not stated	32	2.90%	17	3.80%
	1122	100.00%	448	100.00%

Table 5. Sex Profile in Ethnic Groups of CR Participants

		Male		Female	
		N	% within Ethnic group	N	% within Ethnic group
Ethnic group	White(British)	1031	71.40%	412	28.60%
	White (Irish)	9	69.20%	4	30.80%
	Mixed White/ Asian	1	50.00%	1	50.00%
	Indian	18	64.30%	10	35.70%
	Pakistani	8	80.00%	2	20.00%
	Bangladeshi	5	100.00%	0	0.00%
	Other Asian	10	100.00%	0	0.00%
	Black Caribbean	1	100.00%	0	0.00%
	Chinese	1	33.30%	2	66.70%
	Other Ethnic Group	6	100.00%	0	0.00%
	Not stated	32	65.30%	17	34.70%
Total		1122	71.50%	448	28.50%

Ethnic Groups

- White(british)
- White (Irish)
- White(Others)
- Mixed white/Black Caribbean
- Mixed white/Black African
- Mixed White/ Asian
- Mixed others
- Indian
- Pakistani
- Bangaldeshi
- Other Asian
- Black Caribbean
- Black African
- Black other
- Chinese
- Other Ethinic Group
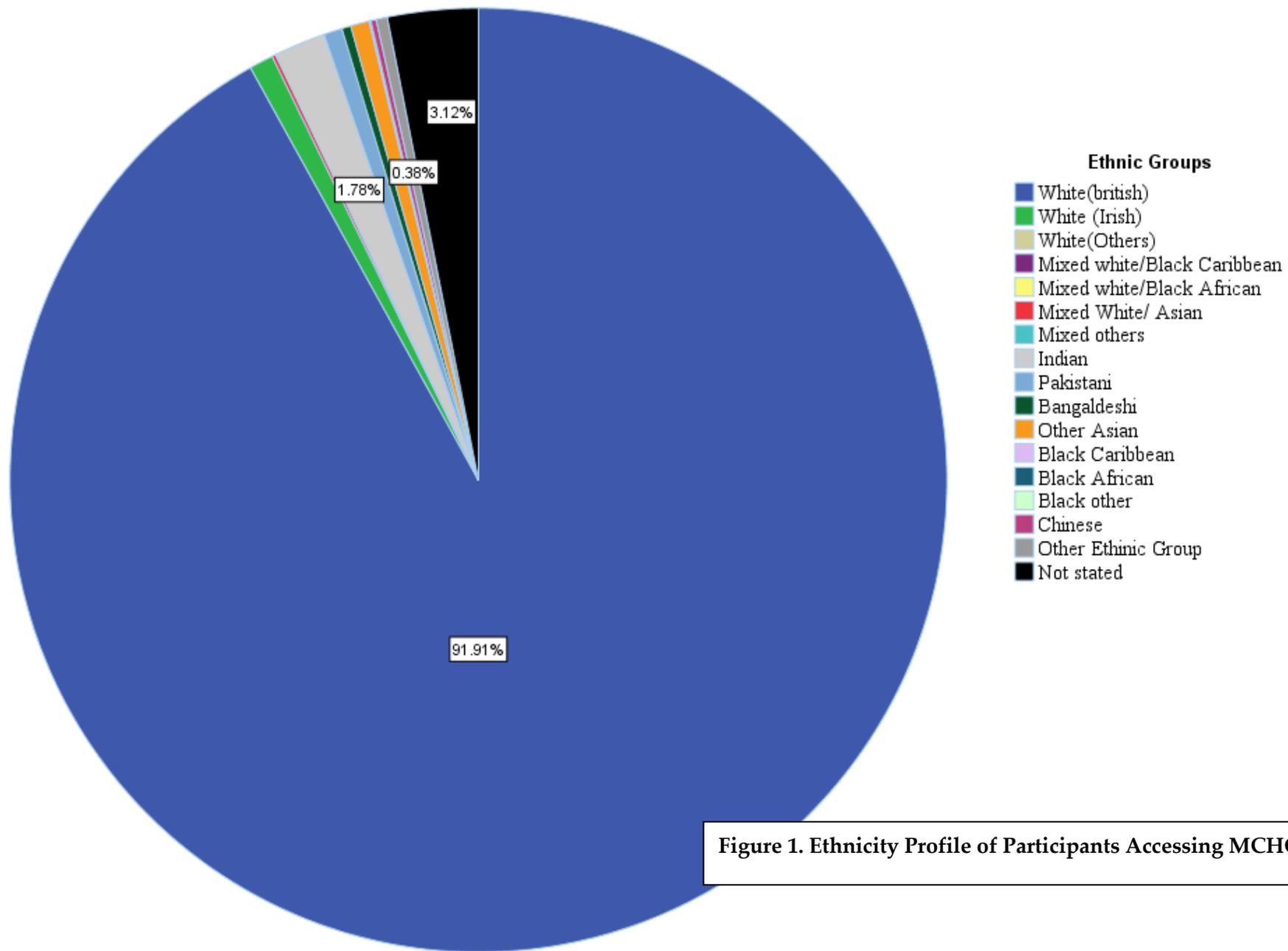- Not stated

