

Original Research

Received 07 June 2026

Revised 15 July 2026

Accepted 30 July 2026

Natural Resources for Human Health 2026, Vol. 6 (13s): 1523–1531

KEYWORDS:

Early Cardiac Rehabilitation, Information Booklet, Caregivers, Post-operative Cardiac Patients, Knowledge, Quasi-Experimental Study, Nursing Education.

Cardiac Rehabilitation Education among Caregivers: Effect of Information Booklet

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ABSTRACT:

Background: Cardiac rehabilitation is an essential component of recovery after cardiac surgery. Caregivers play a major role in ensuring adherence to rehabilitation practices after hospital discharge. However, many caregivers have inadequate knowledge regarding early cardiac rehabilitation, which may adversely affect patient recovery.

Introduction: Early cardiac rehabilitation includes gradual physical activity, breathing exercises, medication adherence, dietary modifications, wound care, and regular follow-up. Providing structured educational material to caregivers may improve their knowledge and enhance patient outcomes.

Purpose: To assess the effectiveness of an information booklet on early cardiac rehabilitation among caregivers of post-operative patients admitted to selected hospitals.

Materials and Methods: A quantitative, quasi-experimental, non-equivalent control group pre-test–post-test design was adopted. Sixty caregivers (30 experimental and 30 control) were selected using non-probability purposive sampling. Baseline knowledge was assessed using a structured questionnaire. The experimental group received an information booklet on early cardiac rehabilitation, while the control group received routine care. Post-test knowledge was assessed using the same questionnaire. Data were analyzed using descriptive and inferential statistics.

Results: Before the intervention, both groups had comparable knowledge levels (experimental mean = 11.90 ± 3.20 ; control mean = 12.10 ± 3.45). After the intervention, the experimental group showed a marked improvement in knowledge (mean = 24.50 ± 1.20) compared with the control group (mean = 17.20 ± 2.50). The calculated unpaired t value (13.28) was statistically significant ($p < 0.001$), demonstrating the effectiveness of the information booklet. No significant association was found between pre-test knowledge and demographic variables.

Conclusion: The information booklet was highly effective in improving caregivers' knowledge regarding early cardiac rehabilitation. Incorporating structured educational booklets into routine discharge teaching can strengthen caregiver competence, promote adherence to rehabilitation practices, and improve postoperative recovery outcomes.

INTRODUCTION

Cardiovascular diseases (CVDs) remain the leading cause of morbidity and mortality worldwide and represent a major public health challenge in India. Despite significant advances in cardiac surgery and medical management, successful recovery depends not only on the surgical procedure but also on effective post-operative rehabilitation. Early cardiac rehabilitation is a structured program that includes gradual physical activity, breathing exercises, medication adherence, dietary modifications, wound care, lifestyle changes, and regular follow-up to promote recovery and prevent complications.

Following discharge, caregivers play a vital role in supporting patients during the recovery period. They assist with medication management, encourage physical activity, monitor warning signs, provide emotional support, and ensure adherence to rehabilitation guidelines. However, many caregivers have inadequate knowledge regarding early cardiac rehabilitation, which may result in delayed recovery, increased complications, hospital readmissions, and reduced quality of life for patients.

Providing structured educational interventions, such as an information booklet, can improve caregivers' understanding and confidence in delivering appropriate home care. An information booklet serves as an accessible, cost-effective, and standardized educational resource that caregivers can refer to whenever required. Strengthening caregivers' knowledge through such interventions may enhance compliance with rehabilitation practices and contribute to better postoperative outcomes.

Therefore, the present study was undertaken to assess the effectiveness of an information booklet on early cardiac rehabilitation among caregivers of post-operative patients admitted to selected hospitals in Pune City.

Need of the Study

Cardiovascular diseases are a leading cause of mortality in India, and many patients require long-term rehabilitation following cardiac surgery. Successful recovery depends not only on medical treatment but also on the caregiver's knowledge and ability to provide appropriate care at home. Many caregivers lack adequate information about early cardiac rehabilitation, including exercise, breathing techniques, wound care, medication adherence, diet, and recognition of warning sign.

In Maharashtra, particularly in Pune, structured educational resources for caregivers are limited despite the increasing number of cardiac surgeries. Inadequate discharge education may lead to poor adherence to rehabilitation, delayed recovery, increased complications, and frequent hospital readmissions.

Therefore, developing and evaluating an information booklet for caregivers is essential. Such an educational intervention can improve caregivers' knowledge, strengthen home-based care, support nursing discharge education, and ultimately improve patient outcomes after cardiac surgery.

