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# Heart Failure and Exercise: A Narrative Review of the Role of Self-Efficacy

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Chronic heart failure (CHF) is a common, debilitating condition associated with significant health and economic burden. CHF management is multidisciplinary, however, achieving better health relies on a collaborative effort and patient engagement in self-care. Despite the importance of self-care in CHF, many patients have poor adherence to their medical and lifestyle regimens, in particular with regards to engaging in physical exercise. The patient's confidence in their ability, otherwise known as self-efficacy, is an important determinant of CHF health outcomes, most likely due to its effect on the uptake of CHF self-care activities especially exercise initiation and maintenance. Self-efficacy is responsive to experience such as exercise training, however the critical components of exercise interventions to improve self-efficacy have yet to be determined. This narrative review provides an overview of the role of self-efficacy in exercise adherence in CHF.

## Keywords

Chronic heart failure • Self-care • Exercise • Self-efficacy

## Introduction

Chronic heart failure (CHF) is a debilitating form of cardiovascular disease (CVD) with short survival following first hospitalisation and a 30-day readmission rate of approximately 25% [1,2]. Over 23 million people live with CHF worldwide, although this has likely increased amidst the growing global, as well as ageing, population [3]. Despite advances in medical therapy, survival remains poor [4] and quality of life (QOL) is often diminished with approximately 20% suffering from major depression [5]. While the management of CHF is multidisciplinary, patients are recommended to engage in self-care activities, which encompass the everyday decisions made by patients to recognise and respond to heart failure (HF) symptoms and to optimise their health [6]. These include taking daily medications, managing fluid intake and weight, maintaining a low sodium diet, undertaking routine exercise and attending medical appointments.

High self-care translates to improved health outcomes including fewer deaths and hospitalisations among CHF patients [7]. This is particularly in relation to exercise, of which the benefits include improved functional performance [8], QOL [9] and potentially long-term survival [10,11]. Yet, despite the known benefits of self-care and strong recommendations in national HF guidelines [12], adherence is poor, especially with regard to exercise adherence [13]. One Danish study of 501 HF patients found that exercise compliance was significantly lower (39%) than most other self-management activities such as medication adherence (>90%), appointment-keeping (>90%) and diet control (83%) [13] and this poor adherence persisted at 18 months follow-up [14].

Known barriers to physical activity include impaired physical health, symptoms of CHF and low energy [13–15]. Psychosocial factors, such as patient knowledge and understanding of self-care requirements, social support and mental health, are also predictors of exercise behaviour

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[13,14,16]. However, there is growing evidence in the contemporary literature that suggests that one of the crucial determinants of exercise adherence is the patient's own confidence to engage in exercise, otherwise known as self-efficacy. In focussing on this potentially key factor, there is an opportunity to reduce mortality and morbidity associated with CHF through better self-care engagement. This narrative review aims to summarise the evidence for the effect of self-efficacy on CHF health outcomes, its ability to predict self-care and specifically exercise behaviour, and finally interventions to improve exercise self-efficacy.

## Literature Search and Information Sources

The evidence summarised and presented in this review arises from digital literature searches conducted through the PubMed, MEDLINE and Embase databases. Keywords using Medical Subject Heading (MeSH); where available; included 'Heart Failure'; 'Self Care'; 'Exercise'; 'Exercise Therapy'; 'Self Efficacy' and 'Confidence'. The search was not limited by language or date of publication. Titles and abstracts found through the searches were screened for relevance; and a further search through reference lists of relevant articles was undertaken. For the synthesis of randomised controlled trials evaluating exercise interventions to increase related confidence in CHF; data items were pre-specified prior to data collection.

## Definition of Self-Efficacy

Self-efficacy refers to a belief in one's ability to execute tasks in a given situation [17,18]. The formation of self-efficacy is a complex and dynamic interplay between psychological, physiological and environmental influences. As such, it is not a static trait but rather a psychological construct that responds to changes in the subject's circumstances. Self-efficacy influences the way that challenges are perceived, as being within one's capability or exceeding it, and consequently, whether such challenges will be accepted or avoided.

## Impact of Self-Efficacy on Health Outcomes

Self-efficacy has been shown to influence a variety of physical, social and psychological health-related outcomes in the CVD population as well as CHF specifically. Research suggests that low self-efficacy may be a risk marker for the development of CVD. For instance, low exercise self-efficacy has been linked to a significantly higher incidence of cardiovascular events in healthy men without CVD at the time of study enrolment (32% vs. 17%,  $p < 0.01$ ) after adjustment for cardiovascular risk factors [19]. Self-efficacy may also predict health-related outcomes in those with known CVD. For example, in patients with coronary artery disease (CAD),

self-efficacy predicts physical, social and family functioning at 6 months follow-up after cardiac catheterisation, adjusted for anxiety and depression [20]. In CHF patients specifically, a cross-sectional study found that self-efficacy predicted physical functioning, adjusted for age and illness severity [21]. These findings were confirmed in longitudinal assessment, where newly-diagnosed CHF patients with high self-efficacy at baseline had less functional decline compared to those with low confidence at 8 weeks follow-up [22]. There is less certainty as to the role of self-efficacy in reducing the risk of mortality in CVD. In a cohort of stable CAD patients, lower self-efficacy predicted an increased risk of CHF hospitalisations and all-cause mortality after 4 years follow-up, however this result was not significant when adjusted for baseline cardiac function (LVEF, wall motion index and exercise capacity) [23]. Similarly, the confidence of CHF patients in undertaking self-care predicted survival after 4 years follow-up on univariable analysis, although was no longer significant when adjusted for NYHA class [24].

In relation to psychological health, depression and self-efficacy are both important predictors of outcomes in CHF and appear to be inversely associated, whereby those with more depressive symptoms have lower self-efficacy and vice-versa [25-27]. Research has shown that self-efficacy fully mediates the relationship between depression and self-care adherence in CHF patients [28,29]. As such, depression may act as a barrier to self-efficacy and may undermine responsiveness to interventions to improve self-efficacy interventions. Some of these patients also have a background of low psychological resilience that predisposes them to depression and likely limits their self-efficacy as well [30].

Overall, self-efficacy clearly affects various domains of health in CHF patients and the mechanism has been predominantly explained by its role in determining the level of patient engagement in self-care activities.

## Self-Efficacy and Exercise

Self-efficacy has been shown to independently predict CHF self-care, possibly to a greater extent than even depression or health literacy [31,32]. The self-care models in these studies included various activities such as daily weighing, as well as sodium, fluid, smoking and alcohol restriction, all of which were influenced by self-efficacy independent of patient age, gender, physical health and the presence of depression or anxiety. Nevertheless, while there is clear evidence for self-efficacy in predicting individual behaviours which collectively form self-care, the evidence is most definitive for its role in exercise adherence.

Self-efficacy is positively correlated with the amount of self-reported exercise behaviour in Australian patients newly-referred to a HF clinic, after controlling for relevant covariates such as age, functional status and gender [31]. Furthermore, exercise self-efficacy was the only significant predictor of exercise maintenance in a cohort of sedentary, but otherwise well, community-dwelling participants who

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