


Barriers to cardiac rehabilitation in India

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Abstract

Cardiac rehabilitation (CR) is an essential component in the prevention and management of cardiovascular disease (CVD). High levels of evidence suggest significant benefits with respect to morbidity and mortality in addition to cost savings. However, CR is grossly underutilized and has not received the attention it deserves in India. This underutilization of such an effective intervention is due to the various barriers that exist with respect to awareness and understanding of the benefits of CR among health-care professionals, referrals to CR, limited presence of specialized professionals trained in CR, and a lack of awareness among patients on the benefits of CR. This article describes barriers to CR and proposes some solutions to aid overcoming these.

Key Words

• Cardiac rehabilitation
• Cardiovascular disease
• Exercise
• Lifestyle
• India

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References


4. Blood pressure management
5. Lipid management
6. Diabetes management
7. Tobacco cessation
8. Psychosocial interventions
9. Physical activity counseling
10. Exercise training

These components have also been adapted and used by various leading CR organizations around the world. Each of the core components described by AHA provides possible directions for evaluation, intervention, and expected outcome. This has been summarized in Table 1.

### Benefits and utilization of CR:

Evidence from recent reviews has shown significant benefits for patients undergoing CR including improved control of risk factors, improved quality of life, and reduced mortality. Various benefits of CR are:

- Improves control of risk factors
- Reduction in obesity indices (BMI and body fat by 1.5% and 5%, respectively)
- Improves lipid profiles (5% reduction in total cholesterol, 2% reduction in LDL cholesterol, and 6% improvement in HDL cholesterol)
- Reduces metabolic syndrome by 37%
- Improves exercise capacity by 15% and 35% for peak VO2 and MET capacity
- Improves quality of life
- Reduces cardiovascular-related mortality (OR: 0.64; 95% CI: 0.46–0.88)
- Reduces all-cause mortality (OR: 0.74; 95% CI: 0.58–0.95)
- Reduces 12-month mortality (RR: 0.82; 95% CI: 0.67–1.01)
- Reduces risk of re-infarction (OR: 0.53; 95% CI: 0.38–0.76)
- Reduces 12-month re-admissions (RR: 0.75; 95% CI: 0.62–0.90)
- Reduces heart failure-specific admissions (RR: 0.61; 95% CI: 0.46–0.8)

Available evidence has enabled CR to be considered as part of standard intervention for patients with CVD and heart failure. However, its role in certain conditions like pulmonary arterial hypertension is still growing, despite evidence showing benefits in terms of exercise capacity and quality of life.

Despite all the evidence supporting CR, it remains grossly underutilized across the world. CR is available in only 38.8% of countries worldwide (6.0%–67.0%), 28.2% of middle-income, and 8.3% of low-income countries. CR density (number of CR programs per inhabitant), which is a crude estimate of the number of patients who have access to CR, has shown that the CR density ranges from 1/100,000 to 1/300,000 inhabitants in high-income countries, while in middle-income countries, it has been found to range between 0.9 and 6.4 million inhabitants per program. The international STABILITY study that included 15 middle-income countries revealed participation rates were ~30% in 12–15% of the 15 included countries. Other data on CR participation were reviewed by Turk-Adawi et al., and revealed rates ranging from 3% to 89%. This brings out the need for stronger advocacy for CR and has become the focus of various organizations like the International Council of Cardiovascular Prevention and Rehabilitation (http://globalcardiachab.com).

### The Indian scenario

CR is in a nascent stage in India and very few research studies have addressed the status, feasibility, and barriers to CR in India. We recently reviewed the status of CR in India based on published literature. CR programs in India have targeted patients with coronary artery disease, heart failure, angina, heart transplant, congenital heart disease, and pulmonary arterial hypertension. Most programs limit CR to Phase-1 and Phase-2 CR and are delivered either through institutional- or home-based programs. Recently, the worksite has been used as a potential site for the delivery of CR. In India, the worksite has been used in various settings to help promote cardiovascular health. However, its use as a CR delivery model needs to be evaluated.

### Barriers to CR in India

Despite its utility, many barriers to CR have been identified globally. However, in the Indian context, there is scarcity of data on proportion of eligible participants receiving CR and various factors influencing CR participation. In the absence of research data addressing barriers, most of the potential barriers identified are from specialists working in the area of CR. Potential barriers to CR can be classified as health-care system barriers (including infrastructure and staffing), health-care professionals-related barriers, and patient-related barriers.

