Resaerch Article

Cardiac Rehabilitation Utilization in Birjand, Iran: Referral, Participation, and Completion Rates in an Underprivileged Area - A Retrospective Cohort Study

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Running title: Cardiac rehabilitation utilization in an underprivileged region of Iran

Abstract

Background: Cardiac rehabilitation (CR) is a cornerstone of secondary prevention following coronary revascularization; however, its utilization remains suboptimal in underserved regions. This study aimed to evaluate referral, participation, and completion rates of CR and their associated factors in Birjand, Iran.

Material and Methods: This retrospective cohort study included 758 consecutive patients undergoing percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) between April 2022 and May 2023. Data on demographics, insurance status, education level, and physician CR familiarity were collected using a structured checklist and phone follow-up. The CR program was defined as 36 supervised sessions. Multivariate logistic regression models were used to identify factors associated with referral, participation, and completion. All reported odds ratios were derived from fully adjusted models.

Results: Among 749 eligible patients, 197 (26.3%) were referred to CR, 103 (52.3% of referred) participated, and 69 (67.0% of participants) completed the program. Multivariate analysis showed that higher education was the strongest predictor of referral (OR = 9.50, 95% CI: 4.90–18.27, $p < 0.001$), followed by male gender (OR = 2.12, 95% CI: [1.00-4.49], $p = 0.005$). Furthermore, Physicians familiar with CR had approximately a 3-fold

higher referral rate compared to less-familiar colleagues. Insurance coverage was significantly associated with completion of the program (78% of insured vs. 59% of uninsured completers, p = 0.018).
Conclusion: Referral is the main systemic barrier to cardiac rehabilitation utilization in this underprivileged region. Participation and completion among referred patients reflect a selected group with adequate access, highlighting the need for system-level interventions focused on physician referral practices—particularly for women and less-educated patients—and improved insurance coverage to enhance equitable CR access.
Keywords: Cardiac rehabilitation; Referral; Patient participation; Treatment adherence

Introduction:

The global increase in the prevalence of coronary artery disease (CAD) presents a significant public health challenge . While advancements in primary prevention and acute care have helped reduce early mortality, secondary prevention strategies remain essential for long-term prognosis and quality of life [1].

Cardiac Rehabilitation (CR), a critical component of secondary prevention, demonstrably reduces all-cause mortality, lowers hospitalization rates, and improves the physical and psychological well-being of patients following events such as myocardial infarction, angioplasty, and cardiac surgery [2-5].

Despite the clear evidence and strong clinical recommendations, there is a persistent and significant gap in the referral, enrollment, and participation rates for CR programs worldwide . Reports indicate that only 20% to 50% of eligible patients actually participate [6]. This access disparity is particularly pronounced in low- and middle-income countries (LMICs), where essential CR infrastructure is often minimal [7]. Globally, only 38.8% of countries have CR programs, with the lowest prevalence in LMICs. For example, in the United States, just 62% of eligible patients are referred to CR, but attendance drops sharply, with only 23% participating in at least one session and just 5% completing a full cycle of 36 sessions [7].

Barriers to participation are complex and multi-faceted, encompassing both systemic and patient-specific factors [1]. Systemic barriers include low referral rates by physicians and logistical issues, while patient-specific factors often involve socioeconomic status, education level, and geographical distance to the rehabilitation center [8]. A better understanding of these specific barriers is crucial for developing targeted interventions.[9]

In Iran, efforts have been made to expand CR availability; the number of centers significantly increased between 2018 and 2023 [10, 11]. However, this growth has primarily been concentrated in provincial capitals, leaving vast segments of the population in non-capital cities or disadvantaged regions with limited or no access to these life-saving services [11]. This disparity highlights a major ongoing challenge in achieving health equity.

Birjand, a city located in a disadvantaged area of eastern Iran, exemplifies the challenge of limited access and health inequity. The true rates of referral, enrollment, and completion of CR programs in this specific context are unknown. Furthermore, the role of key local predictors, such as geographical distance, insurance status (as a socioeconomic proxy), and physician familiarity with CR benefits and referral protocols, has not been adequately studied here.

