EMPOWERING THE HEART AT HOME: A SCOPING REVIEW OF SELF-EFFICACY AND QUALITY OF LIFE IN HOME-BASED CARDIAC REHABILITATION

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ABSTRACT

Background: Home-Based Cardiac Rehabilitation (HBCR) is an increasingly accepted approach for the rehabilitation of patients with cardiovascular disease (CVD), allowing patients to undergo rehabilitation at home with the support of technologies such as telerehabilitation and mobile health (mHealth). Self-efficacy, which refers to an individual's belief in their ability to manage their health condition, plays a critical role in the success of HBCR and can improve patients' quality of life (QoL). **Methods**: A scoping review was performed to identify and synthesize quantitative and mixed-methods studies (2019–2024) examining self-efficacy and quality of life among patients with CVD engaged in HBCR. R**esults**: The analysis of 12 articles revealed that home-based interventions, including telerehabilitation, mHealth, and Short Message Service (SMS)-based reminders, enhanced patients' self-efficacy and QoL. Furthermore, external factors, namely social support and access to technology, were identified as significant contributors to strengthening the relationship between self-efficacy and QoL. **Conclusion**: The integration of HBCR with technological tools and social support can significantly improve self-efficacy and quality of life in individuals with CVD. Further research is needed to develop more personalized interventions to enhance the outcomes of home-based cardiac rehabilitation programs.

Keywords: Home-Based Cardiac Rehabilitation, self-efficacy, quality of life, tele-rehabilitation, mHealth

Introduction

Home-Based Cardiac Rehabilitation (HBCR) has emerged as an innovative approach for managing individuals with cardiovascular disease (CVD), providing a convenient alternative for those unable to participate in hospital-based rehabilitation programs. Through the integration of technologies such as telerehabilitation, mobile health (mHealth), and Short Message Service (SMS) reminders, HBCR enables patients to undergo rehabilitation at home, enhancing adherence to medication and lifestyle changes. One of the key factors contributing to the success of HBCR is self-efficacy, which is defined as the belief that patients have in their ability to manage their health independently (Bernal-Jiménez et al., 2024). Enhancing self-efficacy is pivotal in ensuring patient

adherence to medication regimens and engagement in regular physical activity, thereby improving their overall QoL (Fujioka et al., 2020).

Theories of health behavior, including the Health Belief Model (HBM), Theory of Planned Behavior (TPB), and Social Cognitive Theory (SCT), provide significant insights into the development of self-efficacy within the context of home-based rehabilitation. The HBM emphasizes that an individual's perception of susceptibility to disease drives preventive actions that enhance self-efficacy, while the TPB links behavioral intention with self-efficacy in adopting healthier lifestyles (Malarvizhi et al., 2021). SCT highlights the importance of social support in strengthening patients' confidence in managing their conditions (Bandura, 2004).

Substantial increases in self-efficacy are directly associated with improvements in QoL, encompassing the physical, emotional, and social aspects of well-being (Nguyen et al., 2018). Patients with higher self-efficacy tend to have a more favorable perception of their quality of life, reducing anxiety and depression and improving energy and mobility (Tonga et al., 2020). Therefore, a better understanding and measurement of self-efficacy and QoL are essential for designing more effective rehabilitation interventions in the future.

Various home-based interventions, such as telerehabilitation, mHealth, and home visits, have proven effective in enhancing self-efficacy and QoL in patients with heart disease (Borg et al., 2023; Hassan et al., 2021). More personalized monitoring and social support from family and healthcare professionals play crucial roles in increasing patients' confidence in managing their condition (Poortaghi et al., 2022).These findings emphasize the necessity of designing tailored interventions that not only leverage technology but also integrate social and emotional support systems to enhance patients' self-efficacy and overall well-being. Therefore, future research should aim to investigate *how specific forms of personalized support influence the relationship between self-efficacy and quality of life* in the context of HBCR, particularly among patients with varying levels of comorbidity and digital health literacy. Addressing this research question is essential to optimizing the effectiveness of HBCR programs and advancing patient-centered cardiac care.

Methods

Research Question

What is the impact of self-efficacy on the quality of life of patients with cardiovascular disease undergoing home-based cardiac rehabilitation?

Using the PCC Framework: (1) Population (P): Patients with cardiovascular disease (e.g., coronary heart disease, heart failure, acute coronary syndrome, or myocardial infarction) undergoing home-based cardiac rehabilitation; (2) Concept (C): Self-efficacy as a psychosocial factor influencing patients' quality of life in terms of physical, emotional, and social aspects related to their ability to participate in rehabilitation programs and self-care; (3) Context (C): Home-based cardiac rehabilitation, which may include rehabilitation conducted directly at home or

through technologies such as tele-rehabilitation and virtual rehabilitation.