#### Health-care system- and health-care professionals-related barriers

There has been a significant increase in number of centers offering coronary interventions in India. Data from the National Intervention Council indicate a tremendous increase in coronary interventions. For the year 2013, 216,817 coronary interventions were reported from 404 centers across the country. Despite the increase in number of centers offering coronary interventions and having a registry for centers offering such facilities, there is limited information on number of centers offering CR facilities. Though grey literature (hospital Websites, promotional services, etc.) indicates that prominent health-care centers in major cities of the country offer CR services; their availability in small cities and towns are sparse. There is a possibility that setting up a full-fledged CR facility is infrastructure-
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• Reduces 12-month readmissions (RR: 0.75; 95% CI: 0.62–0.90)
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Evidence available has enabled CR to be considered as part of standard intervention for patients with CVD and heart failure. However, its role in certain conditions like pulmonary arterial hypertension is still growing; despite evidence showing benefits in terms of exercise capacity and quality of life.

Despite all the evidence supporting CR, it remains grossly underutilized across the world. CR is available in only 38.8% of high-income, 28.2% of middle-income, and 8.3% of low-income countries. CR density (number of CR programs per inhabitant) is a crude estimate of the number of CR programs. Table 1. Description of the various core components of CR

<table>
<thead>
<tr>
<th>Component</th>
<th>Evaluation</th>
<th>Intervention</th>
<th>Expected outcome</th>
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</thead>
<tbody>
<tr>
<td>Patient assessment</td>
<td>Medical history, physical examination, and testing</td>
<td>Risk reduction with regular follow-up to ensure goals of prevention and control are met</td>
<td>Achieving targeted goals</td>
</tr>
<tr>
<td>Nutritional counseling</td>
<td>Detailed dietary evaluation and calorie intake</td>
<td>Dietary modifications along with education and counseling</td>
<td>Adherence to dietary changes</td>
</tr>
<tr>
<td>Weight management</td>
<td>Evaluation of weight, BMI, and waist circumference</td>
<td>Establish short-term and long-term goals for weight reduction. Develop a diet, exercise, and behavioral program</td>
<td>Adherence to the weight management program and attainment of goals</td>
</tr>
<tr>
<td>Blood pressure management*</td>
<td>Measurement of BP on ≥2 visits</td>
<td>Lifestyle modifications and pharmacotherapy as indicated</td>
<td>Ensure regular monitoring of BP and modify interventions to attain optimal BP</td>
</tr>
<tr>
<td>Lipid management*</td>
<td>Fasting lipid profile</td>
<td>Counselling and lifestyle modifications including diet and exercise in addition to pharmacotherapy to attain reductions in LDL and non-HDL cholesterol</td>
<td>Attain goals of reduced LDL cholesterol between 70 and 100 mg/dl (target &lt;70 mg/dl) and reduced non-HDL cholesterol between 100 and 130 mg/dl (target &lt;100 mg/dl)</td>
</tr>
<tr>
<td>Tobacco cessation</td>
<td>Assess amount smoked (or chewed) and readiness to change, along with identification of psychosocial factors that may prevent success</td>
<td>Behavioral strategies, social support groups, and pharmacological interventions as needed</td>
<td>Change in behavior toward willingness to stop smoking, resulting in complete cessation</td>
</tr>
<tr>
<td>Psychosocial management</td>
<td>Screen for psychological distress by assessing depression, anxiety, hostility, and social isolation</td>
<td>Group support, counseling, and supportive rehabilitation</td>
<td>Improved emotional well-being</td>
</tr>
<tr>
<td>Physical activity counseling</td>
<td>Assessment using questionnaires and readiness to change</td>
<td>Strategies to improve physical activity to ensure meeting recommended goals (30–60 min of moderate activity)</td>
<td>Improvement in the various domains of physical activity and fitness levels</td>
</tr>
<tr>
<td>Exercise training</td>
<td>Evaluation of exercise capacity and cardiorespiratory fitness</td>
<td>Aerobic and resistance training programs with warm up and cool down</td>
<td>Improved exercise capacity</td>
</tr>
</tbody>
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Abbreviations: BMI, body mass index; BP, blood pressure; LDL, low-density lipoproteins; HDL, high-density lipoproteins; HbA₁c, glycated haemoglobin

