



Patient factors associated with enrollment, adherence, and change in cardiac risk factors among cardiac rehabilitation patients in Qatar

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ABSTRACT

Background: Cardiovascular disease is the number one killer in Qatar¹. Cardiac rehabilitation (CR) is a secondary prevention model of care for cardiac patients. It is well-documented that CR reduces cardiovascular morbidity and mortality by 20%². However, CR is underutilized worldwide, with low enrolment and adherence rates³. This study aims to investigate factors associated with enrolment and adherence, and to examine the relationship between adherence and change in cardiac risk factors.

Methods: There were 714 cardiac patients, aged ≥ 18 years, referred to a CR program in Qatar. Retrospective cohort study using data from (January 2013-September 2018) were analyzed. Logistic regression models were used to assess factors associated with enrolment, adherence, and predictors of adherence. A paired sample t-test was used to identify mean change in cardiac risk factors: body mass index, low-density lipoprotein, high-density lipoprotein and total cholesterol) pre/post-CR. An independent sample t-test was used to identify change between groups (adherents vs. non-adherents).

Results: The majority of our patients were males (n=641, 89.8%) and non-Qatari (n=596, 83.5%), i.e., similar to the Qatar population profile of 75% males and 15% Qatari, one fourth were smokers (n=185, 25.91%), and one fifth (n=128, 18.8%) were diagnosed with severe depression. Significant patient factors positively associated with enrolment (p < 0.05) were nationality, percutaneous coronary intervention (PCI), coronary artery bypass grafting, and coronary artery disease (Table 1). The number of sessions attended by patients is shown in Figure 1. Patients with American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) moderate and high-risk levels were more likely to adhere compared to those with low risk. Percutaneous coronary intervention (PCI) and musculoskeletal disease were negatively associated with adherence (Table 1). We found clinically significant health improvements among adherents compared to non-adherents; reduction of 10% in cholesterol, and 15% in LDL (low-density lipoprotein).

Conclusion: This study provides new insights into the factors that lead patients to enrol in and adhere to CR in the Qatar setting. These factors represent opportunities for targeted interventions to improve CR utilization.

Keywords: cardiac rehabilitation, patient compliance

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Table 1. Patient factors associated with enrolment in the cardiac rehabilitation program (univariate logistic regression) and predictors of adherence to cardiac rehabilitation (multivariable logistic regression)

Variables	OR	95%CI		P-value
Age	1.02	1.01	1.05	< 0.001
Gender				
Female	Ref			
Male	1.28	0.78	2.11	0.34
Nationality				
Qatari	Ref			
Non-Qatari	1.81	1.18	2.77	0.006
AACVPR Risk Category				
Low risk	Ref			
Moderate risk	12.67	7.89	20.34	< 0.001
High risk	10.41	6.46	16.77	< 0.001
Cardiac Depression Scale (CDS)				
No depression	Ref			
Moderate-mild depression	0.85	0.52	1.39	0.53
Severe depression	0.92	0.62	1.36	0.68
Smoking				
No	Ref			
Yes	0.60	0.43	0.86	0.01
Indications				
PCI				
No	Ref			
Yes	0.61	0.44	0.83	< 0.001
CABG				
No	Ref			
Yes	1.68	1.16	2.44	0.01
Coronary artery disease				
No	Ref			
Yes	1.42	1.05	1.93	0.021
Myocardial infarction				
No	Ref			
Yes	1.04	0.76	1.41	0.83
Heart failure				
No	Ref			
Yes	1.26	0.56	2.82	0.57
Valve replacement				
No	Ref			
Yes	1.15	0.53	2.53	0.72
Angina				
No	Ref			
Yes	1.53	0.29	7.98	0.61
Valve disease				
No	Ref			
Yes	1.19	0.51	2.78	0.70
Comorbid conditions				
Diabetes mellitus				
No	Ref			
Yes	1.35	0.99	1.83	0.05
HTN				
No	Ref			
Yes	1.09	0.81	1.48	0.57
Back pain				
No	Ref			
Yes	0.22	0.07	0.60	< 0.001
Musculoskeletal disease				
No	Ref			
Yes	0.28	0.10	0.76	0.013
Body mass index (Kg/m²)	1.01	0.98	1.04	0.381
Systolic blood pressure (mmHg)	1.01	1.00	1.02	0.01
LDL (mmol/L)	0.94	0.81	1.08	0.38
HDL (mmol/L)	0.40	0.29	0.54	< 0.001
Cholesterol (mmol/L)	0.90	0.79	1.03	0.12