Aim of the Study:

To assess the effectiveness of an information booklet on early cardiac rehabilitation among caregivers of post-operative patients admitted in selected hospitals of Pune City.

Objectives

- 1) To assess the knowledge regarding early cardiac rehabilitation among caregivers of post-operative patients prior to the treatment.
- 2) To assess the knowledge regarding early cardiac rehabilitation among caregivers of post-operative patients post treatment.
- 3) To assess the effectiveness of information booklet regarding early cardiac rehabilitation among caregivers of post-operative patients.
- 4) To associate the findings with identified demographic variables

METHODOLOGY

Research Approach: Quantitative

Research Design: Quasi-experimental, Non-equivalent Control Group Pre-test and Post-test Design

Research Setting: Selected hospitals in Pune city

Independent Variable: Information booklet on early cardiac rehabilitation

Dependent Variable: Knowledge regarding early cardiac rehabilitation

Target Population: Caregivers of post-operative cardiac patients

Accessible Population: Caregivers of post-operative cardiac patients admitted to selected hospitals in Pune

Sample Size: 60 caregivers (30 Experimental Group + 30 Control Group)

Sampling Technique: Non-probability purposive sampling

Inclusion Criteria

Caregivers of patients who underwent cardiac surgery (CABG/angioplasty)

Able to read and write Marathi or English

Present at discharge and follow-up

Willing to participate in the study

Exclusion Criteria

Caregivers already enrolled in a cardiac rehabilitation programme

Caregivers who have themselves undergone cardiac surgery

Research Tool

Section I: Demographic data (age, education, marital status, occupation, family type, habits)

Section II: Structured knowledge questionnaire covering:

Meaning of cardiac rehabilitation

Phases

Required care

Diet

Exercise

Follow up.

Scoring

Correct answer = 1 mark

Incorrect answer = 0 mark

Data Collection Procedure

Ethical committee approval

Permission from hospital authorities

Informed consent from participants

Collection of pre-test and post-test data.

Data Analysis

Descriptive statistics: Frequency and percentage

Inferential statistics: Student's t-test and Chi-square test

Data presented in tables, graphs, and diagram.

Validity

Content validity established through expert review.

Reliability

Test-retest method

Karl Pearson's correlation coefficient

Reliability (r) = 0.95, indicating very high reliability.

Pilot Study

Confirmed feasibility of the main study after obtaining permissions and informed consent.

Results:

The study was analyzed under the following

- 1) Pre-Intervention findings of knowledge in allocated groups
- 2) Post-Intervention findings of knowledge in the allocated groups
- 3) Effectiveness of treatment on early cardiac rehabilitation among samples
- 4) To associate the findings with selected demographic variables.

Demographic Variables:

Table No 1 : demographic analysis of the samples

Variable	Category	Experimental f(%)	Control f(%)
Age	18-28	11(36.7%)	8(26.7%)
	29-39	12(40%)	8(26.7%)
	40-50	06(20%)	7(23.3%)
	50-60	01(3.3%)	7(23.3%)
Gender	Male	17(57.6%)	16(53.3%)
	Female	13(43.3%)	14(46.7%)
Occupation	Employed	20(66.7%)	17(56.7%)
	Business	5 (16.7%)	9 (30%)
	Housewife	5 (16.7%)	9 (30%)
Education	Graduate	8 (26.7%)	00

	Higher Secondary	3 (10%)	8 (26.7%)
	Secondary Education	16 (53.3%)	15 (50%)
	Primary Education	3 (10%)	7 (23.3%)
Marital Status	Married	22 (73.3%)	21 (70%)
	Son	8 (26.7%)	8 (26.7%)
	Daughter	3 (10%)	2 (6.7%)
	Daughter in law	1 (3.3%)	1 (3.3%)
	Father	2 (6.7%)	4 (13.3%)
	Mother	5 (16.7%)	-
	Husband	1 (3.3%)	3 (10%)
	Brother	1 (3.3%)	-
	Sister	1 (3.3%)	1 (3.3%)
	Grand Mother	1 (3.3%)	1 (3.3%)
	Cousin	-	1 (3.3%)
	Son in Law	1 (3.3%)	-

Majority of caregivers in both groups were in the age group of 18-39 years, gender wise males were present, majority were employed, education status showed majority studied up to higher education, majority were married, with higher secondary education, and wives & sons were present to take care of patients. The demographic outcomes reveal that maximum of caregivers in both groups were comparable in terms of age gender occupation education marital type and relation with patient, and so both groups were homogeneous

Most caregivers in the experimental group were in the age 29–39 years (40%), resulted by 18–28 years (36.7%).