Therefore, this study was conducted on patients who underwent angioplasty and cardiac surgery in Birjand to assess the rates of referral, participation, and completion of cardiac rehabilitation programs. Crucially, we also sought to identify the impact of specific systemic and socioeconomic predictors on patient engagement within this underserved region.

Materials and Methods:

Study Design and Population

This study was a retrospective cohort study. Patients were followed from hospital discharge through successive stages of CR utilization (referral, participation, and completion). All consecutive adult patients undergoing PCI or CABG at Razi Hospital between March 2021 and March 2023 were screened.

Exclusion criteria included:In-hospital death,missing baseline medical records,inability to establish post-discharge follow-up and death after discharge but before CR assessment (n=9).Excluding post-discharge deaths may introduce survivorship bias; however, these patients were not eligible for CR participation assessment.

Data Collection

Data were collected using a researcher-designed checklist based on prior literature and expert review. Face validity was assessed by two cardiologists and one CR specialist.Clinical data were extracted from medical records, while referral status, participation, completion, and reasons for non-referral were obtained via structured telephone interviews. Telephone follow-up may introduce recall bias, which is acknowledged as a limitation.

Variable Definitions

Referral was defined as a documented physician recommendation for cardiac rehabilitation (CR). Participation was defined as attendance at at least one CR session following referral, while completion was defined as attendance of all 36 prescribed sessions according to the local CR protocol. Physician familiarity with CR was categorized a priori based on clinical role and historical referral volume.

Ethical Considerations

The study protocol was approved by the Birjand University of Medical Sciences Ethics Committee (approval code: IR.BUMS.REC.1401.189).

Statistical Analysis

Normality was assessed descriptively. Given the large sample size, formal normality tests were interpreted cautiously. Multivariate logistic regression models were constructed using clinically relevant variables. Multicollinearity was assessed using variance inflation factors. Statistical significance was set at $p<0.05$.

Results

Patient Flow and Characteristics

A total of 758 patients were initially identified. Nine patients died after hospital discharge and before CR follow-up and were excluded**,** resulting in 749 patients included in the final analysis (Figure 1).

