RESEARCH PAPER

Assessment of Healthcare Receiver Perceived Readiness and Participation in Exercise-Based Cardiac Rehabilitation: A Scoping Review

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Background: CVDs remain among the primary contributors to mortality and morbidity across the globe, especially among developing nations such as India. It has been found that CR programs that include exercises are helpful for patients through enhancement of functional state, QoL, and survivability. At the same time, poor levels of participation, adherence, and compliance exist in such CR programs. Ready healthcare receivers for CR programs have been recognized as a significant factor influencing the degree of CR program participation among individuals.
Aim: The purpose of this scoping review is to review and synthesize relevant literature regarding readiness and participation in exercise-based cardiac rehabilitation programs, including relevant factors, measurements, barriers, facilitators, and research gaps.
Methods: It is a scoping review that was conducted following the Population-Concept-Context (PCC) framework. The target population included adults diagnosed with CVDs who can take part in exercise-based CR programs. Various qualitative, quantitative, and systematic reviews written in English were considered for review.
Results: The findings revealed a total of 23 studies from 2009 to 2024. The readiness was perceived in the sense of motivation, self-efficacy, confidence, and acceptance of illness, which contributed to the positive participation and adherence to CR programs. The barriers to engagement were found to be mainly psychological factors (e.g., fear, anxiety), logistical issues (transportation, access to program), and related health problems. Some facilitators included support from providers, education, motivational approaches, goal setting, and flexible CR programs (home-based CR programs).
Conclusion: In conclusion, readiness is a key aspect that contributes to the engagement of patients in exercise-based cardiac rehabilitation. Intervention strategies targeting motivation, confidence, and personal needs of individuals can contribute to the success of CR programs.
Keywords: Cardiac rehabilitation; perceived readiness; participation; adherence; motivation; cardiovascular disease; barriers; facilitators; exercise-based rehabilitation, SDG (3)-Good health and well-being, SDG (4)-Quality Education, SDG (5)-Gender Equality.
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INTRODUCTION

Cardiovascular diseases (CVDs) are the group of chronic and progressive diseases that affect the cardiovascular system, cardiovascular diseases have been considered as a major health hazard and a cause of mortality and morbidity. In spite of advancements in the acute coronary care of patients suffering from acute coronary syndromes such as myocardial infarction, coronary revascularization and heart failure, the risk of recurrence of cardiovascular diseases, reduction in physical capacity and reduction in quality of life persist in high percentage of patients. Cardiovascular diseases cause a shocking 17.9 million deaths annually. One-third of the total mortality occurs due to cardiovascular diseases. The burden of cardiovascular

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diseases is more in developing countries than in developed countries [1,2].

Cardiac rehabilitation is a "medically directed, socially supported and physically oriented program for patients with heart disease and aimed at helping them and improve their physical, psychological and social condition so that they can return to their normal daily activity" [3]. It is beyond a doubt that the involvement of patients in the exercise-based cardiac rehabilitation can result in a reduction in cardiovascular mortality, improvement in the functional state and an increase in the quality of life for the patients suffering from heart diseases [3,4]. The alarming fact is that the presently observed rates for the cardiac rehabilitation are extremely low, i.e., less than 50% of the eligible patients actually enrolled for the program and even fewer succeed in completing the exercises-based cardiac rehabilitation program [5,6].

Cardiac rehabilitation (CR), is a multidimensional intervention for which is strong evidence based and focus on education, physical activity and lifestyle modifications has been shown to has been shown to have a positive effect on cardiac patient through a reduction in the cardiovascular mortality rate, improvement in functional capacity and improvement in the quality of life [3]. The percentage of registered for cardiac rehabilitation has been consistently low; less than half of the eligible cardiac patients are enrolled in a cardiac program worldwide [5,6].

Apart from this, India is also a major contributor to the total burden of cardiovascular diseases, which is also higher than one-fifth of the total mortality rate due to CVD worldwide [2]. The prevalence rate of coronary artery diseases in India has also been estimated. It has been estimated that the prevalence rate of this disease in India lies between 8% and 10% in urban areas, whereas in rural areas, this rate lies between 3% and 5%. It has also been estimated that the onset of this disease occurs a decade earlier in India as compared to Western countries. It has also been stated that the states in South India have the highest prevalence rate of cardiovascular diseases. This can be due to a variety of reasons, i.e., urbanization, sedentary lifestyle, diabetes, hypertension, demographic, etc. Though a positive change in the survival rate of people suffering from heart disease has occurred, the rate of participating in structured exercise-based cardiac rehabilitation in India and South India has been very low.

