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Are patient characteristics and modes of delivery associated with completion of cardiac rehabilitation? A national registry analysis

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Highlights

- The population receiving cardiac rehabilitation in the home-based mode was significantly different from the populations in the centre-based and hybrid modes
- The rate of non-completion in the home-based mode was higher than the other modes and had different subgroups of patients not-completing
- Compared to centre-based, the home-based mode has significantly lower completion (34 % reduced likelihood) recorded on the national registry even after accounting for differences in the populations.
- Cardiac rehabilitation programs offering home-based and hybrid delivery modes need to be structured to ensure adequacy of completion

Abstract

Aim

To achieve effectiveness and reduce inequality in everyday cardiac rehabilitation, this study aims to compare individual patient characteristics along with completion rates to traditional and evolving modes of delivery in cardiac rehabilitation.

Method

Patients were included from the UK National Audit of Cardiac Rehabilitation (NACR) database. All patients with coronary heart disease (≥ 18 years) between the 1st of January 2014 to 31st of December 2019 that started core rehabilitation with a recorded mode of cardiac rehabilitation delivery were eligible. Modes of delivery were divided into: centre-based, home-based, and hybrid. Logistic regression models were used to investigate association between modes of delivery and completion adjusting for patient demographics.

Result

In total 182,722 patients had mode of delivery recorded: 72.8% centre-based, 8.3% home-based and 18.9% hybrid. The home-based mode in comparison to hybrid and centre-based had significantly higher rates of females, single, white, and unemployed patients ($p < 0.001$). There was a higher proportion of cardiovascular risk factors in home-based than the other modes ($p < 0.001$). There was a reduced likelihood of completing home-based cardiac rehabilitation compared to centre-based with an odds ratio of 0.66, (95% CI: 0.48 to 0.91) but no significant difference between hybrid and centre-based modes (odds ratio, 1.18; 95% CI 0.92 to 1.51).

Conclusions

From large real-world data, home-based modes of delivery appear to have significantly lower levels of completion than centre-based modes. Cardiac rehabilitation programs offering home-based and hybrid delivery modes need to be structured to ensure adequacy of completion.

1.0 Introduction

The rising incidence of cardiovascular disease, combined with a reduced mortality rate[1,2], means an even higher proportion of people will need help to recover from cardiovascular diseases in the future. Cardiac rehabilitation (CR) aims to restore physical, mental and social impairments making patients able to return to the routines of their daily life prior to the cardiovascular disease[3]. The effects of CR are well documented and services have been implemented in most European countries[4–6]. Despite this, the number of patients who enrol in CR across Europe are under 50%[7,8].

To make CR more attractive to the range of eligible patients, clinical guidelines and experts have underlined the importance of CR being delivered in consideration with patient needs and preferences[3,9]. Hence, a vast amount of tailored CR interventions have been investigated, with increasing focus on new and innovative/virtual home-based modes[10–14]. Many more traditional settings of CR, that are centre-based modes, have also adopted or combined centre and home-based interventions (a hybrid model), which among other benefits, are believed to overcome a number of barriers related to accessibility of health services[8,15]. An increasing body of evidence supports the effectiveness of these new modes of delivery[10–14] and their inclusion provides a natural addition to the CR menu-based allowing greater scope for tailoring to the needs and preferences of patients[9].

To achieve effectiveness in routine practice, there is a need to ensure that quality of delivery and intervention content of these new modes are optimized. The ability to clearly denote completion of CR is an extremely important quality maker and one that aligns with appropriate evaluation of a goals based behavioural change approach[16]. A clear definition and endpoint of core CR are essential as they encompass many central post-CR elements including; post-assessment and providing patients with a long-term maintenance strategy[16]. A lack of clear CR completion can lead to ambiguity around the full intervention delivery and effectiveness which is unlikely to yield expected results[17].

A number of predictors for completion of CR have been identified that can be divided into the individual patient characteristics[18–20], the rehabilitation service, work or other social concerns[8,20]. In everyday CR across the UK, for both men and women, the reasons for not taking part in daily CR are most often defined as personal to the individual patient characteristics[8]. The extent to which patient characteristics and patient choice influence the preference of mode of CR delivery has not been sufficiently explored. It may be that specific patient types are presently taking up the home-based and hybrid-based models in greater number which by self-selection are a sub-population. In addition, it is important to identify if there are specific characteristics that predispose these groups to not complete CR.