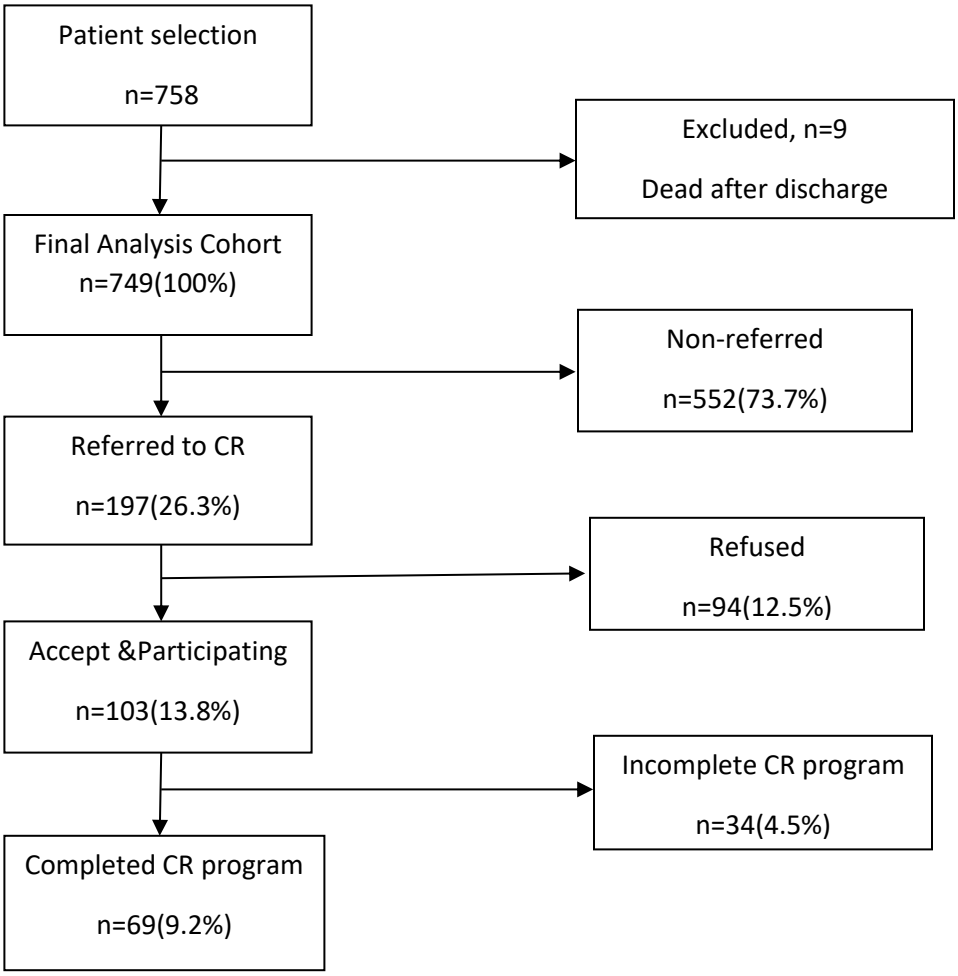

Figure 1. Flowchart of Patient Referral, Participation, and Completion of Cardiac Rehabilitation.

Baseline characteristics are presented in Table 1. Left ventricular ejection fraction was reported uniformly as mean ± standard deviation.

Predictors of Referral

Among eligible patients, 197 (26.3%) were referred to CR. Referral was significantly associated with younger age, male sex, higher education, CABG surgery, insurance coverage, shorter distance to the CR center, and physician category.The large magnitude observed for university education (OR=9.50) should be interpreted cautiously due to small subgroup size and potential residual confounding.Variation in referral across physicians suggests provider-level heterogeneity**.**

Table 1: Univariate characteristics associated with referral to cardiac rehabilitation

Characteristics	**All Patients (n=749 ,100%)**	**Referral to CR (N=197,26%)**	**Non-referral to CR (N=552 , 73%)**	**P-value**	**Univariate OR (95% CI)**
Age **(years)**	61.77± 11.9	58.9 ± 9.9	63.0 ± 12.2	**<0.001***	0.97 (0.96-0.99)
EF (%)	42.42 ± 11.1	45.0 %	45.0 %	0.14	1.01 (1.00-1.03)
Sex				**<0.001***	
- Female	223 (29.8%)	35 (15.7%)	188 (84.3%)		Ref

- Male	525 (70.2%)	162 (30.9%)	363 (69.1%)		2.40 (1.60-2.60)
Occupation				**<0.001***	
- Housewife	212 (28.4%)	31 (14.6%)	181 (85.4%)		Ref
- Retired	176 (23.6%)	68 (38.6%)	108 (61.4%)		3.70 (2.26-5.00)
- Employee	37 (5.0%)	17 (45.9%)	20 (54.1%)		5.00 (2.34-10.50)
- Self-Employment	321 (43.1%)	81 (25.2%)	241 (74.8%)		2.00 (1.25-3.10)
Education				<0**.001***	
- Illiterate	235 (31.5%)	29 (12.3%)	206 (87.7%)		Ref
- Below University	481 (64.5%)	150 (31.0%)	331 (69.0%)		3.03 (2.00-4.70)
- University	30 (4.0%)	18 (60.0%)	12 (40.0%)		9.50 (4.90-18.27)
Marital Status				0.27	
- Single	24 (4.0%)	4 (16.7%)	20 (83.3%)		Ref
- Married	725 (96.0%)	193 (26.6%)	532 (73.4%)		1.81 (0.61-5.37)
Insurance				<0**.001***	
- No	521 (70.0%)	112 (21.5%)	409 (78.5%)		Ref
- Yes	224 (30.0%)	84 (37.5%)	140 (62.5%)		2.20 (1.60-3.08)
Cigarette Smoker				0**.01***	
- No	606 (81.0%)	148 (24.4%)	458 (75.6%)		Ref
- Yes	143 (19.0%)	49 (34.3%)	94 (65.7%)		1.61 (1.09-2.38)
Opium user				0.26	
- No	559 (75.0%)	153 (27.4%)	406 (72.6%)		Ref
- Yes	190 (25.0%)	44 (23.2%)	146 (76.8%)		0.80 (0.54-1.18)
FH of CAD				0.15	
- No	575 (77.0%)	144 (25.0%)	431 (75.0%)		Ref
- Yes	174 (23.0%)	53 (30.5%)	121 (69.5%)		1.31 (0.90-1.91)
History Previous CAD				**0.01***	
- No	414 (55.3%)	124 (30.0%)	290 (70.0%)		Ref
- Yes	335 (44.7%)	73 (21.8%)	262 (78.2%)		0.65 (0.47-0.91)
Diabetes Mellitus				**0.15**	
- No	546 (73.1%)	136 (24.9%)	410 (75.1%)		Ref
- Yes	203 (26.9%)	61 (30.0%)	142 (70.0%)		1.30 (0.91-1.85)
Dyslipidemia				0.63	
- No	530 (71.0%)	142 (26.8%)	388 (73.2%)		Ref
- Yes	219 (29.0%)	55 (25.1%)	164 (74.9%)		0.92 (0.64-1.32)
Hypertension				**0.01***	
- No	414 (55.3%)	124 (30.0%)	290 (70.0%)		Ref
- Yes	335 (44.7%)	73 (21.8%)	262 (78.2%)		0.65 (0.47-0.91)
Intervention				**<0.001***	
- PCI	613 (81.7%)	139 (22.7%)	474 (77.3%)		Ref
- CABG	125 (16.8%)	56 (44.8%)	69 (55.2%)		2.77 (1.86-4.13)
- Valvular Surgery	10 (1.6%)	1 (10.0%)	9 (90.0%)		0.38 (0.05-3.02)
Doctor				**<0.001***	
- Doctor 1	539 (71.9%)	128 (23.7%)	411 (76.3%)		Ref
- Doctor 2	82 (10.9%)	14 (17.1%)	68 (82.9%)		0.66 (0.36-1.22)
- Doctor 3	127 (17.2%)	55 (43.3%)	72 (56.7%)		2.45 (1.64-3.67)
Distance to CR Center **(km)**				<**0.001***	

