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Patient perceived barriers to phase II cardiac rehabilitation in patients with and without percutaneous coronary angioplasty

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Abstract

Context: Cardiac Rehabilitation is an accepted standard of care after any cardiac event and is considered a class I indication following myocardial infarction or revascularisation procedures. It aims at the reduction of cardiovascular risk factors and improves quality of Life by promoting healthy behavior and an active lifestyle. However, despite its proven benefits and need, it is highly underutilized. Hence this study aims to explore the barriers perceived by patients who were conservatively treated and with percutaneous coronary intervention to attend outdoor cardiac rehabilitation services.

Settings and Design: Observational study at the cardiology unit of a tertiary health care hospital.

Methods and Material: The barriers perceived by the patients were studied using the interview method using Cardiac Rehabilitation Barrier Scale (CRBS). A complete enumeration sampling technique was used for the enrolment of subjects. The primary outcome measure was to analyse the sub-questions of all four domains of CRBS and compare the difference in the distribution of barriers between conservatively managed and PCI using the Mann-Whitney U test.

Results: 216 patients were enrolled, out of which 123 were managed conservatively and 93 underwent Percutaneous Coronary Intervention. Lack of awareness about CR was found in 128 patients (59.25%), Distance and transportation problems were found in 117 patients (54.16%) in the conservative group, and 101 patients in PCI (46.75%). Work time conflict was observed in 117 patients (53.74%) in conservative and 93 patients (43.05%) in PCI. 84 patients (38.8%) had low energy levels and 44 patients (20.36%) found exercising tiring and painful. Patients with PCI had greater referral issues, cost issues, and low energy levels and found exercise tiring and painful ($p < 0.005$) than conservatively managed.

Conclusions: Referral, Knowledge of CR, access to healthcare resources, and Work Time conflicts are perceived as major barriers to Cardiac Rehabilitation. Additionally, higher Cost issues, Low Energy levels, and fear of exercising were observed more in patients with PCI than in conservatively managed.

Keywords: Cardiac Rehabilitation; Barriers; Cardiac Rehabilitation Barrier scale; Coronary Artery Disease; Percutaneous Coronary Intervention

1. Introduction

Cardiac Rehabilitation is an accepted standard of care after a cardiac event and is considered a class I indication following myocardial infarction or revascularisation procedures as recommended by numerous National Guidelines. It aims at the reduction of cardiovascular risk factors improving Quality of Life by promoting healthy behavior and an

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active lifestyle and thereby reducing disability.[1,2] Hence, it should be offered in a timely and appropriate manner to optimize the patient's post-discharge health and well-being. However, despite its proven benefits and need, it is highly underutilized. There could be various reasons for the underutilization of services. To promote CR the barriers perceived by the patients to attend outdoor cardiac rehabilitation services need to be studied. The referral rate could be varied between patients who have been managed by CABG in comparison to PCI and conservatively managed. Hence this study aims to explore barriers to cardiac rehabilitation in a tertiary care hospital and compare differences between conservatively managed and those with PCI

2. Material and methods

It was an observational study conducted with permission from the Institutional Ethics committee. Patients diagnosed with CAD and admitted based on symptoms, ECG changes and biochemical blood reports or troponin T managed conservatively or thru percutaneous coronary intervention (PCI) were included using complete enumeration sampling. Patients with complicated Myocardial infarction or in failure or presence of concurrent debilitating comorbidity unsuitable for cardiac rehabilitation or with any associated neurological impairments were excluded. All subjects were evaluated and treated for phase I (in hospital phase) cardiac rehabilitation as a routine standard of care. Knowledge regarding outdoor cardiac rehabilitation Phase II was given to all the patients. Among the patients who agreed to participate in the study, the Cardiac rehabilitation barrier scale (CRBS) was administered pre-discharge by a therapist other than the investigator. Each item within these four subscales was rated according to the level of agreement of the selected patients on a 5-point Likert Scale and the barriers was studied. Further Depending upon their intervention of management, subjects were divided into two groups: Conservatively managed and Percutaneous Coronary Intervention (PCI) where the differences in the distribution of barriers among them were studied using the Mann-Whitney U test.