Inclusion and Exclusion Criteria

Inclusion Criteria: (a) Adult individuals aged 18 years and older with cardiovascular conditions (CVD: coronary artery disease, myocardial infarction, acute coronary syndrome, chronic heart failure, post-PCI/CABG) who are participating in home-based cardiac rehabilitation programs. These programs may encompass home-based interventions, telerehabilitation, mHealth, SMS, home visits, and exergaming; (b) Research that evaluates or addresses self-efficacy and/or QoL as research variables, whether as primary, secondary, predictor, mediator, or outcome variables; (c) Types of studies: Quantitative research, including randomized controlled trials (RCTs), quasi-experimental studies, cohort studies, and cross-sectional studies, as well as mixed-methods studies assessing self-efficacy/QoL, with the exclusion of reviews; (d) Language and publication year: Articles published in English from 2019 to 2024, with full-text access available.

Exclusion Criteria: (a) Patient populations under 18 years of age and those diagnosed with non-atherosclerotic cardiac conditions not classified as major cardiovascular diseases—such as congenital heart defects, valvular heart disease, cardiomyopathies, or arrhythmias—as well as individuals whose primary diagnosis involved non-cardiovascular comorbidities (e.g., cancer, chronic kidney disease, or severe psychiatric disorders); (b) Studies that did not measure self-efficacy or QoL and focused on non-cardiovascular diseases; (c) Hospital-based or outpatient rehabilitation without a home-based element; (d) Study types: Non-scientific articles (editorials, opinions, etc.) or reviews; (e) Articles not written in English or published before 2019.

Literature Search Strategy

This scoping review entailed a comprehensive literature search conducted through electronic databases, including Google Scholar, ProQuest, and Scopus. The search terms included a combination of keywords related to self-efficacy, quality of life, and home-based cardiac rehabilitation. The search phrases included: ("self-efficacy" OR "perceived self-efficacy" OR "self-confidence") AND ("quality of life" OR "QoL" OR "health-related quality of life" OR "HRQoL") AND ("home-based cardiac rehabilitation" OR "tele-rehabilitation" OR "mHealth" OR "home visit" OR "exergaming"). To enhance the comprehensiveness of the literature search, reference lists of included studies were also screened. Article selection adhered to predefined inclusion criteria regarding study design, publication year, language, and variable relevance

Literature Screening and Data Extraction

The literature screening process began by identifying relevant articles through searches in the Google Scholar, ProQuest, and Scopus databases using predetermined keywords. The researchers performed an initial screening based on the titles and abstracts to ensure alignment with the inclusion and exclusion criteria. Articles

that met the criteria were further assessed through a full-text review. Data were extracted using an extraction form that included information on study characteristics, population, type of intervention (home-based cardiac rehabilitation), methods used, outcomes measured related to self-efficacy and QoL, and key findings from each study. All extracted data were analyzed descriptively to identify trends, gaps, and consistent findings in the existing literature.

Results

Literature Search Results

Based on a literature search conducted through Google Scholar, Scopus, and ProQuest, 1,842 articles were identified in the initial search phase. After the initial screening based on publication year and article type, 466 articles were retained. After removing duplicates, 344 articles remained, and the final number of articles was 122. The articles were further screened based on the inclusion and exclusion criteria. As a result of the screening, 62 articles were evaluated through full-text assessment to ensure their alignment with the study criteria. A total of 50 articles were excluded at this stage after full-text screening, leaving 12 articles that met the criteria for inclusion in the evidence-mapping. All selected articles were assessed for quality using the JBI checklist for scoping reviews, which is used to evaluate the validity and methodology of the research. The quality assessment results indicated that these articles met the quality standards of this scoping review.