- 0-10	360 (48.5%)	170 (47.2%)	190 (52.8%)		Ref
- 10-30	35 (4.7%)	7 (20.0%)	28 (80.0%)		0.28 (0.12-0.66)
- 30-100	156 (21.0%)	13 (8.3%)	143 (91.7%)		0.10 (0.06-0.19)
- >100	192 (25.8%)	7 (3.6%)	185 (96.4%)		0.04 (0.02-0.09)

Participation Among Referred Patients

Among referred patients, 103 (52.3%) attended at least one CR session (Table 2).These findings apply only to referred patients and should not be generalized to the entire eligible cohort.

Table 2: Characteristics of patients who participated in cardiac rehabilitation

Characteristics	**All Patients (n=197, 100%)**	**Participation (n=103 , 52%)**	**Non-participation (n=94 , 48%)**	**P-value**	**OR (95% CI)**
Age (years)	58.9± 9.9	58.8 ± 8.8	58.9 ± 10.9	0.95	1.00 (0.98-1.03)
EF %	45 ± 9.9	43.5 ± 9.7	43.7 ± 10.3	0.85	1.00 (0.97-1.03)
Sex				0.**04***	
- Female	35 (18%)	13 (37.1%)	22 (62.9%)		Ref
- Male	162 (82%)	90 (55.6%)	72 (44.4%)		2.12 (1.00-4.49)
Occupation				0.45	
- Housewife	31 (16%)	13 (41.9%)	18 (58.1%)		Ref
- Retired	68 (35%)	40 (58.8%)	28 (41.2%)		1.98 (0.84-4.68)
- Employee	17 (8%)	9 (52.9%)	8 (47.1%)		1.56 (0.48-5.12)
- Self-employment	81 (41%)	41 (50.6%)	40 (49.4%)		1.42 (0.62-3.28)
Education				0.08	
- Illiterate	29 (15%)	9 (31.0%)	20 (69.0%)		Ref
- Education Below University	150 (76%)	82 (55%)	68 (45%)		2.58 (1.09-6.06)
- College/University	18 (9%)	12 (66.7%)	6 (33.3%)		4.24 (1.45-12.40)
Marital Status				0.**05***	
- Married	193 (98%)	100 (51.8%)	93 (48.2%)		
- Single	4 (2%)	0 (0%)	4 (100%)		
Insurance				0.43	
- No	112 (57%)	61 (54.5%)	51 (45.5%)		Ref
- Yes	84 (43%)	41 (48.8%)	43 (51.2%)		0.80 (0.45-1.41)
Cigarette Smoker				0.23	
- No	148 (75%)	81 (54.7%)	67 (45.3%)		Ref
- Yes	49 (25%)	22 (44.9%)	27 (55.1%)		0.67 (0.35-1.29)
Opium user				0.49	
- No	153 (78%)	82 (53.6%)	71 (46.4%)		Ref
- Yes	44 (22%)	21 (47.7%)	23 (52.3%)		0.80 (0.40-1.55)
FH of CAD				0.92	
- No	144 (63%)	75 (52.1%)	69 (47.9%)		Ref
- Yes	53 (27%)	28 (52.8%)	25 (47.2%)		1.03 (0.55-1.94)
History Previous CAD				0.80	
- No	124 (63%)	64 (51.6%)	60 (48.4%)		Ref
- Yes	73 (37%)	39 (53.4%)	34 (46.6%)		1.08 (0.60-1.92)
Diabetes Mellitus				0.21	