In addition, different models exist for the exercise-based cardiac rehabilitation programs. The different models include the centre-based programs, the home-based programs, and the combined programs. The traditional centre-based cardiac rehabilitation programs are the most popular compared to the other models of the programs. However, the programs have been associated with various challenges. The challenges include low attendance and a high dropout rate from the programs for various reasons. One of the reasons is the fact that the programs have been associated with various reasons, including practical reasons, economic reasons, and personal reasons [10]. The home-based cardiac rehabilitation programs and the combined cardiac rehabilitation programs have been identified as the new models for addressing the various challenges. The challenges include low attendance and a high dropout rate from the programs. This includes the non-adherents of the cardiac rehabilitation programs who do not want to take part in the centre-based programs. However, research has shown that the success of the various programs depends on the perceived readiness of the healthcare receiver for the programs [13].

Perceived readiness was defined as the person's subjective experience of physical capability, psychological readiness, motivation, self-confidence, beliefs, and perceived barriers related to the initiation and maintenance of exercise-based cardiac rehabilitation [14].Research on the behavioural theory of readiness, self-efficacy, and coping appraisal has shown the importance of the aforementioned factors as predictors of exercise intention and behaviour for individuals undergoing cardiac rehabilitation programs [14, 15]. Other qualitative research on the topic of readiness for exercising for individuals with cardiac conditions showed that individuals with cardiac conditions experience fear of exertion, anxiety, lack of confidence, and uncertainty related to exercising safely.

The factors which influence the participation, compliance, and completion of the cardiac rehabilitation programs are numerous and complex. The evidence which is available points to the fact that the psychosocial factors of motivation, perception of illness, acceptance of the disease, personal values, and benefits to the participants are more predictive of the participants than the severity of the illness. Anxiety, depression, poor acceptance of illness, and perception of non-readiness are predictive factors for non-completion.

It is, therefore, evident that low participation rates in exercise-based cardiac rehabilitation have major public health implications. These include low improvement in cardiorespiratory fitness, a sedentary lifestyle, low control of cardiovascular risk factors, psychological stress, high hospitalization rates, and mortality. Low participation rates in cardiac rehabilitation may also lead to low functional and quality of life outcomes, and this may eventually lead to the burden of chronic cardiovascular diseases.

In addition to this, it is also because of the rise in the number of cardiac survivors, especially within the Indian and South Indian population, and it is also because of the low rate of participation of patients within exercise-based cardiac rehabilitation programs. Therefore, it is important to synthesize the body of evidence that currently exists regarding the perceived readiness and participation of the healthcare receiver. A large body of research that has already been conducted exists regarding the issue of healthcare receiver motivation, as well as the determinants of healthcare receiver participation. However, it is evident that the body of literature that currently exists is extremely fragmented regarding the research design, sample population, and theoretical approach of the research [10,16,18]. The purpose of this scoping review is to attempt to systematically chart the body of literature that currently

exists regarding the issue of healthcare receiver perceived readiness and participation within exercise-based cardiac rehabilitation programs, coupled with the determinants of healthcare receiver participation and the gaps within the body of knowledge.

REVIEW QUESTION

The research question of this scoping review was to assess the level and nature of the evidence that currently exists on the perceived readiness and participation of the healthcare receiver in exercise-based cardiac rehabilitation.

The research question of this scoping review was as follows:

- What is the existing evidence on healthcare receiver perceived readiness and participation in exercise-based cardiac rehabilitation?
- What factors influence healthcare receivers' perceived readiness to participate in exercise-based cardiac rehabilitation?
- How is readiness, motivation, participation, adherence, and engagement for exercise-based cardiac rehabilitation measured and assessed according to the existing literature?
- What are the barriers and facilitators are there for the participation, adherence, and completion of the exercise-based cardiac rehabilitation from the healthcare receiver's point of view?
- What are the existing knowledge gaps in the literature regarding the perceived readiness and participation for the exercise-based cardiac rehabilitation?

Eligibility Criteria

The eligibility criteria for this scoping review were determined a priori according to the Population-Concept-Context (PCC) framework.

Inclusion Criteria

Population

Adults aged 18 years and over with cardiovascular disease, including but not limited to coronary artery disease, myocardial infarction, heart failure, post-revascularization, and other cardiac conditions for which cardiac rehabilitation is indicated

Healthcare receivers (patients, participants, or service users) participating in or eligible for cardiac rehabilitation programs.