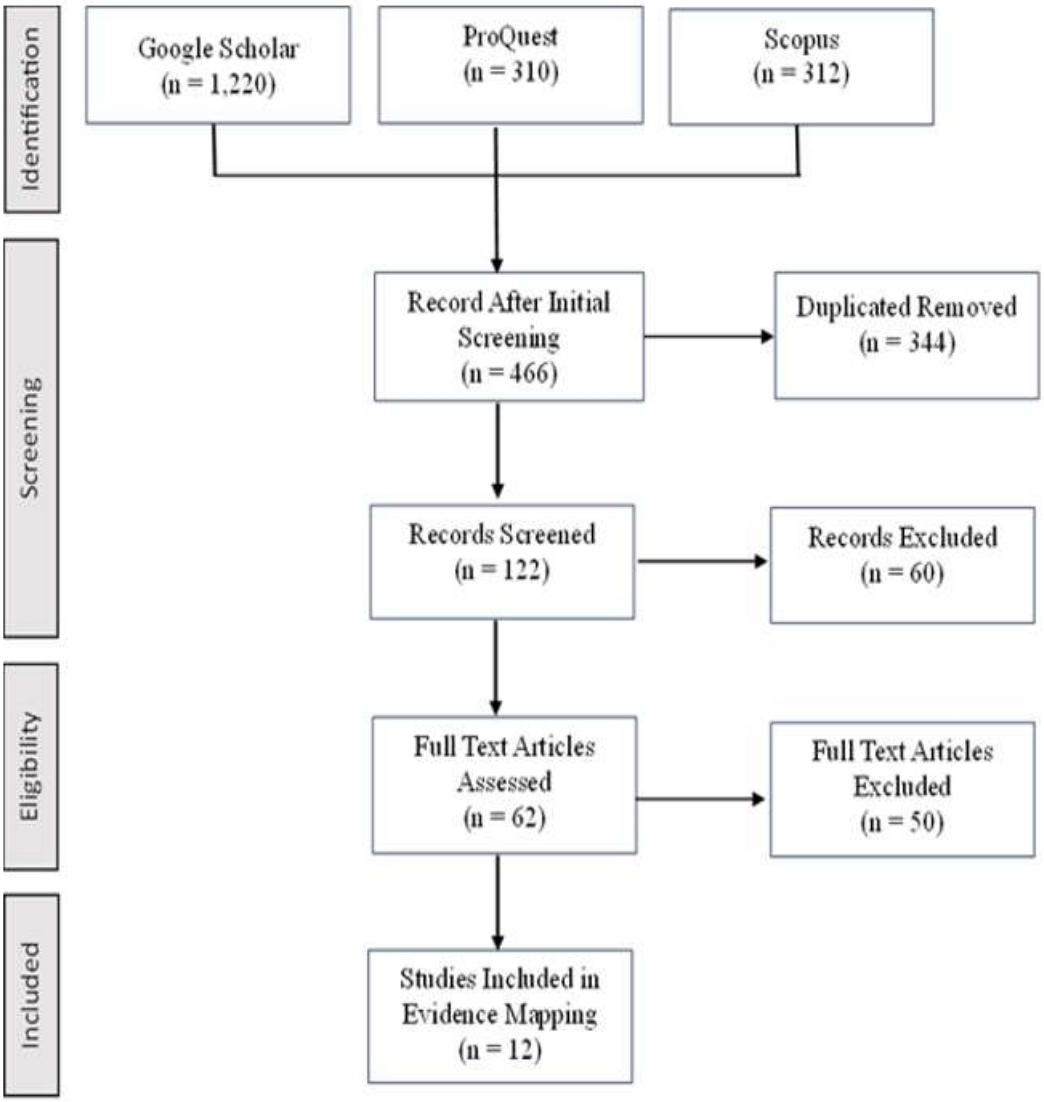

Figure 1. PRISMA Flowchart

Table 1. Results of Article Review

ID Article	Author, Journal, and Year	Article Title	Research Objectives	Population and Sample	Methods	Research Results
HBCR 1	Zhamaliyeva et al., *Journal of Cardiovascular Development and Disease*, 2023	Educational Intervention Effects on Depression and Anxiety in Patients after Myocardial Infarction: A Randomized Controlled Trial	Assessing the effect of educational interventions on depression and anxiety in patients after myocardial infarction	207 patients (76 in the experimental group, 69 in the control group)	RCT, measurement of depression and anxiety using HADS	The experimental group experienced a significant decrease in anxiety and depression compared to the control group.
HBCR 2	Heidari et al., *SAGE Open Nursing*, 2023	Effect of Home-Based Cardiac Rehabilitation Program on Self-Efficacy of Patients with Implantable Cardioverter Defibrillator	Assessing the effect of a home-based cardiac rehabilitation programme on self-efficacy of patients with ICDs	70 patients who received an ICD at Shahid Chamran Heart Centre	Semi-experimental, self-efficacy evaluation using the Sullivan Heart Self-Efficacy Questionnaire	HBCR significantly improved self-efficacy in ICD patients compared to the control group
HBCR 3	Borg et al., *BMC Sports Science, Medicine and Rehabilitation*, 2023	Effectiveness of a behavioral medicine intervention in physical therapy on secondary psychological outcomes and health-related quality of life in exercise-	Assessing the effects of behavioural medicine interventions on psychological outcomes and health-related quality of life in exercise-based cardiac	170 patients with coronary artery disease	RCT, quality of life evaluation using SF-36, EQ-5D, anxiety and depression using HADS	There were no significant differences between the intervention and control groups, although both showed significant improvem