3. Results

Table 1 Baseline Demographics and Descriptive Characteristics in the overall population managed conservatively and thru Percutaneous Coronary Intervention (PCI)

Characteristics	Sub-characteristics	Conservatively managed (n= 93)	Percutaneous Coronary Intervention (PCI) (n= 123)	Total N= 216
Age (years)	Median (interquartile Range)	58 (28,87)	58 (31,73)	58 (28,87)
Gender	Male	68.81%(n=64)	80.49%(n=99)	75.47%(n=163)
	female	31.19%(n= 29)	19.51%(n=24)	24.53%(n=53)
Place of living from Rehabilitation center (Kms)	<20	56%(n=52)	62% (n=76)	59.25%(n=128)
	21-50	28%(n=26)	21%(n=26)	24.07%(n=52)
	51-100	09%(n=08)	05%(n=07)	0.06%(n=15)
	101-500	05%(n=05)	06%(n=07)	0.05%(n=12)
	>500	02%(n=02)	06%(n=07)	0.04%(n=09)
Level Of Literacy (Education)	Primary	55.92%(n=52)	08.13%(n=76)	59.25%(n=128)
	Secondary	12.90%(n=12)	61.79%(n=17)	13.43%(n=29)
	Graduates	21.5%(n=20)	13.82%(n=20)	18.52%(n=40)
	Illiterates	09.68%(n=09)	16.27%(n=10)	18.8%(n=19)
Employment status	Retired	22.58%(n=21)	25.2%(n=31)	24.07%(n=52)
	Employed for wages	34.35%(n=32)	34.96%(n=43)	34.72%(n=75)
	Self-employed	20.43%(n=19)	13.83%(n=17)	16.67%(n=36)
	Housewife	22.58%(n=21)	26.01%(n=32)	24.54%(n=53)

Income class (Kuppuswamy scale)	Lower class	48.36%(n=45)	45.52%(n=56)	46.75%(n=101)
	Lower middle class	23.65%(n=22)	23.65%(n=22)	20.37%(n=44)
	Upper lower class	25.20(n=26)	25.20%(n=26)	24.07%(n=52)
Marital Status	Married	89.43%(n=79)	84.95%(n=110)	87.5%(n=189)
	Single	10.56%(n=14)	15.05%(n=13)	12.5%(n=27)
Type of ACS	NSTEMI	63.44%(n=59)	46.34%(n=57)	53.70%(n=116)
	STEMI	30.11%(n=28)	44.72%(n=55)	38.43%(n=83)
	UA	06.45%(n=06)	08.94%(n=11)	07.87%(n=16)
Level Of Depression (BECK score)	Normal Mild mood disturbance Borderline Clinical Depression	34.40%(n=32) 47.31%(n=44) 15.05%(n=14) 03.22%(n=03)	31.70%(n=39) 36.58%(n=44) 19.51%(n=24) 12.19%(n=15)	32.87%(n=71) 40.74%(n=88) 17.59%(n=38) 0.08%(n=18

NSTEMI: Non-ST elevated Myocardial Infarction, STEMI: ST elevated Myocardial Infarction, UA: Unstable Angina

Table 2 Descriptive Analysis of each sub-questions of the four subdomains of CRBS and comparison of its median values between conservatively managed and with Percutaneous coronary Intervention(PCI)

	Sub-Questions	**Strongly Disagree and Disagree**	**Neither Disagree nor Agree**	**Strongly Agree & Agree**	**Conservatively managed (n=93)**	**PCI (n=123)**	**p-value**
					Median Values		
A1	I didn't know about cardiac rehab(the doctor did not tell me about it)	40.74%(n=88)	None	59.25%(n=128)	2(2,5)	4(2,5)	0.03
A2	I don't need cardiac rehab	93.97%(n=203)	None	16.01%(n=13)	2(1,5)	2(1,5)	0.72
A3	I already exercise at home	84.25%(n=182)	0.46%(n=01)	15.2(n= 33)	2(2,5)	2(1,5)	0.14
A4	My doctor did not feel it was necessary	85.18%(n=184)	10.1%(n=21)	14.62%(n=10)	2(1,4)	2(2,4)	0.30
A5	I can manage my heart problems on my own	92.58%(n=200)	0.92%(n=02)	16.49%(n=14)	2(1,5)	2(1,4)	0.70
A6	I think I was referred but the rehab program didn't contact me	95.36%(n=206)	None	14.62%(n=10)	2(1,5)	2(1,5)	0.43
A7	It took too long to get referred	97.2%(n=210)	0.46%(n=01)	2.31%(n=05)	2(1,5)	2(1,4)	0.15