- No	136 (70%)	68 (50.0%)	68 (50.0%)		Ref
- Yes	61 (30%)	35 (57.4%)	26 (42.6%)		1.35 (0.73-2.47)
Dyslipidemia				0.47	
- No	142 (72%)	70 (49.3%)	72 (50.7%)		Ref
- Yes	55 (28%)	31 (56.4%)	24 (43.6%)		1.26 (0.67-2.35)
Hypertension				0.80	
- No	124 (43%)	64 (51.6%)	60 (48.4%)		Ref
- Yes	73 (37%)	39 (53.4%)	34 (46.6%)		1.08 (0.60-1.92)
Intervention				0.**02***	
- PCI	139 (67%)	82 (59.0%)	57 (41.0%)		Ref
- CABG	56 (18%)	20 (35.7%)	36 (64.3%)		0.39 (0.20-0.73)
- Valvular Surgery	1 (16%)	0 (0.0%)	1 (100.0%)		
Doctor				0.**004***	
- Doctor 1	128 (59%)	78 (60.9%)	50 (39.1%)		2.73 (1.42-5.25)
- Doctor 2	14 (89%)	5 (35.7%)	9 (64.3%)		0.97 (0.28-3.30)
- Doctor 3	55 (12%)	20 (36.4%)	35 (63.6%)		Ref
Distance to CR Center (km)				0.91	
- 0-10	170 (35%)	90 (52.9%)	80 (47.1%)		1.50 (0.33-6.90)
- 10-30	7 (37%)	4 (57.1%)	3 (42.9%)		1.78 (0.21-14.77)
- 30-100	13 (21%)	6 (46.2%)	7 (53.8%)		1.14 (0.18-28)
- >100	7 (18%)	3 (42.9%)	4 (57.1%)		Ref

Completion of CR

Of participating patients, 69 (67.0%) completed the full CR program (Table 3).Interpretation is limited by the small sample size and potential model overfitting. Variables with sparse data and unstable confidence intervals were excluded from the final model.

Table 3: Characteristics of patients who completed cardiac rehabilitation

Characteristics	**All Patients (n=103,100%)**	**CR Completion (n=69,67%)**	**Non-completion of CR** (n=**34 , 33%)**	**P-value**	**OR (95% CI)**
Age (years)	58.8 ± 8.8	59.5 ± 8.7	57.6 ± 9.3	0.29	1.03 (0.98-1.08)
EF %	43.5 ± 9.7	43.4 ±10.1	43.6 ±9.1	0.90	1.00 (0.96-1.04)
Sex				0.41	
- Female	90 (87%)	59 (65.6%)	31 (34.4%)		1.75 (0.45-6.83)
- Male	13 (13%)	10 (76.9%)	3 (23.1%)		Ref
Occupation				0.70	
- Housewife	13 (13%)	10 (76.9%)	3 (23.1%)		2.13 (0.51-9.00)
- Retired	40 (39%)	28 (70.0%)	12 (30.0%)		1.49 (0.60-3.76)
- Employee	9 (9%)	6 (66.7%)	3 (33.3%)		1.30 (0.28-5.86)
- Self-employment	41 (39%)	25 (61.0%)	16 (39.0%)		Ref
Education				0.34	
- Illiterate	9 (9%)	7 (77.8%)	2 (22.2%)		Ref
- Education below university	82 (80%)	53 (65%)	29 (35%)		0.46 (0.09-2.37)