3.12%

0.38%

1.78%

91.91%

Figure 1. Ethnicity Profile of Participants Accessing MCHCRT Services

1.2 Marital Status Distribution

The majority of CR participants are married or in a permanent relationship (67.4%) and is similar to the NACR (2015) demographic of CR attenders. This relationship status provides most participants with a form of social support as the go through CR.

Table 6. Marital Status of CR Participants

	N	Percent
Married	995	62
Widowed	180	11.2
Permanent Partnership	87	5.4
Divorced	49	3.1
Missing Data	295	18.4
Total	1606	100

1.3 Employment status

As the average age of CR participants is 65 years of age, it is not surprising that the majority are retired. However, there are still nearly 40% who are of working age. The lower numbers of unemployed attending CR represents another challenge for MCHCRT, especially in the current austerity climate.

Table 7. Employment Status of CR Participants

	N	Percent
Employed Full Time	386	24
Employed Part Time	38	2.4
Self Employed Part Time	7	0.4
Unemployed - Looking for Work	51	3.2
Looking after family/home	18	1.1
Retired	818	50.9
Permanently sick/disabled	6	0.4
Temporarily sick or injured	131	8.2
Student	4	0.2
Other reasons for not working	29	1.8
Marked as 0	42	2.6
Missing Data	76	4.7
Total	1606	100

2 The Medway and Swale Cardiac Rehabilitation Experience

The nature of contact participants have with MCHCRT is obviously an important issue and something you have more control over in terms of implementing changes to practice. The following sections provide descriptive statistics on attendees and non-attendees, with comparative analysis to the most recent NACR data.

2.1 Invitation Type

Most CR participants receive a telephone invitation to Phase III CR (Table 8). Presumably this occurs after discharge from hospital, and possibly reflects a missed opportunity for clinicians and other healthcare providers to engage in a dialogue with the patient about CR whilst they are in hospital. It would be interesting to know the percentage of patients who attend against the type of invitation provided – is a face-to-face invitation a more effective form of communicating the importance of CR?

Table 8. Type of Invitation Used to Phase 111 CR

	N	Percent
Face-to-face	639	39.8
Telephone	881	54.9
Marked as 0	44	2.7
Missing Data	42	2.6
Total	1606	100

2.2 Phase III Intervention Type

Over 53.3% (Table 9) of CR participants attend an exercise class, which suggests they are engaging and interacting with CR professionals. There are still a large number who do not appear to get any exercise intervention at Phase III, or their intervention type was unknown or not recorded (N=738 or 46%). However, this is similar to the total number of eligible patients who accessed CR programmes in England (47%) as reported in the NACR (2015).

Table 9. Phase III Exercise Intervention

	N	Percent
Exercise class	820	51.1
Pedometer	35	2.2
Changed format	12	0.7
None	572	35.6
Marked as 0	144	9
Missing Data	23	1.4
Total	1606	100

2.3 NACR reasons for not accessing Phase III exercise

Due to the large quantity of missing data (> 50%) it is difficult to establish with any certainty the main reason for this. There was a relatively large group (21.1%) who were not interested / refused. Perhaps there is a strong case for a culture change, where CR becomes a compulsory part of cardiac patient care, in the same way that physiotherapy is an integrated and expected therapeutic intervention following orthopaedic surgery.