The aim of this study was to compare modes of delivery and individual patient characteristics and to investigate if any difference in modes was associated with completion in everyday CR. This would not only help inform routine CR interventions, but also be relevant for other home-based lifestyle interventions across patient groups.

2.0 Method

This study is based on routinely collected CR data from the National Audit of Cardiac Rehabilitation (NACR) database[21] and has been reported in accordance with the STROBE checklist of observational studies[22]. Over 220 CR programs are registered in NACR covering England, Northern Ireland and Wales. In 2020, 189 (82%) use electronically registration of data.

NACR is funded by the British Heart Foundation and has a data sharing agreement with NHS Digital, which as part of their annual data governance arrangement has approval to collect patient data under 251 exemption (i.e. without requiring patient consent). After collection, data is anonymized before shared with NACR.

2.1 Participants

All patients (≥ 18 years) in the period from the 1st of January 2014 to the 31st of December 2019 were referred and took part in a pre-assessment session before entering CR after a coronary heart diagnosis (e.g. myocardial infarction (MI) or valve disease) or a treatment procedure (e.g. percutaneous coronary intervention (PCI) and coronary artery bypass (CABG) eligible for the study. Only patients with a recorded

mode of delivery were included. Baseline demographics including age, gender, marital status, ethnicity and treatment type were compared between patients with and without a recorded mode of delivery to assess the possibility of reporting bias. Patients with a pre-diagnosed heart failure were excluded.

2.2 Mode of delivery

There are many variations of mode of delivery within the NACR data. These include 11 possible unique modes of delivery including Angina Plan[23], REACH-HF[24] and the Heart Manual[25]. For this paper these have been divided into centre-based, home-based and hybrid. Centre-based covering modes performed in a supervised and group-based method which are either education or exercise orientated. Home-based is conducted at home in a facilitated way via structured contact to CR staff. Hybrid is a combination between home and centre or can be at home with the presence of trained CR staff. Modes were self-chosen with consultation by a clinicians at the point of assessment based on identified risk factors, goals and personal preferences.

The healthcare professionals are responsible for imputing all relevant patient demographics and clinical data across the full patient journey from acute in-hospital early CR to outpatient core CR delivery to the NACR database.

2.3 Outcome

The dependent variable was whether the patient completed their CR program. Completion is defined in a variety of ways across Europe, which include total time enrolled, or total sessions attended. Within the UK National Audit of Cardiac rehabilitation[8], the completion status is a joint decision between clinician and patients which determines the end of the core rehabilitation program. A post assessment is made which helps to set long term goals moving to Phase 4. For this paper, patients were deemed to have completed the program if they were recorded as having completed or had a post-assessment with no other recorded reason for them not to have completed.

2.4 Predictors

Based on the literature on completion of CR, a wide collection of patient and service factors were included[18–20]. Patient characteristics, and additional service data, were collected at two time points. Age, gender, ethnicity and treatment procedure were collected during the hospitalization stay prior to referral. All other covariables were collected during a pre-assessment session after a patient was referred to CR. Hence, variables collected during the pre-assessment session were not available for the analysis of referral. Self-reported comorbidities from 15 disease categories were conceptualized into similar or dissimilar based on overall related pathophysiologic profile and care management as CHD. This approach has been described in details elsewhere and has been found to be associated with CR uptake but not referral[26].

2.5 Statistical approach

Bivariate analyses were used to explore the different populations presently taking part in CR in the UK. All patient characteristics are compared across the three modes. For categorical variables, Pearson Chi-square tests were used and mean and standard deviation (SD) for continuous variables along with independent samples t-tests to compare the means of two continuous variables. Logistic regression models were performed to investigate association between mode of delivery accounting for other predictors and completion. All statistical tests were considered significant if P-value <0.05.

3.0 Results

Based on the inclusion and exclusion criteria, a total of 298,569 patients had a coronary heart disease and started core cardiac rehabilitation. A total of 182,722 of these patients had mode of delivery recorded (61%) (Figure 1). The sample was compared for risk of bias and we found no significant difference in age, gender and other socio-demographic characteristics.