- College/University	12 (11%)	9 (75.0%)	3 (25.0%)		1.21 (0.18-8.22)
Marital Status				2.03	
- Married	103 (100%)	69 (67.0%)	34 (33.0%)		
- Single	0	0 (0.0%)	0 (0.0%)		Ref
Insurance				0.**04***	
- No	61 (60%)	36 (59.0%)	25 (41%)		Ref
- Yes	41 (40%)	32 (78.0%)	9 (22.0%)		2.47 (1.01-6.06)
Cigarette Smoker				0.56	
- No	81 (79%)	55 (68.9%)	26 (32.1%)		Ref
- Yes	22 (21%)	14 (63.6%)	8 (36.4%)		0.83 (0.31-2.22)
Opium user				0.28	
- No	82 (80%)	57 (69.5%)	25 (30.5%)		No
- Yes	21 (20%)	12 (57.1%)	9 (42.9%)		0.59 (0.22-1.56)
FH of CAD				0.55	
- No	75 (73%)	49 (65.3%)	26 (34.7%)		Ref
- Yes	28 (27%)	20 (71.4%)	8 (28.6%)		1.33 (0.51-3.42)
History Previous CAD				0.21	
- No	64 (62%)	40 (62.5%)	24 (37.5%)		Ref
- Yes	39 (38%)	29 (74.4%)	10 (25.6%)		1.74 (0.72-4.20)
Diabetes Mellitus				0.49	
- No	68 (66%)	44 (64.7%)	24 (35.3%)		Ref
- Yes	35 (34%)	25 (71.4%)	10 (28.6%)		1.36 (0.56-3.31)
Dyslipidemia				0.06	
- No	72 (70%)	44 (61.1%)	28 (38.9%)		Ref
- Yes	31 (30%)	25 (80.6%)	6 (19.4%)		2.65 (0.97-7.27)
Hypertension				0.21	
- No	64 (62%)	40 (62.5%)	24 (37.5%)		Ref
- Yes	39 (38%)	29 (74.4%)	10 (25.6%)		1.74 (0.72-4.19)
Intervention				0.25	
- PCI	82 (80%)	52 (63.4%)	30 (36.6%)		Ref
- CABG	20 (20%)	16 (80.0%)	4 (20.0%)		2.31 (0.71-7.54)
- Valvular Surgery					
Doctor				0.**04***	
- Doctor 1	78 (76%)	52 (66.7%)	26 (33.3%)		Ref
- Doctor 2	5 (5%)	1 (20.0%)	4 (80.0%)		0.13 (0.01-1.18)
- Doctor 3	20 (19%)	16 (80.0%)	4 (20.0%)		2.00 (0.61-6.60)
Distance to CR Center (km)				0.38	
- 0-10	90 (88%)	61 (67.8%)	29 (32.2%)		4.21 (0.37-48.31)
- 10-30	4 (4%)	2 (50.0%)	2 (50.0%)		2.00 (0.09-44.35)
- 30-100	6 (6%)	5 (83.3%)	1 (16.7%)		10.00 (40.00-250.42)
- >100	3 (2%)	1 (33.3%)	2 (66.6%)		Ref

Discussion

Our study reveals a critical gap in cardiac rehabilitation (CR) utilization in Birjand, eastern Iran, with only 26.3% of eligible patients receiving physician referral, a rate markedly lower than most international benchmarks. For example, referral rates of approximately 80% have been reported in the Netherlands, where older age, higher ejection fraction, and greater distance reduced referral, while gender showed no association [12]. In contrast, Spain reported a referral rate of 13.8%, with age, gender, and coronary artery disease history as independent predictors [13].In the United States, referral rates of approximately 40% have been described, with male sex and Black race associated with lower referral likelihood [14]. More recently, the Queensland Cardiac Outcomes Registry reported referral rates of 63% among over 33,000 eligible patients, largely attributed to system-level interventions such as automated electronic referrals, financial incentives, and dedicated quality-improvement personnel [15]. Evidence from Southeast Asia further supports the effectiveness of automated referral systems, which doubled CR enrollment following coronary artery bypass grafting [16]. These findings highlight the potential role of structured referral pathways and provider-level interventions.