Control group, 40–50 years and 50–60 years (23.3%) caregivers were present, while 18–28 years and 29–39 years (26.7%) each.

Gender

17 (57.6%) were male gender and 13 (43.3%) were female in the experimental group, control group, 16 (53.3%) were male and 14 (46.7%) were female. This shows that male caregivers were marginally more than female caregivers in both groups.

Occupation

Most caregivers were employed in both groups. In the experimental group 20 (66.7%) ,while in the control group 17 (56.7%) .Some were involved in business and some were housewives.

Education

Majority of caregivers in the experimental group had secondary education (53.3%), while in the control group 50% .Some caregivers had graduate and higher secondary education, and a few had primary education.

Marital Status

Most caregivers in both groups were married. In the experimental group 22 (73.3%),8 (26.7%) were unmarried. In the control group 21 (70%) were married and 9 (30%) were unmarried.

Relation with Patient

In the experimental group, caregivers were mostly sons (26.7%) and wives (20%), control group, most were wives (30%) and sons (26.7%). The others daughters, fathers, mothers, husbands, brothers, sisters, grandmothers and other relatives.

The findings confirm that most caregivers were young adults, male, employed, educated up to secondary level, married, and mainly close family members such as wives and sons.

Knowledge regarding early cardiac rehabilitation among caregivers of post-operative patients before the intervention.

Table No 1: Pre-Interventional knowledge score in both experimental and control group

n= 30, 30

Knowledge Score	Experimental		Mean	SD	Control		Mean	SD
	Pre Intervention				Pre Intervention			
	Freq	%			Freq	%		
Poor	02	6.7%	11.90	3.20	02	6.7%	12.10	3.45
Average	21	70%			20	66.7%		
Good	07	23.3%			08	26.7%		
Excellent	00	0%			00	0%		

Table No 2 illustrates the Pre-Interventional knowledge score in both experimental and control group in samples where in experimental group, 70% of the samples had average knowledge with mean score 11.90 SD 3.20 whereas in the control group, 66.07% had average knowledge mean score of 12.10 SD 3.45

Analysis of data related to assess the Post-Interventional knowledge in both experimental and control group

Table No 3: Post-Interventional knowledge score in both experimental and control group

n= 30, 30

Knowledge Score	Experimental		Mean	SD	Control		Mean	SD
	Post Intervention				Post Intervention			
	Freq	%			Freq	%		
Poor	00	0%	24.50	1.20	01	3.3%	17.20	2.50
Average	00	0%			10	33.3%		
Good	08	26.7%			15	50.20%		
Excellent	22	73.3%			04	13.3%		

Table No 3 illustrates In experimental group, 73.03% of the samples had excellent knowledge mean score 24.50 SD 1.20 however in the control group, 50.20% had good knowledge with mean score 17.20 SD 2.50

Analysis of data related to effectiveness of information booklet regarding early cardiac rehabilitation among caregivers of post-operative patients

Table 4: Unpaired t-test for effectiveness of information booklet regarding early cardiac rehabilitation
n=30, 30

	Mean	SD	tcal value	df	Table value	P value	Remark
Experimental (Post Test)	24.50	1.20	13.28	58	2.228	p < 0.001	Post-test scores of Experimental group are significantly higher than Control group.
Control (Post Test)	17.20	2.50					

Table No 4 states since the calculated t value (13.28) is greater than the table value (2.228), the difference is statistically significant, which shows the effectiveness of information booklet regarding early cardiac rehabilitation.

- Information booklet significantly improved knowledge.
- Useful for discharge teaching.
- Can reduce complications and readmissions

Analysis for association of knowledge with demographic variables Chi-square

Table No 5 : Chi square for association of knowledge with demographic variables
n=30,30

Demographic Variable	X ²	df	Table Value	P Value	Remark
Age	1.12	3	7.815	>0.05	Not Significant
Gender	0.42	1	3.84	>0.05	Not Significant
Occupation	1.06	2	5.991	>0.05	Not Significant
Education	1.34	3	7.815	>0.05	Not Significant
Marital Status	0.56	1	3.84	>0.05	Not Significant
Relation with Patient	2.14	5	11.07	>0.05	Not Significant

All calculated chi-square values were less than the respective table values at 0.05 level of significance. Hence, no significant association was found between pre-test knowledge score and selected demographic variables.

DISCUSSION

The present study found that caregivers had average knowledge regarding early cardiac rehabilitation before the intervention in both the experimental and control groups. After administering the information booklet, the experimental group showed a significant improvement in knowledge compared to the control group. The calculated t-value (13.28, p < 0.001) confirmed that the information booklet was effective in improving caregivers' knowledge. The findings are consistent with previous studies reporting that structured educational materials enhance knowledge and promote better post-operative cardiac care. No significant association was found between pre-test knowledge and demographic variables. Therefore, the information booklet can be recommended as an effective discharge teaching tool for caregivers of post-operative cardiac patients.