*Specific guidelines exist for their management

Barriers to cardiac rehabilitation in India

There has been a significant increase in number of centers offering coronary interventions in India. Data from National Intervention Council indicate a tremendous increase in coronary interventions. For the year 2013, 216,817 coronary interventions were reported from 404 centers across the country. Despite the increase in number of centers offering coronary interventions and having a registry for centers offering such facilities, there is limited information on number of centers offering CR facilities. Though grey literature (hospital Websites, promotional services, etc.) indicates that prominent health-care centers in major cities of the country offer CR services; their availability in small cities and towns are sparse. There is a possibility that setting up a full-fledged CR facility is infrastructure-
intensive and may not be financially sustainable for smaller facilities. An ideal CR clinic requires immense infrastructure to meet the requirements for assessment of the core components and also to meet the standards for certification by the American Association of Cardiovascular and Pulmonary Rehabilitation. For example, the cost for setting up a cardiologypulmonary exercise testing unit is estimated to be at US$50,000. These amounts are not feasible in every setting. In a country like India, health-care facilities have the necessity to keep the costs affordable for patients as most rely on out-of-pocket expenses for meeting their health-care needs. It is crucial to validate alternative cost effective methods for CR delivery. Studies in high-income countries such as the United States, Canada, and Australia have identified referrals to CR as a major barrier to participation in CR. A recent study in the United States found that the referrals to CR were much lower (57.9–61.2%) than the prescription of preventive medications like aspirin (97.5%) and statins (89.8%). This study also found that more than a quarter of hospitals referred <20% of their patients with percutaneous coronary interventions to CR. The study identified greater contribution from hospital factors like hospital size, procedure volume, private/community hospital status, geographic location, and patient-related factors toward poor CR participation. A study from Iran assessed physician-related factors and found that limited knowledge about CR programs as main factors affecting CR referral. A recent review identified physician endorsement, physician specialty, and physititians attitudes toward CR to influence referral and enrollment to CR. There is limited data on factors influencing CR referral and referral patterns from India. Understanding these factors and patterns could help us understand their role in facilitating CR participation.

### Patient-related factors

Globally, many patient related factors have been identified to influence CR participation. Age, gender, comorbidities, type of cardiac pathology and intervention received, patients knowledge and positive beliefs about uses of CR, family support, socioeconomic factors, and rurality have all been shown to influence CR participation. Economic stability, translated into the need to resume work quickly by the bread-winner of the family, could be a deciding factor to prevent participation in CR, despite evidence showing how it will benefit in return to work. Reimbursement from insurance companies toward CR may also play a role toward the limited participation in CR. Limited literature is available on patient-related factors influencing CR participation in India. Anecdot al evidence suggests that geographical factors, time constraints, additional costs of transport and rehabilitation, along with limited awareness on the benefits of CR contribute to poor participation in CR programs. A summary of the various potential barriers to CR have been summarized in Table 2.

<table>
<thead>
<tr>
<th>What can be done to overcome these barriers?</th>
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<tbody>
<tr>
<td>Addressing the various concern related to the health-care system, health-care professionals and patients should be a priority. A stronger emphasis for advocacy in CR at the policy-maker level is a requirement if CR can be made available to all patients with CVD. A change in policy will improve the state of CR training in India and will allow for greater use of workforce and specialized health-care professionals (viz., physiotherapists, exercise physiologist, occupational therapists, social workers, specialized nurses, nutritionists, and psychologists) in the delivery of a team-based CR program. Establishment of regional centers of team-based CR may have a role in ensuring various smaller centers can refer patients for both primary and secondary prevention of CVD. Greater staffing requirements for exercise specialists and nurses in small hospitals and primary health-care settings will help promote exercise and healthy lifestyles from the grass-root level. At the health-care professional level, greater emphasis should be placed on development of core competencies and skills required for CR professionals. This requires more intensive training programs toward CR and education among all health-care professionals on the benefits and uses of CR. Overcoming the poor referral rate requires a wide range of interventions. This can be achieved by improving awareness of CR and its benefits and by also ensuring that a standard operating procedure is in place to allow for all patients with CVD to be referred to CR. Studies have shown that automatic referrals along with a dedicated staff member improved CR referral rates as compared with usual systems (85% versus 32%). In addition, there should also be a focus on follow-up from outpatient clinics with the CR team to decide on supervised or home-based exercise programs. To run such a program, dedicated CR staff is of paramount importance. Improvement in the CR density, especially considering the very low density that currently exists, should be a priority. From the patient perspective, patient education is the most important factor to be addressed. Patient education has been found to be useful in patients with CVD, lung cancer, and pulmonary hypertension. Patient education should become an important part of in-hospital CR and should include a multidisciplinary team to ensure the best results. In relation to their attitudes, Horwood and colleagues showed that worry about one’s health was a major cue to action among both high and low attenders to CR. A strong desire to prevent a second coronary event was another driving factor among the high attenders to CR. Social factors like peer influence and family support further prompted participation in CR. A change in attitude and behavior is therefore crucial and can be obtained primarily through education.</td>
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### Conclusions