A8	I prefer to take care of my health alone,not in the group	85.18%(n=184)	0.92%(n=02)	13.88%(n=30)	2(2,5)	2(1,5)	0.47
A9	I prefer to take care of my health alone, not in the group	95.82%(n=207)	None	4.16%(n=09)	2(1,5)	2(1,5)	>0.99
B- Logistical Factors							
B1	Distance	45.83%(n=99)	None	54.16%(n=117)	4(1,5)	4(1,5)	0.95
B2	Cost	60.64%(n=131)	None	39.35%(n=85)	2(1,5)	2(1,5)	0.01*
B3	Transportation problems	53.23%(n=115)	None	46.75%(n=101)		2(1,5)	0.66
B4	Family Responsibilities	75.92%(n=164)	0.46%(n=01)	23.6%(n=51	2(1,5)	2(1,5)	0.89
B5	Severe Weather	75.92%(n=164)	19.44%(n=42)	4.66%(n=10)	2(1,5)	2(1,4)	0.59
C- Work /Time Conflicts							
C1	Travel	80.09%(n=173)	0.92%(n=02)	18.97%(n=11)	2(1,5)	2(1,4)	0.53
C2	Time constraints	56.88%(n=123)	None	43.05%(n=93)	2(1,5)	2(1,5)	0.38
C3	Work responsibilities	45.83%(n=99)	None	53.74%(n=117)	4(1,5)	4(1,5)	0.88
D-Comorbidities/Functional Status							
D1	I find exercise tiring or painful	80.09%(n=173)	0.92%(n=02)	18.97%(n=11)	2(1,5)	2(1,5)	0.00*
D2	I don't have the energy	56.88%(n=123)	None	43.05(n=93)	2(1,5)	4(1,5)	0.00*
D3	Other health problems prevent me from going	45.83%(n=99)	None	53.74%(n=117)	2(1,5)	2(1,5)	0.20
D4	I am too old	80.09%(n=173)	0.92%(n=02)	18.97%(n=11)	2(1,5)	2(1,5)	0.79

*Significant at p<0.001

4. Discussion

Despite the proven efficacy and cost-effectiveness of Cardiac Rehabilitation, its use in India is very low[2] It has previously also been observed that utilization of CR is lower than expected in patients undergoing Percutaneous Coronary Intervention(PCI)[3]

Cardiac Rehabilitation Barrier Scale(CRBS) was chosen as a part of the study as it has a reliable and valid measure of assessing cardiac rehabilitation barriers in both inpatients and outpatients.[4] The study included 216 patients with coronary artery disease managed conservatively (n=93) or thru Percutaneous Coronary Intervention (n=123), the reasons for non-attending cardiac rehabilitation were the lack of awareness about cardiac rehabilitation, lack of referral, patient's perception of need of CR, a distance of the CR center from the living place, travel and transportation issues, cost issues, work and family responsibilities, perception of illness after a cardiac event or angioplasty.

4.1. Referral And Knowledge about CR

The descriptive analysis of the present study shows that 59.25%(128 out of 216) patients were in agreement that they don't know about cardiac rehabilitation as they were not made aware of the effects and need for cardiac rehabilitation by their primary consultant. This was also supported by the study done by Renu P et al [5] at a large tertiary care center and by Dr.Abraham Samuel Babu et al [6] who found that the referral rate depends on cardiologists who most often refer patients to CR and this rate was found to be as low as 10-30% to as high as 60%. They also identified that physicians' neglecting attitudes and lack of endorsement towards CR influenced negatively cardiac rehabilitation referrals.

Our Results also demonstrated that there was a difference in referral among the patients managed with or without percutaneous coronary Intervention(PCI). The study accounted larger number of patients i.e 66.66% (82 out of 123)Who have undergone percutaneous coronary Intervention(PCI) had an agreement for not knowing about Cardiac rehabilitation participation after angioplasty as their doctor didn't tell them about it whereas patients who were managed conservatively had a smaller number of population i.e 48.36%(45 out of 93) patients who had the agreement for the same. This was supported by the study of Aragam, et al [7] who found that the rate of referral was significantly higher among patients who were discharged with medicinal management than those who have undergone Percutaneous Coronary Intervention (PCI). They accounted that the referral rate among patients with PCI was 61.2% whereas that with patients with discharge on aspirin was 97.5%, statins were 89.8%,beta-blockers as 84.8% and those on ACE inhibitors/ARBs were 79.6.%.

