

# Heart Failure Self-management Interventions: Evidence from Korean Patients

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**Purpose:** The aims of this study were to (1) summarize the HF self-management interventions and (2) identify gaps and priorities for further investigation. **Methods:** A computer search of the literature over the past decade yielded 9 HF self-management studies. Six studies used non-experimental design; only 3 (33%) studies used quasi-experimental design which were included in this review. **Results:** The three pivotal HF self-management interventions studies were important because they highlight the positive effects of self-management compliance and other quality of life outcomes as well as discussing various issues. The informational booklet and telephone follow-up were the most common modalities in these interventions. The periodic telephone counseling offered in 2 studies effectively facilitated patient self-management compliance. There were some methodological flaws such as small sample sizes (range 8~21 in each group) and lack of experimental designs, long-term follow-up, and random group assignment. Additionally, the use of valid, reliable outcome measures is necessary to compare the effects of the interventions worldwide. **Conclusion:** More clinical evidence on HF self-management is needed using a larger sample size and the efficacy needs to be tested for various outcomes, including morbidity, mortality, and health care cost

**Key Words:** Heart failure, Intervention, Self-management, Self-care, Korea

## INTRODUCTION

Cardiovascular disease (CVD) is a major health problem that is at epidemic proportions and responsible for approximately 30% of global deaths (16.7 million) (World Health Organization, 2009). Among the various forms of CVDs, hypertensive and ischemic heart patients are at high risk for developing heart failure (HF) as heart muscle undergoes a progressive loss of contractile function over time and accordingly, functional deterioration accompanies (Jessup et al., 2009). Heart failure is one of the most common chronic disabling conditions in older people that is prevalent worldwide (Sanderson & Tse, 2003; World Health Organization, 2009) and particularly in the United States, affecting approximately 5.8 million Americans (American Heart Association [AHA], 2010). Although HF statistics are not

available, approximately 7,000,000 people in South Korea live with chronic illnesses, of which ischemic heart disease and hypertension that tend to develop to HF over time are increasing respectively 40% and 55% in prevalence over the past five years (Health Insurance Review & Assessment Service, 2009 National Health Insurance Statistical Yearbook). Longer exposure to the chronic heart disease due to substantial progress in medical treatment and longevity more likely increases the risk of developing HF in older Koreans.

Despite multidisciplinary efforts made in management of a complex syndrome of HF, many people still suffer from costly health care expenditure associated with frequent hospitalization for HF decompensation and mortality continues to rise (Bennett et al., 1998 O'Connell, 2000). Likewise, CVDs are one of the leading diagnoses at discharge and the length of admission

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ranks third in South Korea, following psychiatric disorder and cancer. Between the years of 2003 to 2007, health care costs for CVDs have increased by 42% (Health Insurance Review & Assessment Service, a report based on 2003-2007 health insurance claim databases). Although poor self-management has been noted in greater than half of HF patients, partially related to self-care activities occurring through intricate cognitive decisional process (Bennett et al., 1998; Carlson, Riegel, & Moser, 2001; Hershberger et al., 2001; Moser & Watkins, 2008; Riegel, Vaughan Dickson, Goldberg, & Deatrck, 2007), self-care has been documented as a critical behavioral strategy in HF self-management (Eastwood, Travis, Morgenstern, & Donaho, 2007; Grady, 2008; Hummel, DeFranco, Skorcz, Montoye, & Koelling, 2009; Riegel, 2008). Multidisciplinary efforts are also important in that multi-faceted HF self-managements have proven beneficial for greater health outcomes this concluded from a meta-analysis and an integrative review of HF self-management interventions -each study using more than 30 and 21 clinical trials respectively (Holland et al., 2005; Yu, Thompson, & Lee, 2006).

It is surprising that the documentation and efficacy of HF self-management has not been extensively explicated in South Korea. We expect this review of limited evidence about HF self-management for Koreans to disclose both our current state and problematic areas of HF self-management, and will lead us to develop the most advantageous approaches to treat chronic disabling syndrome of HF as well as to establish evidence-based recommendations for Korean HF patients. For example - given the cultural influence on dietary sodium intake, no clinical evidence exists favoring a 2-gram over a 3- to 4-gram sodium restriction per day while only generic dietary sodium guidelines are offered to Korean HF patients (Riegel et al., 2009). Therefore, the purpose of this article is to provide a synthesis of the state of the science about self-management interventions for Korean elders with HF, using the literature published on or prior to April 2010. Specifically the study will meet the following objectives: (1) summarize the HF self-management interventions, and (2) identify gaps and priorities of further investigation.