Table 1 shows the socio-demographic and service differences across the centre-based, home-based and hybrid modes. The split across the modes was 72.8% centre-based, 8.3% home-based and 18.9% hybrid. The average age of patients in the home-based group (mean 68 years 12 SD) was 3 years older than centre-based (mean 65 years 11 SD) and 2 years older than hybrid (mean 66 12 SD), the difference was significant (<0.001).

The gender, marital, ethnicity and employment splits were also all significant with more female, single, white and unemployed patients attending the home-based mode in comparison to hybrid and centre-based modes (<0.001).

A lower rate of patients had no comorbidity in the home-based compared to the two other modes. However, more had a similar and dissimilar comorbidity profile (27.2%). The single measure of hypertension was also significantly higher in the home-based mode than the other modes (<0.001).

In terms of risk factors, there were higher rates of less active, smoking, obese, anxious and depressed patients in the home-based mode than the centre-based modes (<0.001).

The rates of the more deprived populations in the centre-based mode were much lower than the home-based and hybrid modes. This aligns with the higher associated risk factors in these groups. The proportion in the most deprived was 13.5% in the centre-based mode, whereas it was 17.9% and 18.6% in the home-based and hybrid modes respectively.

Table 2 shows the socio-demographics of the non-completers in each mode of delivery. The overall rate of non-completion was highest in the home-based mode (26%) whereas hybrid and centre-based modes were similar with one fifth not completing. The trend where consistent for most of the socio-demographic and patient factors as non-completion rates across the different sociodemographic and patient factors were from 1% to 9% higher in home-based mode compared to centre-based and hybrid modes. The factor which did not follow the trend was smoking, which showed a >10% higher likelihood of non-completion in the centre-based than the home-based and hybrid modes (Table 2).

The results from the regression models are shown in Table 3. There were three sequential models built, the first included mode of delivery, gender and age, the second included patient demographics and baseline assessments and the third also included service indicators. The models were a good fit and met all assumptions and the third model correctly predicted 83.6%.

The regression models show that in all three models there was a negative association between patients attending a home-based program in the time period and completion of core CR compared to centre-based mode. The odds ratio in the final model was 0.66 (p 0.01, 95% CI 0.48-0.91) and indicates a 34% reduced likelihood of completing CR once the population was accounted for. The attendance of a hybrid program compared to a centre-based program, in any statistical model, did not yield a statistical significant difference in terms of completion (p >0.05). For a full breakdown of all covariates included, the full statistical model used for table 3 are available in the supplementary data.

4.0 Discussion

In this study, we found that the population receiving CR in the home-based mode was significantly different from the populations in the centre-based and hybrid modes. The population receiving the home-based mode included more females, single, white and unemployed patients that, in addition, had more baseline risk factors such as not adhering to physical activity recommendations, smoking and obesity. The rate of non-completion in the home-based mode was higher than the other modes and had different subgroups of patients not-completing. The main regression analysis found that, after accounting for the population receiving each mode of delivery, there was a consistent, significant negative association in completion in home-based modes compared to traditional centre-based CR – even when taking common predictors into consideration. Patient-selected delivery models is a natural step towards tailored intervention, which requires clinical teams to strive to achieve a clear point of completion of CR in all modes, preferably based around post-assessment.

In the research domain, and to some extent in routine practice, alternative delivery modes in CR (e.g. home-based) are known to demonstrate effectiveness comparable with that of traditional centre-based CR[10–14,27]. The inclusion of home-based modes into routine practice is also viewed as a solution to overcome low attendance rates in CR services[7,8] and provide a better alignment with patients' needs and preferences[9,28]. In a randomized trial with preference arms, Dalal et al.[29] showed that clinical outcomes were not worse in patients choosing the preferred mode. Similar findings have been showed in routine NACR

data across various outcomes when comparing patients from patient-selected modes to each other[11–13]. Pooling data across the intervention arms of two parallel randomized controlled trials using two self-preferred CR modes Tang et al[30] reach similar findings as the routine NACR data. These studies all support the effectiveness of patient-selected modes in CR. However, it is important to acknowledge that to achieve the expected outcome from CR, high adherence and completion of the CR program is necessary[17]. A fundamental part of successful CR completion includes post-assessment and provision of a long-term maintenance strategy[16]. So far, knowledge on alternative delivery modes has mainly been assessed in randomized trials[10,14,27] restricting the knowledge on patient characteristics and completion rates in patient-selected delivery modes using routine data. Our findings of low completion rates in the home-based mode illustrate why it is important to ensure that effective alternative CR delivery modes in randomized trials are correctly adopted in routine practice and meet the clinical standards[31]. Comparing patient characteristics in randomized trials to routine practice data display substantial differences in e.g. age of the patients[17,32].