Table 1 – Continued

Variables	OR	95%CI	P-value	
Predictors of adherence to CR (multivariable logistic regression)				
Age (years)	1.01	0.98	1.04	0.42
Gender				
Female	Ref			
Male	1.20	0.53	2.74	0.66
AACVPR Risk Category				
Low risk	Ref			
Moderate risk	12.71	7.81	20.68	< 0.001
High risk	10.60	6.44	17.44	< 0.001
PCI				
No	Ref			
Yes	0.39	0.17	0.89	0.03
CABG				
No	Ref			
Yes	0.49	0.19	1.28	0.14
Musculoskeletal diseases				
No	Ref			
Yes	0.15	0.06	0.5	0.003

P-value < 0.05 is considered significant. OR: Odd ratio. CI: Confidence interval. AACVPR: American Association of Cardiovascular and Pulmonary Rehabilitation. CR: cardiac rehabilitation. HTN: hypertension. LDL: low-density lipoprotein. HDL: high-density lipoprotein. PCI: percutaneous coronary intervention. CABG: coronary artery bypass grafting.

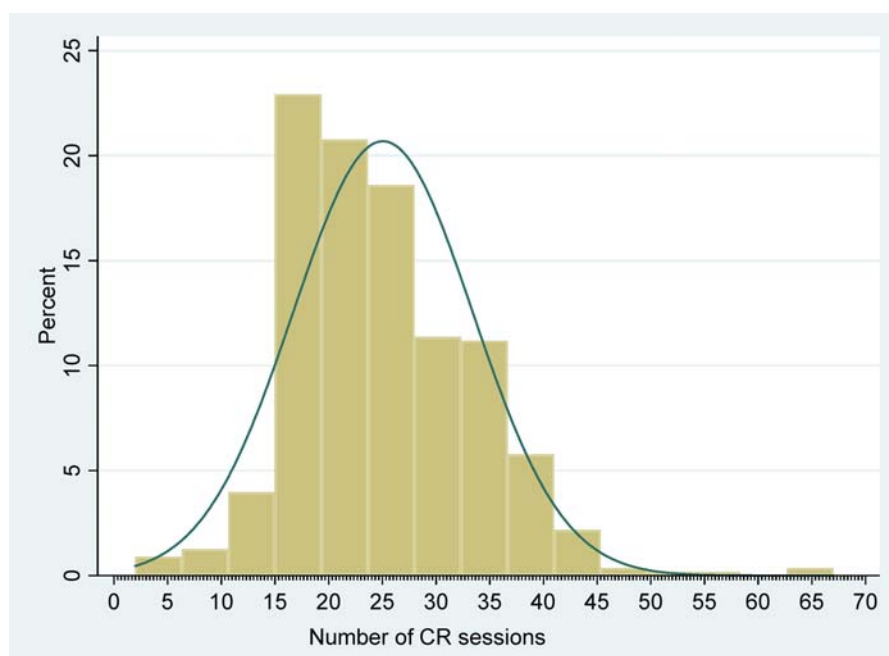


Figure 1. Distribution of CR sessions attended by the patients

Notes: This study was classified as exempt by the Medical Research Center of Hamad Medical Corporation [MRC-01-18-430] and the Qatar University Institutional Review Committee [QU-IRB 1039-E/19].

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