



WWJMRD 2022; 8(09): 38-41  
www.wwjmr.com  
International Journal  
Peer Reviewed Journal  
Refereed Journal  
Indexed Journal  
Impact Factor SJIF 2017:  
5.182 2018: 5.51, (ISI) 2020-  
2021: 1.361  
E-ISSN: 2454-6615

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## Cost Effectiveness and Functional Outcomes of Smartphone Cardiac Rehabilitation Assisted Self-Management in Coronary Artery Disease Patients (SCRAM) – Systematic Review Protocol

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**Abstract**

**Introduction:** Telerehabilitation is defined as rehabilitation services that are delivered remotely through information and communication technologies and it has received increasing attention as it can overcome key accessibility barriers that limit participation in centre-based CR. The effectiveness of telerehabilitation, which commonly includes telephone, internet and videoconference communication between participants and healthcare practitioners, has been demonstrated. SCRAM extends beyond a single behavior (exercise) to include other secondary prevention self-management behaviors (medication adherence, physical activity and sedentary behavior, healthy eating, stress management and smoking cessation). This study protocol aims to learn the cost effectiveness and functional outcomes of SCRAM in CAD Patients. **Methods/Design:** Cost effectiveness and functional outcomes of SCRAM in CAD patients will be received based on systematic search on the following databases: US National Library of Medicine Database (PubMed), Scopus, Medical Literature Analysis and Retrieval System Online (MEDLINE), Excerpta Medica Database (EMBASE), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Elton B. Stephens Co. (EBSCO), Web of Science, Database of Abstracts of Reviews of Effects (DARE), Cochrane Database of Systematic Review, and Physiotherapy Evidence Database (PEDro). **Discussion:** Based on the search results and intervention of results, the concept of administering Cardiac Rehabilitation in CAD patients with least cost not compromising functional outcomes of those patients will be drawn conclusively.

**Keywords:** Smartphone Cardiac Rehabilitation Assisted self-Management (SCRAM), Cost Effectiveness, Cardiac Rehabilitation (CR), Coronary Artery Disease (CAD).

**Introduction**

Cardiac Rehabilitation (GR) programs in India are comprehensive in nature, consist of multidisciplinary teams and demonstrate improvement in various clinical parameters. However, there is a disparity in patient evaluation, risk assessment, data collection and documentation. CR programs in India need to be streamlined to meet the quality indicators outlined by the international guideline recommendations.<sup>1</sup> Uptake and adherence to center-based CR are influenced by diverse factors, but access barriers such as limited program availability, transport restrictions, conflicting domestic/occupational responsibilities, and geographic isolation are key contributors.<sup>2-5</sup> Establishing new programs in diverse locations could improve accessibility, but this may not be feasible, given the high infrastructure costs associated with center-based facilities.<sup>6,7</sup>

Importance of Cardiac Rehabilitation and its execution expenses has been taken in to analysis in Priya Chockalingam et al Study (2014). Their study concluded that secondary prevention of CHD is the definitive solution to the growing rate of complications and spiraling healthcare costs in India. This study has demonstrated that patients can be motivated to attend a comprehensive CR program, with some modification to suit their requirements. Lack of easily accessible CR facilities is a deterring factor for participation.<sup>8</sup> The elaborated review article of Sudhir Rathore et al (2020) stated that with a growing

realization that CR services are both lifesaving and underused, there is a stark need to find new methods to augment the delivery of CR services to the >80% of eligible patients who do not participate in traditional programs. The focus of this review, HBCR, may provide such an alternative method of CR. The decades old evidence behind CBCR is convincing but limited by patient-, provider-, and system-based barriers to participation. Although the evidence behind HBCR is relatively new and less developed, its findings are generally consistent with those reported for CBCR. Available evidence suggests that HBCR may provide an alternative option for CR services for stable low-to moderate-risk patients with CVD who lack available CBCR and very relevant and appropriate in Indian subcontinent.<sup>9</sup>