Table 10. NACR Reasons for Not Accessing Phase III CR Exercise

	N	Percent
Medically unsuitable (cardiac) (NHS-excluded)	71	4.4
Medically unsuitable (non-cardiac) (NHS-excluded)	64	4
Carer	8	0.5
Work commitments	30	1.9
Lack of transport	3	0.2
Travel/extended holiday	4	0.2
Self-directed exercise perceived satisfactory	23	1.4
Not interested/refused	339	21.1
Frailty	9	0.6
Mental Health Issues	11	0.7
Language barrier	2	0.1
Died	64	4
Ongoing medical investigation (cardiac)	18	1.1
Ongoing medical investigation (other)	8	0.5
Other	73	4.5
Missing Data	879	54.7
Total	788	49.1

2.4 Reason for not Accessing Phase III Exercise Session

Due to the large number of missing data it is difficult to draw any conclusions from Table 11. However, as reflected in Table 10, 24.1% were not interested or refused. This represents 1 in 4 patients who are not interested / refuse to complete some form of exercise; and this number is likely to be higher due to 45% of data being missing. The main reason for not taking part in core CR in the NACR (2015) was lack of interest (39%) followed by physical incapacity (10%).

Table 11. Reason for not Accessing Phase III Exercise

	Frequency	Percent
Medically unsuitable (cardiac) (NHS-excluded)	91	5.7
Not interested/ Refused	387	24.1
Frailty	9	0.6
Mental Health Issues	14	0.9
Language Barrier	2	0.1
Died	66	4.1
Ongoing Medical Investigation (cardiac)	22	1.4
Ongoing Medical Investigation (other)	11	0.7
Others	86	5.4
Medically Unsuitable (non-cardiac) (NHS-excluded)	90	5.6
Carer	13	0.8
Work Commitments	46	2.9
Lack of Transport	3	0.2
Travel/ Extended holiday	4	0.2
Self-directed Exercise Perceived Satisfactory	37	2.3
Missing Data	725	45.1
Total	1606	100

2.5 Reason for not Accessing Phase III Education

As reported in Tables 10 and 11, 1 in 4 patients reported not being interested or refused a Phase III CR education programme (Table 12). This is a missed opportunity for CR professionals to help instigate and support lifestyle behaviour change to manage disease risk factors (obesity, cholesterol, blood pressure, physical fitness, etc.) and promote secondary prevention. It might be considered more understandable that an older group of patients, presenting with multiple co-morbidities, may consider the prospect of exercise training beyond their current capability. However, engaging these patients in a group or one-to-one meeting provides an important education opportunity, and based upon current theoretical understanding of behaviour change, could be significant.

Table 12. Reasons for Not Accessing Phase III Education

	Frequency	Percent
Not invited	60	3.7
Already attended previous session	7	0.4
Carer	14	0.9
Work commitments	46	2.9
Lack of transport	7	0.4
Travel/extended holiday	6	0.4
Not interested / Refused	408	25.4
Mental Incapacity	11	0.7
Mental Health Issues	10	0.6
Self-Perceived Frailty	7	0.4
Died	69	4.3
Other	183	11.4
Missing Data	777	48.2
Total	919	57.2
	1606	100

2.6 Access to Cardiac Rehabilitation Programme

The data reported in Table 13 was a little puzzling and perhaps needs to be looked into and clarified. It is not clear whether this presents a perceived accessibility, or actual problem.

Table 13. Accessibility to CR Programmes

	N	Percent
Access to CR programme	832	51.8
Do not have access to CR programme	759	47.3
Missing Data	15	0.9
Total	1606	100

2.7 Cardiac Condition

Whilst the total number of eligible patients that could access MCHCRT services is not known at this point, it is not possible to comment on service performance or compare with NACR (2015) data. The MI population are the largest group (50.1%) and this was also reflected in the NACR. Whilst this would appear to be the largest clinical group the percentage starting CR is the lowest. This would need further investigation and interrogation of local data to establish if there was a similar pattern. MCHCRT programme appears to have adapted alongside newer cardiology approaches such as primary PCI (Table 14), but may have done so at the cost of patients following the more traditional post-MI pathway. Angioplasty and PCI group is the next biggest (16.3%). One observation is the relatively low numbers (199 or 12.39%) of potentially more complex patients (ICD,

congenital, cardiac arrest, heart failure and pacemaker) in the cohort. This may either reflect actual low patient numbers, or these potentially more debilitated patients are 'slipping through the CR net'.