ID Article	Author, Journal, and Year	Article Title	Research Objectives	Population and Sample	Methods	Research Results
		based cardiac rehabilitation	rehabilitation			ent on some measures at the 4-month follow-up.
HBCR 4	Jaarsma et al., *ESC Heart Failure*, 2021	Exploring factors related to non-adherence to exergaming in patients with chronic heart failure	Examining factors that influence non-adherence to exergaming in patients with chronic heart failure	Data from 605 patients in the HF-Wii study, exergame (305 patients) and motivational support (300 patients) groups	RCT, logistic regression analysis to analyse factors of non-adherence	Almost half of the patients were adherent factors such as lower social motivation and higher exercise capacity were associated with adherence.
HBCR 5	Ferreira et al., *International Journal of Telerehabilitation*, 2023	Hybrid Cardiac Telerehabilitation After Acute Coronary Syndrome: Self-selection Predictors and Outcomes	Assessing the effectiveness of a hybrid cardiac telerehabilitation programme on quality of life and physical activity of patients after acute coronary syndrome	59 patients (27 in CCRP, 32 in HCTR)	59 patients (27 in CCRP, 32 in HCTR)	HCTR is superior to CCRP in improving quality of life and physical activity of ACS patients
HBCR 6	(Aharon et al., 2022) *PLOS ONE*, 2022	Improving cardiac rehabilitation patient	Assess improvement in CR patient	95 patients eligible for CR	Randomised controlled trial,	The personalised interventio

ID Article	Author, Journal, and Year	Article Title	Research Objectives	Population and Sample	Methods	Research Results
		adherence via personalized interventions	adherence through personalised interventions	programme	adherence analysis using data from historical controls	n significantly improved adherence, with 76% of patients remaining active after 3 months, compared to 24% in the control group
HBCR 7	Zhen Yang et al., *BMC Nursing*, 2023	Predictors of Home-Based Cardiac Rehabilitation Exercise Adherence Among Patients with Chronic Heart Failure	Examining factors that influence adherence to home-based cardiac rehabilitation exercises in chronic heart failure patients	215 patients with chronic heart failure	cross-sectional, hierarchical linear regression analysis	Factors that influence adherence include age, education level, fear of movement, perceived social support, and exercise self-efficacy.
HBCR 8	David W. Schopfer et al., *Journal of the American Heart Association*, 2020	Effects of Home-Based Cardiac Rehabilitation on Time to Enrollment and Functional Status in Patients with Ischemic	Comparing the effectiveness of HBCR vs FBCR in improving the functional status of patients with	237 patients with ischaemic heart disease	Pragmatic test, comparison between HBCR and FBCR	HBCR was more effective in increasing the distance of the 6-minute walk test after 3 months

ID Article	Author, Journal, and Year	Article Title	Research Objectives	Population and Sample	Methods	Research Results
		Heart Disease	ischaemic heart disease			than FBCR, although there was no significant difference in exercise self-efficacy.
HBCR 9	Shahin Salarvand et al., *BMC Cardiovascular Disorders*, 2024	The Effect of Personalized Mobile Health (mHealth) in Cardiac Rehabilitation for Discharged Elderly Patients After Acute Myocardial Infarction on Their Inner Strength and Resilience	Assessing the effect of mHealth in cardiac rehabilitation in elderly patients after acute myocardial infarction	56 elderly patients with acute myocardial infarction	RCT, penggunaan skala Inner Strength dan Connor-Davidson Resilience Scale (CD-RISC)	The mHealth intervention increased inner strength and resilience in the intervention group compared to the control group
HBCR 10	Dandan Xu et al., *Journal of Medical Internet Research*, 2024	The Effectiveness of Remote Exercise Rehabilitation Based on the SCeiP Model in Homebound Patients with Coronary Heart Disease	Assessing the effect of a remote exercise rehabilitation intervention based on the SCeiP model in patients with coronary heart disease	147 patients with coronary heart disease	RCT, using SCeiP model with WeChat app and sports wristband	The experimental group showed higher exercise adherence and decreased anxiety than the control group
HBCR 11	Zhongqin Yu et al., *Heart*	Clinical Application of Cardiac	Assessing the effectivenes	417 patients with	Retrospective, comparati	The group receiving self-

ID Article	Author, Journal, and Year	Article Title	Research Objectives	Population and Sample	Methods	Research Results
	Surgery Forum, 2024	Rehabilitation Program Based on Self-Efficacy Theory in Patients with Acute Myocardial Infarction Undergoing Percutaneous Transluminal Coronary Intervention	s of a self-efficacy theory-based cardiac rehabilitation programme in acute myocardial infarction patients undergoing PCI	acute myocardial infarction who underwent PCI	ve analysis between a self-efficacy-based rehabilitation programme and a control programme	efficacy-based rehabilitation showed significant improvements in cardiac function and quality of life compared to the control group
HBCR 12	Leila Ebrahimi Sheikh-Shabani et al., *Arya Atheroscler*, 2022	The Effect of Family-Centered Intervention via SMS on Life Expectancy and Self-Efficacy in Medication Regimen Compliance in Patients with Acute MI	Assessing the effect of SMS-based intervention involving family on life expectancy and self-efficacy in drug regimen adherence in acute myocardial infarction patients	80 patients with acute myocardial infarction	RCT, SMS-based intervention with evaluation of life expectancy and self-efficacy	SMS intervention increased life expectancy and self-efficacy in medication adherence in the experimental group compared to the control group