Our results demonstrate a skewed distribution of patients' characteristics across the three groups of delivery modes. Home-based programs were originally made to accommodate those patients who were unable to attend CR sessions due to problems accessing the rehabilitation centre, e.g., elderly[10,33]. This somewhat aligns with our findings across the three modes, as the population in home-based mode were predominantly made up by higher risk profile patients, that are correlated with reduced outcomes and benefit from CR[34]. From previous studies, a patient's employment status, income and ethnic background have been reported as factors that could affect a patient's choice of mode[35]. Nonetheless, research is needed to help enhance our understanding of the mechanisms that influences why some programme better appeals to certain patients types. This, together with more clinical knowledge could support strategies on how to improve completion for especially home-based modes when used in routine CR.

An interesting aspect is that randomized trials do not normally demonstrate low completion rate in home-based modes[14]. In all our three regression models, we found lower completion rates in home-based modes compared to centre-based-modes – also in the fully patient characteristics adjusting model. To some degree,

this could be influenced by various definitions of completion across trials and routine practice[14], however, another explanation may be differing professional and organizational factors known to influence participation[36–38]. Such factors will typically be controlled or similarly distributed in randomized trials whereas modes in routine care may not meet the standard of that found in randomized trials. Unfortunately, the current data within the audit cannot be used to ascertain how much of the association seen between the modes and completion was down to the type of mode and any possible practitioner impact not offering a clear point of completion for patients. It might be that, on the home-based mode, patients are not presented with as clear a completion date in comparison to the centre-based program, as patients simply can continue their long-term management at home. However, home-based programs should highlight the importance of discharging and performing a post-assessment after core CR since it helps providing patients with new goals for long-term management[16]. Identifying more detailed reasons why there was higher non-completion in the home-based CR is required, not only to inform routine CR interventions, but also other home-based lifestyle interventions in pulmonary, stroke and diabetes populations.

Hybrid models are gaining more ground in CR, and similar to our findings, studies are reporting promising results equal to the centre-based modes[39,40]. A future strategy may be to encourage and enrol a higher proportion of patients into individualized tailored hybrid programs instead of home-based modes - especially for the subpopulations of patients with higher drop-out rates, e.g. patients with a partner or with clinical depression. Yet, our findings reflect CR before the COVID-19 pandemic which has resulted in a widespread adoption of home-based CR. In UK, during the time of COVID-19, the population in home-based modes have increase by 36 % whereas centre-based modes and hybrids modes have dropped by 27% and 8%, respectively[32]. Whether this is maintained in the COVID-19 era and beyond is uncertain. Due to the widespread adoption, it is however unlikely that services will go back to where they were before the pandemic.

5.0 Limitations

One of the main limitations of this study is that it was utilizing routine data which may be limited in terms of data completion and specific data points that could improve the analysis. For example, 39% of all those who

started CR did not have a mode of CR delivery recorded in the time period. Through the inclusion of audit and evaluation in the BACPR core components and the prioritization of completion of data via the National Certification Program, the recording of key fields such as the mode of delivery is likely to increase which will reduce this limitation in future work[31].

Another potential limitation is that the mode of delivery between 2014-mid 2019 was limited to nine choices, however, development in May 2019 increased the granularity of recording to include more choices such as splitting home-based options into named interventions e.g. Heart Manual[25], Angina Plan[23] and REACH-HF[24]. Unfortunately, the small time period meant that this could not be utilized for this study. In general, we divided all modes into three groups; centre-based, hybrid and home-based. Future research should study patients that receive more specific modes within each delivery group.

Finally, lack of randomization to delivery modes do not allows us to conclusion if the delivery mode itself or the skewed distribution of patients' characteristics across modes that explain the difference in terms of completion. By adjusting our analysis, we did tried to take account for the skewed distribution but some variance is likely still to occur for the patient-preferred delivery modes used in routine practice.