Table 14. Cardiac Condition of CR Participants

	N	Percent
MI	805	50.1
ICD	2	0.1
Congenital heart	1	0.1
Other	20	1.2
PPCI	13	0.8
Angioplasty/PCI	262	16.3
Cardiac arrest	11	0.7
Angina	11	0.7
Other surgery	124	7.7
Heart failure	183	11.4
Pacemaker	2	0.1
Missing	172	10.7
Total	1606	100

3 Risk Factors

This data is reported for information and may present an opportunity for strategic delivery of CR service. The relatively low number of patients who accessed smoking cessation services was low (12%). It would be interesting to report the success of this intervention. The majority of CR participants reported high cholesterol (60.9%) and this reiterates the importance of dietary and exercise lifestyle change, along with medication compliance to statins and other lipid-lowering agents. This may be better achieved through regular face-to-face contact with the patient in Phase III CR. Nearly half of participants reported high stress levels. This may indicate the need for effective stress management interventions, or underlies the importance of Phase III in statistically improving HAD anxiety and depression scores. Whether this relates to clinically significant change is unknown.

Table 15. Risk factor Profile of CR Participants

Risk Factor	Yes (%)	No (%)
Family History (N=1414)	62.5	37.4
Accessed Smoking cessation (N=1024)	12	87.7
Hypertension	56.4	43.6
Cholesterol (N=958)	60.9	39
Alcohol (N=1359)	17.1	82.9
Stress (N=1296)	49.5	50.5

4   Outcome Measures

Statistical testing was performed on participant outcome data and is reported in Table 16 with statistically significant results highlighted in yellow. HAD anxiety and depression scores also improved. What is not clear was the reason for this – passage of time as part of the natural recovery process, or Phase III? It would be interesting to know whether those who do not attend Phase III, and therefore do not get exercise or education, experience a similar decline in these measures. This would be relatively easy to establish by using a control sample of non-Phase III attendees and could be the focus of a potential research study. Participants walked an average 10 additional shuttles in the 6-minute shuttle walking test (= additional 100m), which is equivalent to a 30% improvement in distance covered. This indicates participants are walking quicker and with no apparent increase in recovery shuttle heart rate (pre and post measures were 65 beats per minute - see Table 16). There was no improvement in resting heart rate, blood pressure (systolic or diastolic), which is not surprising, as patients are usually medicated to control these parameters.

Table 16. Pre and Post CR - Outcome Measures

Measurement	Pre	Post	Mean Diff (±SD)	95% Confidence Interval of the Difference		P Value P<0.05
				Lower	Upper	
CR Anxiety HAD score (N=353)	5.52	4.69	0.83±3.19	0.498	1.168	0.00
CR Depression HAD score (N=353)	3.52	3.07	0.45±3.02	0.14	0.773	0.005
CR Resting Heart Rate (N=353)	65.58	65.97	-0.38±8.62	-1.012	0.24	0.227
CR Resting Systolic Blood Pressure (N=731)	118.13	120.95	-2.81±45.10	-6.099	0.461	0.092
CR- Resting Diastolic Blood Pressure (N=729)	71.69	71.16	0.53±11.13	-0.272	1.348	0.193
Shuttle Test (N=669)	25.75	36.15	-10.39±18.74	-11.822	-8.976	0.00
Recovery Shuttle Heart Rate (N=684)	65.65	65.51	0.13±9.86	-0.603	0.878	0.716
Recovery Shuttle Systolic Blood Pressure (N=655)			227.27±5860.30	-222.357	676.897	0.321
Recovery Shuttle Diastolic Blood Pressure (N=653)	71.60	72.72	-1.12±31.85	-3.57	1.325	0.368

5 Summary

One of the main objectives in MCHCRT is to provide an exercise rehabilitation experience and support for lifestyle behaviour change for a recovering cardiac patient. The data presented in this report suggest there is an improvement in walking ability in CR patients, combined with reduced levels of anxiety and depression, as reported in the HAD questionnaire. All of these outcome measures contribute to an improved mental and physical state of a CR participant, which can influence the achievement of rehabilitation goals and reduce the incidence of secondary events.