Self-Efficacy Measurement

A review of 12 articles revealed the use of various instruments to assess self-efficacy in home-based cardiac rehabilitation (HBCR). The *Cardiac Self-Efficacy Scale* (CSES) was the most frequently employed three studies, reflecting its relevance in evaluating condition-specific confidence. In contrast, the *General Self-Efficacy Scale* (GSES) and the *Self-Efficacy for Physical Activity* (SEPA) were each utilized in one study, offering complementary perspectives on patients' belief in

managing health-related tasks. These findings highlight a preference for disease specific tools particularly CSES in capturing self-efficacy within HBCR settings. The following section provides a detailed overview of each instrument, including its conceptual focus and application in the reviewed studies.

a) *The Cardiac Self-Efficacy Scale (CSES)* evaluates an individual's confidence in managing heart disease and their ability to participate in physical activities essential for home-based cardiac rehabilitation. Heidari & Harandi (2023) utilised the CSES to assess improvements in patients' self-efficacy in managing heart disease after participating in a home-based rehabilitation program.

b) *General Self-Efficacy Scale (GSES)* measures general self-efficacy, including patients' confidence in facing life challenges such as physical activity and disease management. Schopfer et al., (2020) in a study, the GSES was used to measure physical self-efficacy, and it was shown that increased self-efficacy was associated with enhanced patient confidence in participating in physical exercises during rehabilitation.

c) *Self-Efficacy for Physical Activity (SEPA)* evaluates individuals' confidence in their ability to perform the physical exercises necessary for cardiac rehabilitation in a home setting. The article by Yang, Jia, et al., (2023) used SEPA and reported a significant improvement in physical self-efficacy in patients after undergoing home-based rehabilitation, contributing to increased participation in the recommended exercises.

In the 12 articles reviewed, self-efficacy was measured in two dimensions.

1. *Self-Efficacy Related to Physical Activity*: This dimension measures patients' confidence in their ability to engage in physical activities, which is an integral part of home-based cardiac rehabilitation. Patients with high physical self-efficacy are more likely to engage in physical exercise and feel confident in performing the recommended physical activities. For example, Schopfer et al., (2020) demonstrated that patients who experienced an increase in physical self-efficacy after home-based rehabilitation were more actively involved in structured physical exercise.
2. *Self-Efficacy Related to Disease Management*: This dimension assesses patients' confidence in managing their heart disease, including adherence to medication regimens and adoption of healthy lifestyle changes. Higher disease management self-efficacy is associated with improved adherence to medication and healthy lifestyle practices, which are crucial for home-based cardiac rehabilitation. For example, Heidari & Harandi (2023) found that patients with increased self-efficacy in disease management were more likely to follow medication instructions and maintain a healthy lifestyle in the long term.

Quality of Life (QoL) Measurement

Among the 12 articles reviewed, only three studies explicitly reported the use of quality of life (QoL) measurement tools. The SF-36, EQ-5D, and the *Cardiac Quality of Life Index* were each used in one study, indicating limited consistency in instrument

selection across the literature. To provide further context, the following section outlines the characteristics and applications of each QoL instrument identified in the reviewed studies.

a) *"The SF-36, or Short Form Health Survey,* evaluates overall quality of life by assessing eight different health aspects, including physical and emotional functioning, energy levels, and mental well-being. For example, Borg et al. (2023) used the SF-36 to assess changes in physical function and emotional health in patients undergoing home-based cardiac rehabilitation in Norway.

b) *The EQ-5D, or EuroQol-5 Dimension,* is an instrument developed to evaluate health-related quality of life by concentrating on five key domains: mobility, self-care, usual activities, pain or discomfort, and mental well-being. For instance, Lee et al., (2023) used the EQ-5D to measure both physical and emotional QoL in patients undergoing home-based cardiac rehabilitation.

c) *The Cardiac Quality of Life Index,* is an instrument developed to assess the quality of life in individuals with cardiovascular disease, emphasizing dimensions such as physical activity, emotional well-being, and satisfaction with their medical treatment. Heidari & Harandi (2023) used this instrument to assess changes in quality of life after home-based rehabilitation.

Several dimensions of QoL evaluated in home-based cardiac rehabilitation studies include:

1. *Physical Function*: Measures the ability of patients to perform daily physical activities without limitations. Patients with increased physical self-efficacy are more likely to engage in recommended physical exercise during home-based cardiac rehabilitation. For example, Borg et al., (2023) demonstrated improvements in physical function among patients participating in home-based rehabilitation, particularly in their physical capabilities after an exercise program.
2. *Emotional Function*: Assesses the impact of health conditions on patients' emotional well-being, including manifestations of anxiety, depression, and stress. Increased disease management self-efficacy can contribute to reduced anxiety and enhanced emotional wellbeing. Heidari & Harandi (2023) showed improvements in emotional function among patients who underwent home-based rehabilitation, related to decreased anxiety and improved self-control.
3. *Social Health*: Measures the impact of patients' physical and emotional conditions on their social interactions and participation in social activities. Improved physical function related to home-based rehabilitation can enhance social health. Yang, Jia, et al., (2023) reported that patients who experienced improvements in physical function also showed enhancements in social health.