6.0 Conclusion

This study is the first utilizing routinely collected data to compare the different populations attending various modes of CR delivery and identify predictors of completion. Moreover, it is unique in that in contrast to the literature supporting equivalency in outcomes across modes of CR delivery, this study suggests that, in its routine form, the home-based mode has significantly lower completion recorded on the national registry even after accounting for differences in the populations. Given the positive and widespread adoption of various delivery modes in CR, especially since the COVID-19 pandemic, clinical programs offering home-based and hybrid modes should strive to achieve a clear point of CR completion defined by end of post-assessment as part of routine practice.

Author Contributions:

Authors Dr. Tang and Dr. Harrison's contributions to the paper are equal and would like to be acknowledged as equal and both first author.

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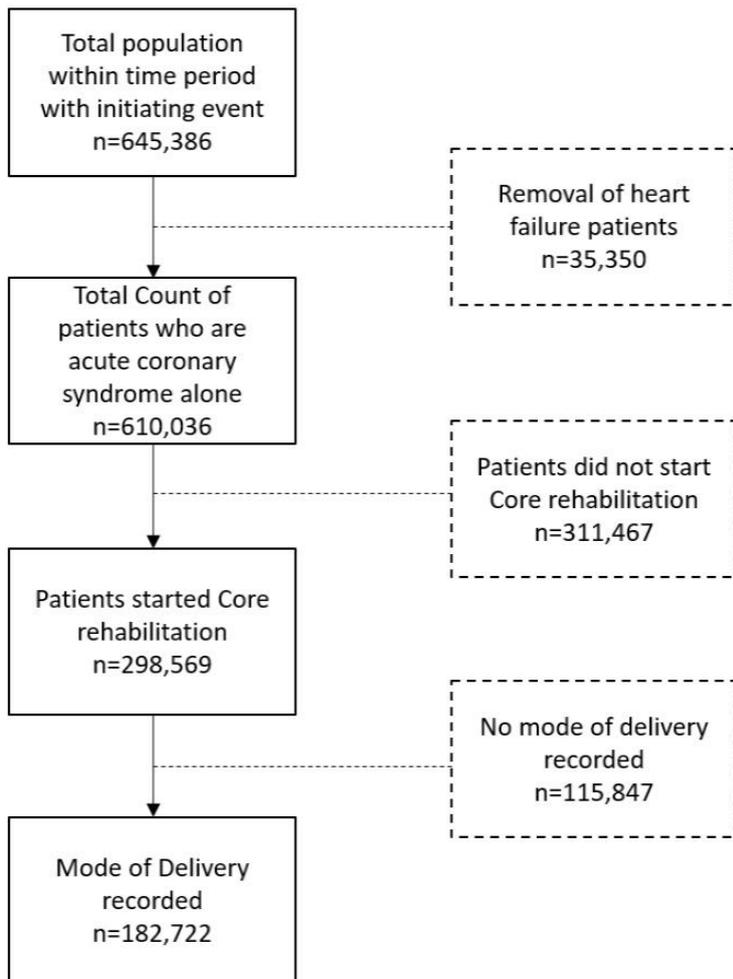


Figure 1: Flow diagram of the initial population then how the sample reduced due to the inclusion and exclusion criteria for the study.

Table 1: Showing the socio-demographic split of the population within each mode of delivery group