Concept

- Research on perceived readiness, willingness, motivation, intention, or preparedness for participating in cardiac rehabilitation
- Research on participating, attending, adhering, engaging, completing, or not participating in exercise-based cardiac rehabilitation
- Research on patient-reported barriers, facilitators, beliefs, attitudes, or psychosocial determinants for participating

Context

- **Exercise-based cardiac rehabilitation programs, including:**
  - Hospital-based (centre-based)
  - Home-based
  - Community-based
  - Hybrid or technology-assisted programs
  - Hybrid or Technology-Assisted Programs

Types of Evidence Sources

- Quantitative studies (randomized controlled trials, cohort studies, cross-sectional studies, etc.)
- Qualitative studies (interviews, focus groups, phenomenological studies, etc.)
- Mixed-methods studies
- Review articles relevant to the topic
- Articles published in peer-reviewed journals
- Studies published in the English language

Exclusion Criteria

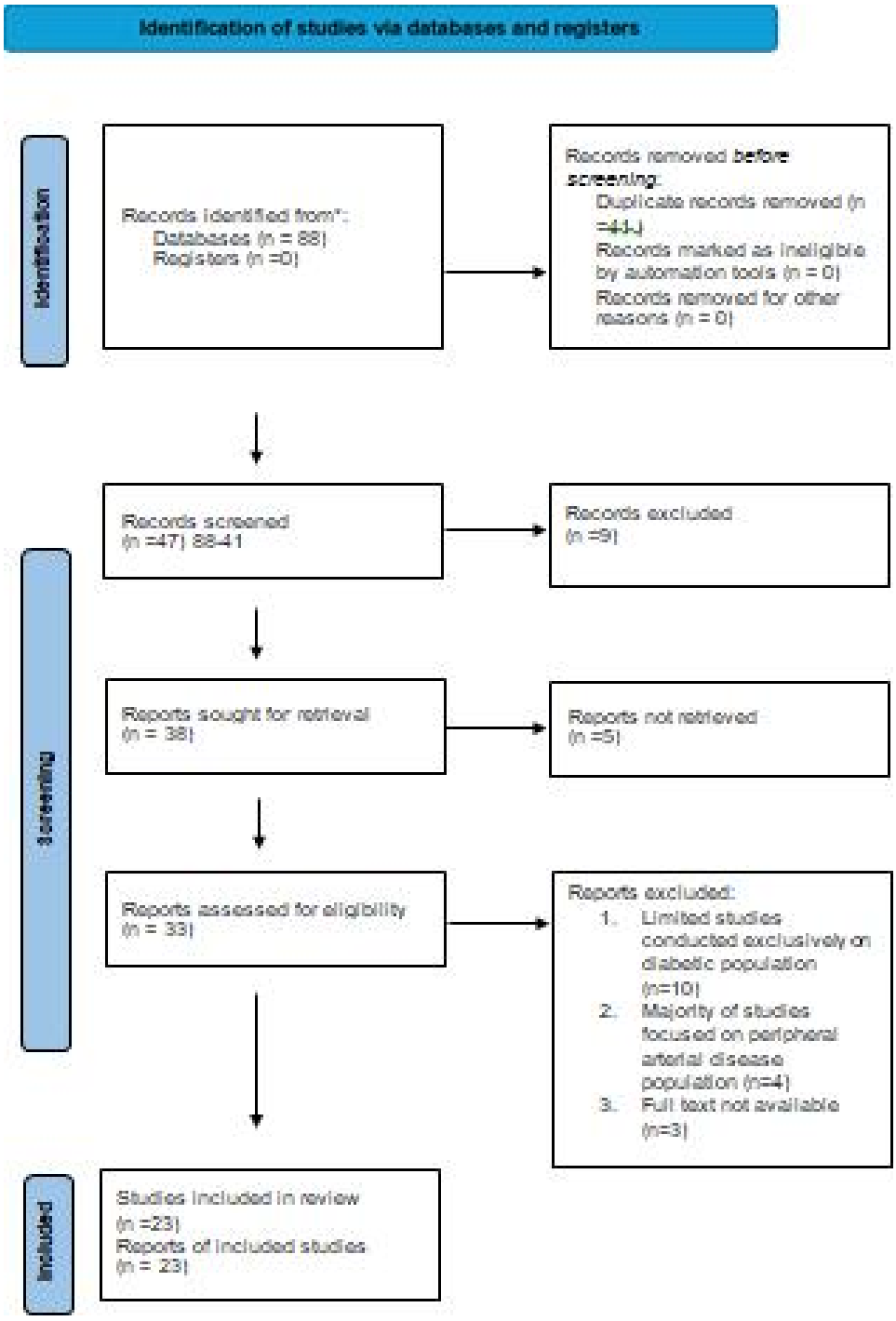
- Studies on pharmacological interventions, surgery, or diet alone without a cardiac rehabilitation component of exercise
- Studies on the perspectives of healthcare providers, systems, and clinicians alone without any information on patient perceptions and participation
- Paediatric patients (<18 years of age)
- Conference abstracts, editorials, commentaries, protocols, letters to the editor, and opinion pieces
- Animal studies
- Studies not available in full text or not written in English language