The results of this economic evaluation of **Lan Gao et al (2020)** study results will fill the evidence gap for the cost-effectiveness of this mHealth CR programme versus usual care CR alone, given that the current economic credentials of a precursor intervention are based on a non-inferiority RCT. The results will assist policy makers, healthcare managers and other healthcare service providers to inform decisions regarding the ongoing use or future implementation of the SCRAM programme. If the economic evaluation finds the SCRAM programme to be cost-effective, then it can be recommended at the national or even international level as a complementary alternative CR delivery model that may meet the needs of many people who are unable or unwilling to participate in traditional centre-based CR services.<sup>10</sup>

Rongjing Ding et al 2017 in their study concluded that home-based cardiac rehabilitation service is a feasible, affordable, acceptable, and appropriate method to deliver a cardiac rehabilitation service in China, and provides the opportunity to increase cardiac rehabilitation access and uptake for Chinese patients with CVD.<sup>11</sup>

Wong WB et al, 2012 in their study examined the cost-effectiveness of cardiac rehabilitation for patients with myocardial infarction or heart failure, and suggested that home-based cardiac rehabilitation was no different from center-based cardiac rehabilitation and that home-based programs were generally cost-saving compared with no cardiac rehabilitation.<sup>12</sup>

### Need of the Study

The latest Covid-19 pandemic has made the execution of cardiac rehabilitation worse than before. In this background, the developed countries like Australia has already started telerehabilitation, Smartphone Cardiac Rehabilitation Assisted Self-management (SCRAM)<sup>10-11</sup> and other kind of Hybrid Rehabilitation along with conventional Cardiac Rehabilitation to minimize the cost of execution of Cardiac Rehabilitation and in the aspect of preventive measures to come out of this pandemic.

In India the understanding of importance Cardiac Rehabilitation and its useful effects of post cardiovascular diseases is better, but at the same time the execution of Cardiac Rehabilitation in India has been very limited due to its execution cost<sup>1</sup>. So that from phase 2 to phase 4 Cardiac Rehabilitation is very much luxury and the percentage of participation of cardiac patients in cardiac rehabilitation after the needed emergency hospitalization is very minimal due to many factors. The cost of carrying phase 2 to phase

4 Cardiac Rehabilitation in a setup is an important factor. Thus modified, altered form of carrying Cardiac Rehabilitation in current electronically advanced methods of Smartphone Cardiac Rehabilitation Assisted Self-Management (SCARM) will fulfil the desired results of participation of Cardiac Rehabilitation in India like developing countries.

The concept of telerehabilitation has been arising in the field of cardiac rehabilitation since 2010. Even though number of RCTs, NRCTs and Quasi Experimental studies are available for the Cost effectiveness and functional outcomes of Telerehabilitation designed Cardiac Rehabilitation and Smart Phone Cardiac Rehabilitation Assisted Self-Management (SCRAM), there is lack of systematic reviews to concise the concept of SCARM in the management of cardiac diseases. This study protocol may serve the need to establish authenticity regarding SCARM in the phase of Cardiac Rehabilitation management for cardiac diseases. The main aim of the study to learn and understand the cost effectiveness and functional outcomes of SCARM in CAD Patients and to analyse the effects of SCARM in Cardiac Rehabilitation by systematically reviewing the published articles related to SCARM for cardiac disease patients.

### Methodology

**Study Design:** Systematic Review Protocol.

**Study Setting:** Institute of Physiotherapy, Srinivas University, Mangaluru, Karnataka.

**Study Duration:** 24 Months.

**Period of Selection:** January 2010 to December 2021

### Search Engines

US National Library of Medicine Database (PubMed), Scopus, Medical Literature Analysis and Retrieval System Online (MEDLINE), Excerpta Medica Database (EMBASE), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Elton B. Stephens Co. (EBSCO), Web of Science, Database of Abstracts of Reviews of Effects (DARE), Cochrane Database of Systematic Review, and Physiotherapy Evidence Database (PEDro).