The present study results show that about 31.62%(23 out of 216) of patients did not wish to attend cardiac rehabilitation as they feel they don't need CR and can manage on their own as they are good and have no cardiac symptoms at present. This could be because patients with PCI believe that the stent has fixed their problem and CR was unnecessary(Fergus Gardiner et al).[8] Also Patient related factor i.e. lack of patient knowledge and negative beliefs about the use of CR acts as a barrier to CR participation.[9]

4.2. Logistical factors (distance, transport, time, cost, and work responsibilities)

Besides this, the failure of some patients to attend CR could be due to various factors like distance, transportation, cost issues, work and family responsibilities, and time constraints. Our study accounted that distance and travel from home to the rehabilitation center were a barrier for 54.16% (117 out of 216) and 46.75% (101 out of 216) respectively. The distance was seen to be a problem because patients required access to a car, public transportation which is accompanied by a crowd, inability to get a seat, and use of staircase which may be perceived as difficult and harmful by the patient. As access to public transportation is difficult, many patients have to opt for private transportation which is not affordable for them as the maximum population of the study belongs to lower socio-economic strata. And thus 39.35% (85 out of 216) concluded that transportation cost was the issue for them to attend cardiac rehabilitation.

Hyo Won Im et al [10] also found similar results in Korean patients for nonenrolment in cardiac rehabilitation programs. They accounted that 53.9%, 65.7%, 44.9% and 25.5% of the patient population agreed that distance, cost of travel, transportation problems, and family responsibilities respectively as the cause for declining participation in CR. Thus this seems to be a Global problem.

The study also found a significant difference in cost issues among patients managed with or without PCI. They accounted that about 67.78%(83 out of 123) patients who have undergone Percutaneous Coronary Intervention (PCI) agreed that cost was a barrier for them as compared to those who were discharged with medicinal management (48.38 %) In spite of CR facilities at our tertiary care hospital being free, probably traveling expenses were perceived costly with a view of using private transport instead of public. Also, the cost of medicines could be higher than that of conservative management. Additionally, work responsibilities and family responsibilities, and time constraints were the other barriers to CR for 53.74%(117 out of 216), 23.6%(51 out of 216), and 43.05%(93 out of216) of patients because 34.72% of the study population were employed for wages and therefore work was a priority for them to earn their bread butter rather than attending CR because programs might conflict their occupational demands and other social roles associated with housework and family life. These findings are attributed to the meta-analysis of Clark et al[11] and Dr.Sherry L. Grace, et. al[12] which concluded that fulfilling the perceived domestic responsibilities hampered their participation into the cardiac rehabilitation. They further explained that issues of career advancement and finances may negatively conflict with time to dedicate to Cardiac rehabilitation participation. These barriers can be overcome by the provision of cardiac rehabilitation programs in the evening and on weekends. [8]Subjects with physically demanding jobs believed that exercise is a part of their occupation only and that more exercise in their leisure time is not necessary.[9]

4.3. Comorbidities/Functional status

In the present study, we also found that patients complained of different comorbidities and their present condition as a barrier to participating in CR. The results of the study accounted that 55.24% (128 out of 216) patients feel that they have low energy levels and get fatigued after a cardiac event which was a barrier for them to attend cardiac rehabilitation. 12.03% (26 out of 216) patients had some other health issues which prevented them from attending cardiac rehabilitation and 18.05% (39 out of 216) consider that they are too old to exercise. This was supported by the study of A F Cooper, et a [13,14] who concluded that Non-attenders were likely of the misconceptions about rest and reduced physical exertion after a cardiac event and thus develops Kinesiophobia. The patient's belief about their illness and recovery is also related to subsequent attendance at cardiac rehabilitation.[15]They concluded that psychological factors play a more important role than the medical factor in the recovery process and CR participation. These can be improved by the early identification of illness perceptions among patients to improve the outcome in terms of participation in cardiac rehabilitation programs. Elderly perceived that exercise was more important for younger male subjects[11] than the old person which probably negatively affects their participation in Cardiac rehabilitation

As compared to Conservatively managed patients, a greater number of Patients with PCI stated that they don't have the energy to exercise and find exercising painful and tiring. This was supported by Higgins M, Dunn, and Theobald[16]who reported that most of the patients with PCI have low levels of energy which was the mediating factor for non-attendance in Cardiac Rehabilitation, delayed mobilization, and resumption of work. Thus, at the time of discharge, patient education concerning energy levels and information on recovery expectations and participation in CR should be provided to patients and care takers.

5. Conclusion

Referral, knowledge of CR, access to healthcare resources, and Work Time conflicts are perceived as major barriers to Cardiac Rehabilitation. Additionally, cost issues, low energy levels, and fear of exercising were observed more in patients with PCI than in conservatively managed. Inspite of the given evidence access and uptake of cardiac rehabilitation remain major issues to be resolved

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest.

Statement of ethical approval

The study was registered and institutional ethics committee permission was obtained.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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