Data Extraction

- A pre-determined data extraction tool was employed for extracting relevant data from all of the studies included for this scoping review. The data that was extracted from all of the studies included was the name of the first author, year of publication, country of publication, type of study, characteristics of participants, type of exercise-based cardiac rehabilitation program, and objectives of studies. In addition, data was also extracted regarding the outcome measures for healthcare receiver perceived readiness, which included readiness, motivation, intention, beliefs, and attitudes for participation in cardiac rehabilitation. The data was also extracted regarding participation outcomes, including enrolment, attendance, adherence, engagement, completion, and nonparticipation for exercise-based cardiac rehabilitation programs. The key findings regarding barriers, facilitators, and psychosocial or contextual

factors for participation and readiness were also extracted.

- Data extraction was done in a systematic way, and the accuracy of the extracted information was verified. Inconsistencies were addressed through discussions. The information that was extracted was then synthesized descriptively, as well as in a narrative and tabular form, in order to track the nature and characteristics of the existing evidence, as well as gaps in literature regarding healthcare receiver perceived readiness and participation in exercise-based cardiac rehabilitation.



ARTICLE NAME AND AUTHOR	TYPE OF STUDY	PARTICIPANTS	INTERVENTION	STUDY DURATION	OUTCOME MEASURE	RESULT	LIMITATIONS
Medical and Psychosocial Factors Associated with Low Physical Activity and Increasing Exercise Level after a Coronary Event Peersen K et al., 2020	Observational cohort	Adults post-coronary event	Exercise behaviour following Cardiac rehabilitation	Follow-up study	Physical activity level, psychosocial variable	Psychosocial factors strongly influenced exercise participation	Self-reported activity
Pattern and predictors of uptake and adherence to cardiac rehabilitation Sharp J & Freeman C, 2009	Observational	CR- eligible cardiac patients	Standard CR	Program duration	Uptake and adherence	Psychological readiness predictors	No readiness scale
Does protection motivation theory explain exercise intentions and behaviour during home-based cardiac rehabilitation's. Blanchard CM et al., 2009	Theory-based observational	Home-based CR patient	Home-based exercise	Home-based exercise	Intention behaviour, motivation	Protection motivation predicted exercise behaviour	Small sample
Coronary Artery Disease Patient Perspectives on Exercise Participation Campkin LM et al., 2017	Qualitative	CAD patients	Exercise participation perspectives	Not specified	Patient perceptions, barriers	Fear and confidence affected participation	Qualitative only
Adherence behavior in the prevention and treatment of cardiovascular disease Miller NH, 2012	Narrative review	CVD patients	Adherence behaviours	Not applicable	Adherence concepts	Identified behavioural determinants	Not empirical
Life Values as an Intrinsic Guide for Cardiopulmonary Rehabilitation Program Engagement A QUALITATIVE ANALYSIS Ellis JM et al., 2018	Qualitative	CR participants	CR engagement	Not specified	Life values, engagement	Values guided participation	Small sample
Improving cardiac rehabilitation attendance and completion through quality improvement activities and a motivational program Pack QR et al., 2013	Quality improvement	CR patients	Motivational program	Program duration	Attendance, completion	Improved CR completion	Single-centre
Identifying reasons for nonattendance and noncompletion of cardiac rehabilitation insights from Germany and the Netherlands Vonk T et al., 2021	Mixed-methods	CR non-attendees	Usual CR referral	Not specified	Reasons for nonattendance	Transport and motivation major barriers	Regional focus