Types of HBCR Interventions

Interventions in Home-Based Cardiac Rehabilitation (HBCR) involve various approaches to enhance rehabilitation outcomes for patients with cardiovascular disease. Below are some of the types of interventions applied in the HBCR:

1. *Exercise-Based Interventions*: These interventions aim to enhance cardiovascular fitness through personalized physical exercise programs, including aerobic activities, strength training, and flexibility exercises, tailored to the patient's physical condition and performed at home.
2. *Telerehabilitation*: Utilizes communication technologies like video calls or digital apps to monitor and guide cardiac rehabilitation at home, allowing patients to follow exercise routines, consult healthcare providers, and report progress without hospital visits.
3. *mHealth (Mobile Health) Interventions*: Involves mobile applications to assist patients in managing home-based cardiac rehabilitation by tracking physical activity, food intake, medication schedules, and health progress.
4. *Home-Based Education Programs*: These programs educate patients on healthy lifestyle changes, stress management, and medication adherence, focusing on heart disease management, healthy diets, and stress reduction techniques at home.
5. *Family-Based SMS Interventions*: Uses SMS to remind patients about medication, provide motivation, and improve adherence to treatment, with family support reinforcing healthy behavior changes.
6. *Remote Exercise Rehabilitation (SCeiP Model)*: Focuses on structured home exercises with remote monitoring through technology to ensure safe participation and increase self-confidence and adherence to physical activity.
7. *Exergaming*: Combines physical exercise with interactive video games, engaging patients in enjoyable physical activity, boosting motivation for regular exercise as part of home-based cardiac rehabilitation.
8. *Social Support and Remote Monitoring*: Involves support from family, friends, or support groups via technology, helping patients stay engaged in rehabilitation, reduce anxiety, and receive essential psychological support during recovery.

Impact of Intervention on Self-Efficacy and QoL

Table 2. Summary of the impact of different intervention types on self-efficacy and quality of life among patients engaged in home-based cardiac rehabilitation

HBCR Intervention Type	Impact on Self-Efficacy	Impact on QoL	References
Physical Exercise-Based Interventions	Increase patient's confidence in their ability to exercise, such as physical exercise and daily activities, and boost their self-confidence.	Improved quality of life, especially in physical function and reduction of anxiety related to physical activity, improved patient mental health and adherence to	(Heidari & Harandi, 2023; Schopfer et al., 2020)

HBCR Intervention Type	Impact on Self-Efficacy	Impact on QoL	References
		exercise and management of heart disease	
Telerehabilitation	Improving physical self-efficacy through remote monitoring and instructional support, Improvements in disease management and participation in physical exercise through telemonitoring technology	Improved QoL related to increased physical ability and reduced anxiety	(Ferreira et al., n.d.; Xu et al., 2024)
mHealth-based Interventions	Increase patient confidence in disease management through physical activity monitoring and symptom management. Demonstrated improvement in self-efficacy in following a rehabilitation programme through a mobile phone app that facilitated monitoring and reminders for physical exercise.	Improved QoL related to increased inner strength and resilience Improved QoL, especially in psychological and social aspects through easier active monitoring	Salarvand et al., (2024) Aharon et al., (2022)
Home-based Education	Improve self-efficacy in heart disease management and healthy lifestyle management and impact on mental aspects and medication management.	Improve overall QoL by focusing on stress management and healthy lifestyle changes Improve QoL by reducing anxiety and improving understanding of heart disease management.	Heidari & Harandi, (2023) Zhamaliyeva et al.,(2023)
Family-based SMS Intervention	Improved self-efficacy related to medication adherence due to reminders and family support through text messages	Improved QoL in terms of medication adherence and increased confidence in disease management	Sheikh-shabani et al., (2023)

HBCR Intervention Type	Impact on Self-Efficacy	Impact on QoL	References
Remote Exercise Rehabilitation (SCeiP Model)	Improving self-efficacy through an exercise promotion model based on self-assessment and perceived effectiveness	Improved QoL related to increased adherence to exercise and reduced exercise-related anxiety	Xu et al., (2024)
Exergaming	Improving self-efficacy in physical activity through an interactive game that combines exercise with entertainment.	Improving physical capacity and QoL, as well as reducing feelings of anxiety and increasing motivation for regular physical exercise.	Jaarsma et al., (2021)
Social Support and Remote Monitoring	Increased self-efficacy related to social support, which motivates patients to continue participating in the rehabilitation programme.	Improving QoL by reducing anxiety and providing a sense of ongoing social support during home-based cardiac rehabilitation.	Borg et al., (2023)

Findings and Implications

The findings from the 12 articles reviewed indicate that self-efficacy is strongly associated with QoL in patients undergoing HBCR. An increase in self-efficacy, which reflects patients' belief in their ability to manage their health, is often linked to improvements in QoL across the physical, mental, and social aspects. However, this relationship is not always linear, as external factors such as social support and accessibility to technology also influence outcomes. Therefore, while self-efficacy plays a crucial role, other factors must be considered.