Consistent with prior Iranian studies, CR referral rates in our setting remain notably low. Previous reports from Kermanshah and other regions have identified limited physician awareness, inadequate insurance coverage, and geographic barriers as major impediments to referral [17,18]. Hybrid CR models have shown improved referral rates in western Iran, although distance and female gender continued to negatively influence access [19]. Our findings align with this literature, highlighting distance to CR centers and insufficient provider recommendations as key barriers. However, given the retrospective observational design, these associations should not be interpreted as causal, as distance and physician familiarity with CR may act as proxies for unmeasured patient-, provider-, or system-level confounders.

Among the 197 patients who were referred, 52.3% participated in at least one CR session, a rate lower than that reported in the Netherlands but comparable to or higher than several international and regional estimates [12,20,21]. Prior studies have consistently shown reduced participation among women, older adults, and patients with lower educational attainment, while higher participation has been observed among men and those with greater socioeconomic resources [21–24].In our cohort, female gender was similarly associated with lower participation, whereas marital status and stronger provider recommendations appeared to facilitate engagement. PCI patients also demonstrated higher participation compared with CABG patients, potentially reflecting differences in recovery trajectories, perceived illness severity, or functional capacity at discharge.

Although 67.0% of participating patients completed all 36 prescribed CR sessions, this completion rate should be interpreted with caution. Comparable studies have reported substantially lower completion rates in real-world settings [25,26], while others, particularly in highly organized systems, have achieved higher rates [12]. In observational cohorts such as ours, elevated completion rates likely reflect selection and survivorship effects, whereby patients who successfully overcome early barriers to referral and participation represent a highly selected subgroup with greater capacity or motivation to persist in the program. Consequently, completion among participants should not be interpreted as evidence of uniformly high adherence across the broader eligible population.

Overall, while international comparisons provide valuable context, mechanistic explanations for the observed local gender disparities remain incompletely elucidated. The findings primarily highlight systemic shortcomings in referral pathways and access, emphasizing the need for cautious interpretation of participation and completion metrics and for future prospective studies to better disentangle patient-, provider-, and system-level determinants of CR utilization.

Conclusion

Physician referral constitutes the main systemic barrier to cardiac rehabilitation (CR) utilization in this underprivileged region, with marked disparities affecting women, older adults, and less-educated patients. Although participation and completion rates were moderate among referred patients, these outcomes reflect a selected subgroup and are likely influenced by survivorship and selection effects. The substantial attrition

across the CR cascade underscores the need for system-level interventions targeting physician referral practices, insurance coverage, and geographic accessibility to improve equitable CR access.

Limitations

This study is limited by its retrospective design, reliance on partly self-reported data, and single-center setting, which restrict causal inference and generalizability. Although major comorbidities were reviewed, incomplete documentation and limited statistical power precluded their inclusion in multivariable models, raising the possibility of residual confounding. Physician-level clustering and heterogeneity in referral behavior were not fully accounted for and likely influenced referral estimates**.** Additionally, hospital- and system-level factors (e.g., institutional referral pathways and resource availability) were not assessed despite their potential impact on access and adherence. Exclusion of patients who died after discharge may have introduced survivorship bias, potentially inflating participation and completion estimates.

Conflict of interest

The authors declared no conflict of interest.

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Authors' contributions

Conceptualization, Data collection, and Writing: Azar Zare Noughabi**,** Toba Kazemi**, and** Maryam Sadat Rahimi**;** Methodology: Seyed Mohammad Riahi**;** Data analysis: Fateme Mahdizadeh**;** Supervision, Writing, and Data collection: Toba Kazemi **and** Maryam Sadat Rahimi**;** Conceptualization and Data collection: Azar Zare Noughabi**;** Critical revision and final approval of the manuscript: **All authors**

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