Home-Based Cardiac Rehabilitation among Patients Unwilling to Participate in Hospital-Based Programs Nabutovsky I et al., 2024	Observational	CR-eligible nonparticipants	Home-based CR	Program duration	Participation, adherence	Home-based CR increased engagement	Short follow-up
Higher anxiety and will to live are associated with poorer adherence to cardiac rehabilitation Harris KM et al., 2019	Observational CR duration	CR participants	Standard CR	CR duration	Anxiety, adherence	Higher anxiety → poorer adherence	CR duration
Strategic moments: Identifying opportunities to engage clients in attending cardiac rehabilitation and maintaining lifestyle changes Fletcher SM & McBurney H, 2016	Qualitative	Rural CR participants	Community CR	Not specified	Engagement experiences	Mixed support experiences	Small rural sample
Factors associated with utilization of cardiac rehabilitation among patients with ischemic heart disease in the veterans health administration a qualitative study Schopfer DW et al., 2016	Qualitative	Veterans with IHD	CR utilization	Not specified	Barriers, facilitators	System & personal factors affect uptake	Male-dominant sample
Examining Barriers to Adherence and Motives for Engagement and Motivation Among Cardiovascular Rehabilitation Participants da Silva JM et al., 2024	Cross-sectional	CR participants	Exercise-based CR	Not specified	Barriers, motivation	Motivation predicts adherence	Short report
Relationship between acceptance of illness and functional outcomes following cardiac rehabilitation Guck TP et al., 2012	Observational	CR patients	Standard CR	Program duration	Illness acceptance, function	Acceptance linked to better outcomes	Limited psychosocial depth
Reasons for Nonparticipation in Outpatient Cardiac Rehabilitation Among Older Patients with Heart Failure: A Report of the Flagship Study Iritani N et al., 2023	Observational	Older HF patients	Outpatient CR	Not specified	Nonparticipation reasons	Frailty and access major barriers	Older population only
Predicting cardiac rehabilitation attendance in a gender-tailored randomized clinical trial	RCT (secondary analysis)	Female cardiac patients	Gender-tailored CR	Program duration	Attendance	Tailored approach improved attendance	Gender-specific

Beckie TM & Beckstead JW, 2010							
Motivational Strategies and Concepts to Increase Participation and Adherence in Cardiac Rehabilitation Bohplian S & Bronas UG, 2022	Integrative review	CR population	Motivational strategies	Not applicable	Participation, adherence	Motivation-based strategies effective	Heterogeneous studies

RESULTS

There are totally 17 studies that are selected for scoping review, which were published from 2009 to 2024, including quantitative, qualitative, mixed method, quality improvement, and review studies. The studies were done among adult patients having cardiac disease who are eligible to join exercise-based cardiac rehabilitation (CR) in hospitals, home, community, and mixed modes of CR.

Across the selected studies, the constructs of healthcare receiver perceived readiness like motivation, intention, confidence, illness acceptance, and perceived benefit, were found to be associated consistently with attendance in exercise-based cardiac rehabilitation programs such that more readiness had positive attendance while low readiness led to delayed attendance, not attending or drop-out.

Barriers for attendance were found predominantly psychological, logistical and health related. Facilitators of attendance were found predominantly supportive provider role, education, goal setting, motivational approaches, and flexible delivery mode of exercise-based CR programs specifically home-based and mixed model CR that helped attend exercise based CR program.

The measures were quite varied ranging from attendance measure, self-administered questionnaires, interviews and behavioral theories of change. But there was not any specific tool to measure healthcare receiver readiness for exercise-based CR programs.

DISCUSSION

Finally, this systematic review also confirms that perceived readiness plays a crucial role as a predictor for CR attendance and retention, when it comes to exercise-based CR. From what has been revealed, it can be concluded that perceived readiness is rather a dynamic concept, which is affected by one's emotions towards cardiac episodes, exercise-related safety and efficacy beliefs, and situational aspects. It has also been proved that motivational aspects of readiness, namely, motivation, self-efficacy, and illness acceptance have an impact on participation.

Thus, it seems reasonable to suppose that a tailored and patient-centred intervention, such as motivational interviewing, goal-setting, and education at referral, can improve perceived readiness, which would consequently increase attendance rates. The success of both home-based and combined CR programs is the additional evidence for the idea that there is a necessity to tailor CR programs to the patient's situation, so that potential barriers would not affect his/her readiness to participate.

Despite the fact that significant amount of research has been done concerning the concepts of participation and adherence, it should be stressed that the area also suffers from a lack of conceptualization and consistency in measuring readiness. In addition, there are very few longitudinal studies devoted to the relationship between readiness profiles and long-term participation and outcomes is extremely scarce.

LIMITATION

Since it was a scoping review, there was no critical analysis of the quality of the study and risk of bias in them. Thus, the results of the current review are descriptive in nature. Many differences existed between the included studies, population, CR setting, and the outcome measures. Readiness was not always explicitly defined but was measured by the constructs such as motivation and intention at times. Only peer-reviewed literature in English was searched. The inclusion of grey literature could have been more comprehensive since it might introduce language and publication biases. The evidence was obtained from low and middle-income countries.

CONCLUSION

Thus, it is important to conclude that, as shown in the above evidence, the readiness of the receivers of the healthcare service plays a crucial role in exercise-based CR program. Hence, it would be worthwhile to include it in CR programs.

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