The type of intervention used affects HBCR outcomes, with telerehabilitation and mHealth showing a greater impact due to continuous support and real-time monitoring, which enhances both self-efficacy and QoL in patients. In contrast, non-technological interventions, such as SMS and home visits, provide more limited benefits. Demographic factors, such as age, sex, and medical conditions, also play a role in response to interventions, with younger patients and those with milder conditions tending to show more positive outcomes. Social support and moreover equitable access to digital health technologies may serve as a facilitating factor that bridges gaps in continuity of care, particularly for underserved populations, thereby strengthening the overall impact of HBCR interventions.

Discussion

Summary of Key Findings and Comparison with Previous Literature

Based on the analysis of 12 articles, it was found that various types of HBCR interventions significantly improved self-

efficacy and QoL in patients with heart disease. Home-based physical exercise interventions have been shown to improve patients' self-efficacy in physical activity and disease management, which ultimately contributes to improved QoL, particularly in the physical and mental aspects (Heidari & Harandi, 2023; Schopfer et al., 2020). Meanwhile, technology-based interventions such as telerehabilitation and mHealth demonstrate greater results in enhancing both variables, thanks to continuous support and real-time monitoring, which allow patients to stay connected with the medical team and feel more confident in managing their health. Nevertheless, non-technology interventions, such as SMS and home visits, still provide benefits, although their impact is more limited than that of technology-based approaches (Borg et al., 2023).

These findings are consistent with those of previous studies, which also indicated that home-based physical exercise, telerehabilitation, and mHealth have a positive impact on improving self-efficacy and QoL. (Heidari & Harandi, (2023) and Schopfer et al., (2020) found that home-based physical exercise improves self-efficacy and QoL, whereas telerehabilitation and mHealth provide monitoring and support that strengthen both variables (Yang, Sun, et al., 2023). This is in line with the findings of (Hassan et al., 2021), who showed that the use of mHealth can enhance patients' self-efficacy, thereby improving their QoL. However, although the relationship between self-efficacy and QoL is generally positive, some studies have noted that the impact is not always linear, especially in patients with comorbid conditions such as heart failure or diabetes. Factors such as social support and accessibility to technology play important roles in strengthening this relationship (Pham et al., 2023; Schopfer et al., 2020).

The differences in these findings may be influenced by variations in the methodologies used across the studies. The use of different instruments for measuring self-efficacy, as well as differences in sample characteristics, such as medical conditions or comorbidities, can result in varying outcomes. Patients with more complex medical conditions, such as heart failure or diabetes, may show more diverse responses to home-based interventions than patients with mild comorbidities. This suggests that it is important to consider disease severity when evaluating the effectiveness of interventions in HBCR (Borg et al., 2023; Ferreira et al., n.d.). Therefore, tailoring interventions to be more personalised and relevant to the patient's condition is essential for optimising the outcomes.

Theories Underpinning Self-Efficacy in Home-Based Cardiac Rehabilitation

The findings of this scoping review indicate that an increase in self-efficacy significantly contributes to improving the QoL of patients undergoing HBCR. To understand the mechanisms underlying this relationship, a theoretical approach is essential to explain how self-efficacy is formed and reinforced through home-based interventions.

The Health Belief Model (HBM) emphasises that an individual’s perception of vulnerability to disease and its severity drives preventive action. In the context of HBCR, belief in the risk of complications

can enhance motivation to engage in rehabilitation programs, although the HBM tends to focus on individual cognitive dimensions (Pilus et al., 2022). The theory of planned behaviour (TPB) complements this by highlighting the role of behavioural intention, which is shaped by attitudes, subjective norms, and perceived behavioural control. When patients have strong intentions supported by perceptions of control and a supportive social environment, they are more likely to commit to rehabilitation programs, which in turn strengthens their self-efficacy (Malarvizhi et al., 2021; Vats et al., 2024).

Meanwhile, Social Cognitive Theory (SCT) positions self-efficacy as the central construct in behaviour change. Through direct experience, social observation, verbal persuasion, and emotional regulation, SCT explains that individuals' self-belief is dynamically and contextually formed. Interventions such as telerehabilitation, mHealth, and home visits indirectly activate these mechanisms through social support and experience-based training (Bandura, 2004; Yari et al., 2023). (Liou & Kulik (2020) support the SCT approach, demonstrating that theory-based interventions effectively enhance healthy behaviours and chronic disease management. The implications of this theoretical framework underscore the importance of integrating approaches that facilitate the development of self-efficacy into the design of HBCR interventions in the future. Thus, the application of behavioural theories such as the HBM, TPB, and SCT provides a strong conceptual foundation for understanding and optimising the effects of home-based interventions on the sustainable enhancement of self-efficacy and QoL.