CR is an essential component of holistic care for the patient with CVD. The effects and benefits of CR are abundantly clear. However, strategies need to be developed and implemented to overcome the major barriers to utilization of CR with respect to the health-care system, health-care professionals, and the patient. There continues to remain an extensive amount of work to be done in the area of CR in India and overcoming some these barriers will allow for greater benefits to patients with CVD.

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intensive and may not be financially sustainable for smaller facilities. An ideal CR clinic requires immense infrastructure to meet the requirements for assessment of the core components and also to meet the standards for certification by the American Association of Cardiovascular and Pulmonary Rehabilitation. 8 For example, the cost for setting up a cardiospulmonary exercise testing unit is estimated to be at US$50,000. 9 These amounts are not feasible in every setting. In a country like India, health-care facilities have the necessity to keep the costs affordable for patients as most rely on out-of-pocket expenses for meeting their health-care needs. It is crucial to validate alternative cost-effective methods for CR delivery.

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<th>Health-care professionals</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of policy for CR</td>
<td>Absence of a central registry/database</td>
<td>Lack of awareness of CR</td>
</tr>
<tr>
<td>Poor CR density</td>
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<td>Poor outlook toward CR</td>
</tr>
<tr>
<td>Limited centers offering CR</td>
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What can be done to overcome these barriers?

Addressing the various concern related to the health-care system, health-care professionals and patients should be a priority. A stronger emphasis for advocacy in CR at the policy-maker level is a requirement if CR can be made available to all patients with CVD. A change in policy will improve the state of CR training in India and will allow for greater use of workforce and specialized health-care professionals (viz., physiotherapists, exercise physiologists, occupational therapists, social workers, specialized nurses, nutritionists, and psychologists) in the delivery of a team-based CR program. Establishment of regional centers of team-based CR may have a role in ensuring various smaller centers can refer patients for both primary and secondary prevention of CVD. Greater staffing requirements for exercise specialists and nurses in small hospitals and primary health-care settings will help promote exercise and healthy lifestyles from the grass-root level.

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References

Cardiac rehabilitation has been demonstrated to decrease the morbidity and mortality of cardiac patients. There is ample evidence available, and American and European guidelines recommend its use for both primary and secondary prevention of cardiovascular diseases. However, cardiac rehabilitation is a neglected field in India, despite the fact that there is a huge burden of cardiovascular disease in India. There are very few cardiac rehabilitation centers in our country and there is an urgent need to create more such centers, as this could have a huge impact on decreasing the burden of cardiovascular diseases in India. However, there are several barriers in implementing cardiac rehabilitation in India. There is an urgent need for awareness and cost-effective, simple cardiac rehabilitation techniques in India. This article provides several suggestions for overcoming the barriers.

**Key Words**
- Cardiac rehabilitation
- Cardiovascular disease

**Introduction**
Cardiac rehabilitation is a medically supervised multidisciplinary program of exercise and education designed to assist patients with cardiovascular diseases to achieve optimal physical, psychological, and functional status. In 1993, World Health Organization defined cardiac rehabilitation as “The rehabilitation of cardiac patients is the sum of activities required to influence favorably the underlying cause of the disease, as well as to ensure the patients best possible physical, mental and social conditions so that they may, by their own efforts, preserve, or resume when lost, as normal a place as possible in the life of the community.” Rehabilitation cannot be regarded as an isolated form of therapy, but must be integrated with the whole treatment, of which it forms only a facet.” This means that a cardiac rehabilitation program includes: education of the patient and family in the recognition, prevention, and treatment of cardiovascular disease, as well as helping the patient modify risk factors through lifestyle modification and beginning an exercise program tailored according to the abilities and needs of a patient.

Every recent major evidence-based guideline from the American Heart Association (AHA) and the American College of Cardiology Foundation regarding the management and prevention of coronary heart disease provides a Class I recommendation for referral to a

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