	Mode of Delivery Grouped								P value
	Centre-based		Home-based		Hybrid Delivery		Total		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Age (years)	65	11	68	12	66	12	66	11	<0.001
Variable Name (Base Group)	N	%	N	%	N	%	N	%	P value
Gender (Female)	33985	26%	4811	32%	10004	29%	48800	27%	<0.001
Marital Status (Partnered)	76721	78%	7242	70%	20168	76%	104131	77%	<0.001
Hypertension (yes)	64217	48%	7454	49%	15731	46%	87402	48%	<0.001
Four Categories of Comorbidity‡									
No Comorbidities	33405	25%	3314	22%	9039	26%	45758	25%	<0.001
Similar	45464	34%	4872	32%	10785	31%	61121	34%	
Dissimilar	24084	18%	2841	19%	6815	20%	33740	19%	
Both Similar and Dissimilar	30064	23%	4125	27%	7914	23%	42103	23%	
Ethnicity (BAME)	20198	17%	1922	14%	4788	16%	26908	17%	<0.001
Employment Status									
Employed	30004	32%	2198	24%	6321	26%	38523	30%	<0.001
Unemployed	13382	14%	1536	17%	5364	22%	20282	16%	
Retired	51691	54%	5342	59%	12374	51%	69407	54%	
CVD Treatment									
None	9878	7%	923	6%	2119	6%	12920	7%	<0.001
Revascularization	71582	54%	7988	53%	17938	52%	97508	53%	
Sternotomy	19829	15%	1289	9%	4315	13%	25433	14%	
Other Treatment	31728	24%	4952	33%	10181	30%	46861	26%	
Physical Activity-150 mins per week (Yes)	42588	46%	3375	38%	9901	43%	55864	45%	<0.001
Smoking Status (Smoking)	7640	7%	1254	11%	2737	9%	11631	8%	<0.001
BMI (>30)	34568	32%	3232	33%	8291	32%	46091	32%	<0.001
HADS Anxiety (Clinical Anxiety)	12394	14%	1066	16%	2835	15%	16295	14%	<0.001
HADS Depression (Clinical Depressed)	7191	8%	774	12%	1948	10%	9913	9%	<0.001
Index of Multiple Deprivation									
Lowest Quintile	14993	14%	2179	18%	4735	19%	21907	15%	<0.001
Second Quintile	18665	17%	2608	21%	4983	20%	26256	18%	
Third Quintile	21676	20%	2755	23%	5753	23%	30184	20%	
Fourth Quintile	25808	23%	2440	20%	5102	20%	33350	23%	
Fifth Quintile	29724	27%	2183	18%	4838	19%	36745	25%	
MDT within Service (MDT)	95796	84%	10638	87%	21605	84%	128039	84%	<0.001

Abbreviations: CVD: Cardiovascular disease. BAME: Black, Asian and minority ethnic. BMI: Body mass index. HADS: Hospital Anxiety and Depression Scale, MDT within Service: Multidisciplinary teams working for integrated care.

‡ Similar conditions are comorbid conditions with the same overall pathophysiologic and risk profile and are more likely to have a disease management plan related to cardiovascular diseases. Dissimilar comorbid conditions are not directly related in either pathogenesis or management plan to cardiovascular diseases

Table 2: Showing the socio-demographic split of the population within each mode of delivery group that did not complete cardiac rehabilitation

	Mode of Delivery Grouped					
	Centre-based		Home-based		Hybrid Delivery	
	Rate of Non-Completion		Rate of Non-Completion		Rate of Non-Completion	
Average rate	20%		26%		19%	
	Non-Completers					
	Mean	SD	Mean	SD	Mean	SD
Age (years)	64	12	67	13	65	12
Variable Name (Base Group)	Count	Row %	Count	Row %	Count	Row %
Gender (Female)	7328	22%	1259	26%	2003	20%
Marital Status (Partnered)	14574	20%	1984	25%	3273	18%
Hypertension (yes)	6367	20%	1329	27%	2061	20%
Four Categories of Comorbidity‡						
No Comorbidities	13440	20%	2033	26%	3421	18%
Similar	12746	20%	1901	26%	3018	19%
Dissimilar	19291	19%	3026	26%	4888	18%
Both Similar and Dissimilar	6895	21%	908	28%	1551	20%
Ethnicity (BAME)	13938	18%	1907	26%	3466	17%
Employment Status						
Employed	5853	18%	807	24%	1341	15%
Unemployed	8815	19%	1347	28%	1994	18%
Retired	4769	20%	703	25%	1316	19%
CVD Treatment						
None	3167	24%	403	26%	1014	19%
Revascularization	8149	16%	1116	21%	1819	15%
Sternotomy	13511	17%	1639	22%	2731	15%
Other Treatment	3167	24%	403	26%	1014	19%
Physical Activity-150 mins per week (Yes)	6406	15%	688	20%	1337	14%
Smoking Status (Smoking)	2733	36%	365	29%	673	25%
BMI (>30)	7275	21%	746	23%	1519	18%
HADS Anxiety (Clinical Anxiety)	2888	23%	312	29%	583	21%
HADS Depression (Clinical Depressed)	1897	26%	225	29%	435	22%
Index of Multiple Deprivation						
Lowest Quintile	4145	28%	599	27%	1051	22%
Second Quintile	4195	22%	677	26%	925	19%
Third Quintile	4108	19%	704	26%	1003	17%
Fourth Quintile	4186	16%	579	24%	790	15%
Fifth Quintile	4539	15%	527	24%	687	14%
MDT within Service (MDT)	18839	20%	2827	27%	4357	20%

Abbreviations: CVD: Cardiovascular disease. BAME: Black, Asian and minority ethnic BMI: Body mass index. HADS: Hospital Anxiety and Depression Scale, MDT within Service: Multidisciplinary teams working for integrated care.