Moderating Factors Affecting the Relationship Between Self-Efficacy and QoL

External factors such as social support, technology accessibility, and demographic characteristics play a crucial role in moderating the relationship between self-efficacy and QoL in HBCR. Social support from family, friends, and healthcare providers can strengthen self-efficacy by providing motivation and emotional support, which contributes to improved QoL for patients (Banik et al., 2021). Interventions that integrate social support have proven effective in enhancing patient adherence and quality of life.

Technology accessibility through mHealth and telerehabilitation has a positive impact on improving self-efficacy and QoL, especially for patients who face challenges accessing traditional healthcare. However, the use of these technologies heavily relies on digital literacy, particularly among elderly patients, who may encounter barriers in utilizing these technologies. Therefore, user-friendly technology design and training for patients are key to the success of these interventions (Lee et al., 2023; Liu et al., 2021).

Demographic factors such as age, gender, and socioeconomic status (SES) also influence the effectiveness of HBCR. Older patients tend to have lower adherence levels due to physical and psychological limitations (Yang et al., 2023), while gender differences and SES can affect accessibility and health perceptions. Comorbidities, such as chronic obstructive

pulmonary disease (COPD), also impact participation in rehabilitation (Nogimura et al., 2022). Therefore, considering these factors in the design of interventions is essential for enhancing overall rehabilitation outcomes.

Differences in Measurement Instruments in the Studies Obtained

Differences in the instruments used to measure self-efficacy in HBCR studies can significantly affect research outcomes. Instruments such as the Chronic Disease Self-Efficacy Scale (CSES) and the General Self-Efficacy Scale (GSES) have different focuses in their measurements. The CSES is specifically designed to measure self-efficacy in chronic disease management, whereas the GSES is more general, assessing self-efficacy across various life domains. Both instruments have high validity, with the CSES proven to be effective across different cultures, including among patients with chronic diseases in Turkey (İNCİRKUŞ & Nahcivan, 2020), while the GSES is known for its excellent internal consistency, making it the instrument of choice in studies measuring self-efficacy (Cheng et al., 2021). The choice of an appropriate instrument significantly influences the research findings.

The variation in the measurement instruments used in HBCR studies can result in different findings depending on the focus of each tool. For example, Hassan et al., (2021) used the CSES to measure self-efficacy, while other studies, such as Schopfer et al., (2020) and Yang et al., (2023), chose different instruments such as the GSES and the Self-Efficacy for Exercise Scale (SEES). Each of these instruments focuses on different aspects of self-efficacy, such as disease management, physical activity, and daily life. This difference suggests that the instrument used can moderate the results, highlighting the importance of selecting an instrument that aligns with the research objectives and study context.

In addition to self-efficacy measurement, QoL measurement also varies considerably in HBCR studies, with instruments such as the SF-36 and EQ-5D being frequently used. The SF-36 provides a comprehensive overview of various dimensions of QoL, including physical, emotional, and social aspects, and is highly sensitive to clinical changes (Krugten et al., 2021). In contrast, the EQ-5D, although shorter and commonly used in cost-effectiveness studies, offers more efficient results but with a narrower scope. Both instruments have their strengths and weaknesses, with the SF-36 being more suitable for in-depth analysis and the EQ-5D being more practical for cost evaluations. Therefore, selecting the appropriate instrument is critical to ensure validity, reliability, and clinical sensitivity in HBCR research and to allow for more valid comparisons across future studies.

Limitations of the Study

Although the findings of this scoping review support a positive relationship between self-efficacy and quality of life (QoL), several limitations should be considered. Variations in the methodologies and measurement instruments used across studies, such as the CSES, GSES, and SEES, can lead to differences in the results. Additionally, sample characteristics such as age, gender, and disease severity affect the impact of

self-efficacy on QoL. Therefore, further research is needed to address this variability and provide a clearer understanding of the relationship between these variables.

Future research should investigate how external factors such as social support, access to technology, and patient comorbidities affect the outcomes of Home-Based Cardiac Rehabilitation (HBCR). Developing more consistent instruments to evaluate self-efficacy and QoL is essential to ensure study reliability. Practically, nurses should be empowered to lead HBCR initiatives through digital monitoring, personalized education, and psychosocial support. Healthcare systems are encouraged to integrate nurse-led, technology-assisted approaches to enhance patient adherence and optimize rehabilitation outcomes.

Conclusion

This scoping review demonstrates that self-efficacy is significantly associated with quality of life (QoL) in home-based cardiac rehabilitation, with telerehabilitation and mHealth being the most effective interventions. However, other factors, such as social support, technology accessibility, and patients' medical characteristics, also play a crucial role in influencing this relationship. Therefore, further research and the development of more personalised interventions are needed to optimise the benefits of self-efficacy and QoL in patients undergoing home-based cardiac rehabilitation programs.

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