### Criteria of Study Selection

#### Inclusion Criteria

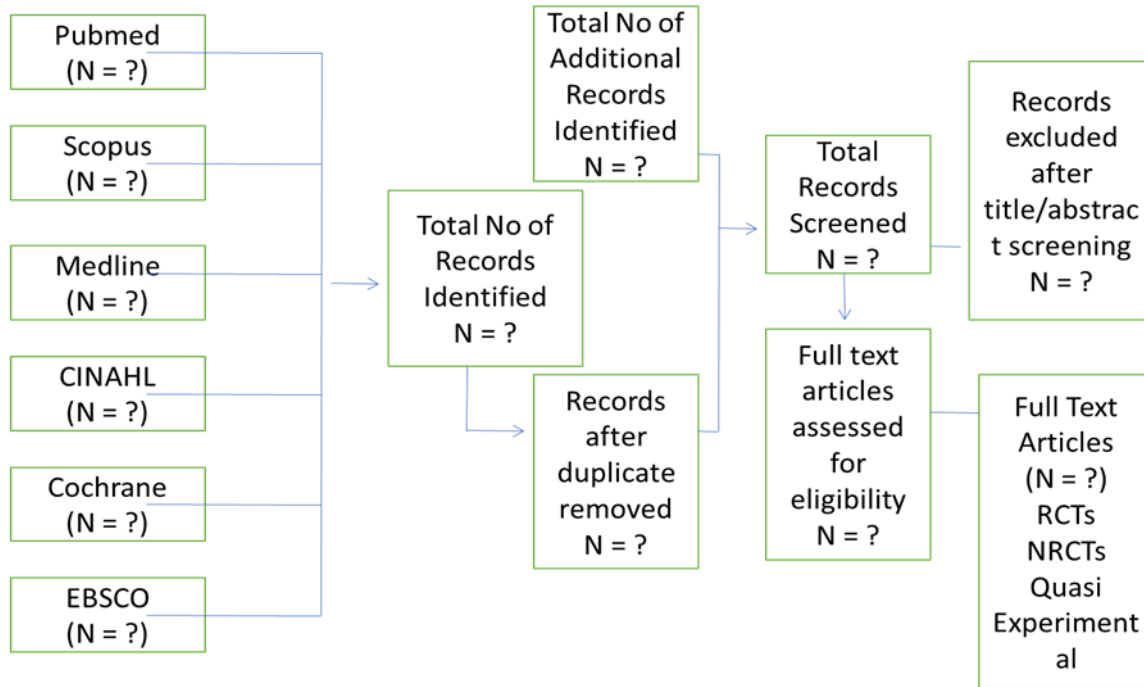
Randomized Control Trials  
Non-Randomized Control Trials  
Quasi Experimental Studies  
Period of studies: Jan 2010 to Dec 2021  
Search Engines: All mentioned

#### Exclusion Criteria

All other Study Designs  
Out of the Period of Selection  
All other Search Engines

**Keywords of Selection:** Smartphone Cardiac Rehabilitation Assisted Self-Management (SCRAM), Cost Effectiveness, Cardiac Rehabilitation (CR), coronary artery disease (CAD).

## Preferred reporting items for systematic reviews and meta-analyses flow diagram of screening process and reasons



\*\*\*Recommendations based on “Cochrane Handbook for Systematic Reviews”

**Fig. 1:** Systematic Review Protocol (Source: Cochrane Handbook for Systematic Reviews)

### Outcome Measures

#### Primary

Cost Effectiveness, Functional Outcomes – Quality of Life, Six Minute Walk Test Results, Talk Test Values.

#### Secondary

Biochemical Variables – Glucose Tolerance Levels, High Density Lipoprotein (HDL) Level.

### Preferred Statistical Analysis

ANCOVA – Analysis of Covariance (spss version IBM 25 for windows)

### Expected Level of Evidence (2)

SCRAM in Cardiac Rehabilitation shall have similar effectiveness in functional outcomes in cardiac disease patients with less cost.

### Discussion

Based on the search results and intervention of results, the concept of administering Cardiac Rehabilitation in CAD patients with least cost not compromising functional outcomes of those patients will be drawn conclusively.

### Funding

Self

### Registration

This systematic review protocol has been registered with institutional ethical and review board, Institute of Physiotherapy, Srinivas University, City Campus, Pandeshwar, Mangaluru, Karnataka – 575001, India.

### Conflict of Interest

None

### Data Availability

Yet to proceed as this is a systematic review protocol.

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