‡ Similar conditions are comorbid conditions with the same overall pathophysiologic and risk profile and are more likely to have a disease management plan related to cardiovascular diseases. Dissimilar comorbid conditions are not directly related in either pathogenesis or management plan to cardiovascular diseases

Table 3: Showing associations between centre-based (reference, odds ratio 1.00) and the two other mode of delivery accounting for other predictors and completion

		Odds Ratio	p-Value	95% Confidence interval	
				Upper	Lower
Model 1					
	Home-based	0.671	0.006	0.505	0.893
Completion against Mode and Age and Gender	Hybrid	1.073	0.533	0.860	1.338
Model 2					
	Home-based	0.677	0.012	0.500	0.916
Completion against Mode and Age and Gender, patient demographics and baseline assessment	Hybrid	1.146	0.245	0.911	1.443
Model 3					
	Home-based	0.660	0.011	0.479	0.909
Completion against Mode and Age and Gender, patient demographics, baseline assessment and service characteristics	Hybrid	1.177	0.200	0.917	1.511

Model information:

Model 1- No. Obs 181645, Correctly Predicted 80.00%, log likelihood -90343.1

Model 2- No. Obs 53,924, Correctly Predicted 83.92%, log likelihood -23060

Model 3- No. Obs 46,056, Correctly Predicted 83.60%, log likelihood -19913.4

Supplementary Data

Table a1: Showing the final model (Model 3) in full detail of completion associated with covariates as shown in part in Table 3

Model 3		Odds Ratio	p-Value	95% Confidence interval	
				Upper	Lower
Mode of Delivery (comparator Group-based)	Home-based	0.660	0.011	0.479	0.909
	Hybrid	1.177	0.200	0.917	1.511
Age	Years	1.002	0.375	0.998	1.006
Gender (comparator Male)	Being Female	0.963	0.332	0.893	1.039
Marital Status (comparator Employed)	Being Partnered	1.169	0.000	1.096	1.247
Employment Status (comparator Employed)	Unemployed	0.887	0.034	0.794	0.991
	Retired	1.075	0.071	0.994	1.163
Ethnicity (comparator White)	Ethnic Minorities	1.014	0.825	0.894	1.151
Cardiac Treatment (comparator None)	PCI	0.916	0.408	0.744	1.128
	CABG	1.261	0.023	1.033	1.541
	Other Treatment	0.970	0.760	0.799	1.178
Index of Multiple Deprivation (Comparator Lowest Quintile/Most Deprived)	Second Quintile	1.091	0.149	0.969	1.227
	Third Quintile	1.184	0.036	1.011	1.386
	Fourth Quintile	1.321	0.001	1.116	1.565
	Fifth Quintile (least Deprived)	1.340	0.026	1.036	1.732
HADs Anxiety (comparator Normal HADs Core <8)	Clinically or Borderline Anxiety	0.843	0.000	0.784	0.906
HADs Depression (comparator Normal HADs Core <8)	Clinically or Borderline Depressed	0.742	0.000	0.676	0.814
Physical Activity (comparator not achieving 150 mins per week)	Yes	1.215	0.000	1.132	1.305
Smoking Status (comparator not smoking)	Smoking	0.474	0.000	0.417	0.539
BMI (comparator <30)	>30 BMI	0.836	0.000	0.792	0.882
Year of Initiating Event	2015	1.121	0.235	0.929	1.352
	2016	0.994	0.967	0.745	1.326
	2017	0.895	0.400	0.692	1.158
	2018	0.805	0.100	0.621	1.042
	2019	0.909	0.477	0.698	1.183
Multidisciplinary Team (Comparator No)	3 or more staff types	1.133	0.413	0.840	1.527
Regression Constant		3.486	0.000	2.064	5.885

Model information:

Model - No. Obs 46,056, Correctly Predicted 83.60%, log likelihood -19913.4