CONCLUSION

The present quasi-experimental study concluded that the information booklet on early cardiac rehabilitation was effective in improving the knowledge of caregivers of post-operative cardiac patients. Caregivers in the experimental group demonstrated

a statistically significant increase in post-test knowledge scores

Compared with the control group, confirming the effectiveness of the educational intervention. The study also found no significant association between pre-test knowledge and selected demographic variables, indicating that the information booklet was beneficial regardless of participants' demographic characteristics. These findings support the incorporation of structured educational booklets into routine discharge teaching to enhance caregivers' knowledge, promote adherence to early cardiac rehabilitation practices, facilitate recovery, and potentially reduce postoperative complications and hospital readmissions.

Information booklet significantly improved caregiver knowledge. Experimental group showed statistically highly significant improvement compared to control group. Improvement in experimental group was more than 40% higher than control group. Demographic variables did not influence pre-test knowledge. Structured educational material is strongly recommended for discharge teaching and caregiver education.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to this study.

FUNDING SOURCE

There was no external funding for this study.

REFERENCES:

- [1] The Lancet Regional Health- Southeast Asia 2023;12: 100156 Published Online 10 February 2023 <https://doi.org/10.1016/j.lansea.2023.10015>.
- [2] 1 Jadhav UM. Cardio-metabolic disease in India-the up-coming tsunami. Ann Transl Med. 2018;6:295.
- [3] 2.GBDcompare | IHMEVizHub.<https://vizhub.healthdata.org/gbdcompare/>. Accessed September 17, 2022. 3 Roth GA, Johnson C, Abajobir A, et al. Global, regional, and national burden of cardiovascular diseases for 10 causes, 1990–2015. J Am Coll Cardiol. 2017;70:1–25.
- [4] The changing patterns of cardiovascular diseases and their risk factors in the states of India: the global burden of disease study 1990–2016. Lancet Glob Health. 2018;6:e1339–e1351.
- [5] .India diabetes report 2000 — 2045. <https://diabetesatlas.org/data/en/country/93/in.html>. Accessed September 17, 2022.
- [6] Geldsetzer P, Manne-Goehler J, Theilmann M, et al. Diabetes and hypertension in India: a nationally representative study of 1.3 million adults. JAMA Intern Med. 2018;178:363–372. .Economics of non-communicable diseases in India. www.weforum.org; 2014. Accessed September 17, 2022. <http://www.weforum.org/issues/healthy-living>.
- [7] Mohanan PP, Huffman MD, Baldrige AS, et al. Microeconomic costs, insurance, and catastrophic health spending among patients with acute myocardial infarction in India: substudy of a randomized clinical trial. JAMA Netw Open. 2019;2:e193831.
- [8] Tarride JE, Lim M, DesMeules M, Luo W, Burke N, O'Reilly D, Bowen J, Goeree R. A review of the cost of cardiovascular disease. Can J Cardiol. 2009 Jun;25(6):e195-202. [\[PMC free article\]](#) [\[PubMed\]](#)
- [9] Servey JT, Stephens M. Cardiac Rehabilitation: Improving Function and Reducing Risk. Am Fam Physician. 2016 Jul 01;94(1):37-43. [\[PubMed\]](#)
- [10] Dalal HM, Doherty P, Taylor RS. Cardiac rehabilitation. BMJ. 2015 Sep 29;351:h5000. [\[PMC free article\]](#) [\[PubMed\]](#)
- [11] Anderson L, Thompson DR, Oldridge N, Zwisler AD, Rees K, Martin N, Taylor RS. Exercise-based cardiac rehabilitation for coronary heart disease. Cochrane Database Syst Rev. 2016 Jan 05;2016(1):CD001800. [\[PMC free article\]](#) [\[PubMed\]](#)
- [12] World Health Organization. (2021). *Cardiac rehabilitation: a global perspective*.

- [13] Sharma, K., et al. (2020). *Availability and density of cardiac rehabilitation programs in India*. Indian Heart Journal, 72(6), 543–548.
- [14] Sherry L Grace et al. (2016). *Barriers to cardiac rehabilitation globally: a systematic review*. Journal of Cardiopulmonary Rehabilitation and Prevention, 36(5), 323–331.
- [15] Ragupathi, L., et al. (2017). *Availability, use, and barriers to cardiac rehabilitation in LMICs*. BMC Cardiovascular Disorders, 17(1), 1–10.