## METHODS

### 1. Search of the literature

A computer search of the literature over the past

decade was conducted in which intervention studies for Korean HF patients were targeted. Six Korean databases (including Korea Research Information Center for Health, Korea Education and Research Information Service, Korea Library of Congress, Journal of Korean Academy of Nursing Database, Journal of Korean Academy of Adult Nursing Database, and Korean Journal of Rehabilitation Nursing Database) were searched and reference lists from the results were checked. For intervention studies published in English language journals, PubMed and the Cumulative Index to Nursing and Allied Health Literature were also searched with the same searching strategies.

The keywords, heart failure and Korea, in combination with each of the following, intervention (studies), self-management, management, and self-care, were used for searching the literature. The relevance (intervention focus, tests of intervention models, or review of intervention studies) was determined based on abstracts of the search results. Studies describing any interventions for Korean HF patients or studies assessing effects of intervention on health outcomes using experimental or quasi-experimental designs were included. All of the resulting 9 references were reviewed, 6 being excluded due to non-experimental designs, and the remaining 3 categorized into 2 groups: (1) self-management education with telephone counseling (n=2)(Kim, Kim, & Jang, 2004; Kim, 2007), and (2) telemonitoring for symptoms (n=1)(Song, 2005).

### 2. Systematic procedure of the literature review

The CONSORT (Consolidated Standards of Reporting Trials) for non-pharmacological trials and the PICO (Patient, Intervention, Comparison, and Outcome) were utilized to guide and evaluate search results of HF self-management intervention studies for quality. None of the HF self-management intervention studies in review used randomized controlled trials. However, a focused technique as guided by both the CONSORT and PICO procedure was applied to generate synthesis of review articles. This technique was applied because these strategies prevent oversimplification of complex intervention programs and provide detailed data on adequate descriptions of the sample of both intervention and comparison; as well as differences in HF self-management programs, interventions and delivery, outcomes measures, and usefulness of evidence for future research (Clark, Savard, & Thompson, 2009).

## RESULTS

### 1. Population

Sample sizes of three HF self-management interventions for Korean elders were small, with total sample sizes ranging 20~41 participants. None of these studies used a random method for group assignments. All participants were aged 60 years or higher, but one study reported age by frequency in three categories ( $\leq 50$ , 51~59,  $\geq 60$ ) (Kim et al., 2004). The category of women with HF is growing, with a prevalence approximately equal in proportion to that of men in the United States (AHA, 2010), while their representation in the research is low (Shah, Klein, & Lloyd-Jones, 2009). Approximately 30% of patients were women in two studies (Kim et al., 2007), and one study had an almost equal distribution of participants in gender (Song, 2005). Left ventricular ejection fraction was reported in one study as a critical covariate and a measure of HF severity, with a mean of 32% (Kim, 2007). Another clinical variable of the New York Heart Association (NYHA) class was reported in one study, with 58% of patients having NYHA class II and 42% having class III (Song, 2005). The studies were lacking sufficient information to determine whether patients were on optimal medication regimens, including angiotensin-converting enzyme inhibitors, beta-blockers, digitalis, or diuretics. The two major comorbid conditions of hypertension and diabetes mellitus were reported in all studies. Other comorbid conditions, such as degenerative arthritis or chronic respiratory disease, that are common among elders and affect health outcomes were not reported (Table 1).

### 2. Interventions

Table 2 presents content and components of the interventions; also who provided interventions, whether the implementation of protocol was standardized, and whether the routine care that control patients received was described.

#### 1) Content and delivery strategies

Self-management was the most beneficial approach; in which self-care strategies, particularly symptom management, have been focused. One study provided multifaceted interventions including self-management education and coping strategies by symptoms while hospitalized, and periodic telephone counseling - both of which effectively improved health outcomes of HF

patients after discharge (Kim, 2007). Education about HF self-management strategies at out-patient (Kim, Kim, & Jang, 2004) or in-hospital settings (Kim, 2007) was the most critical strategy for delivering the intervention; and telemonitoring (Song, 2005), telecounseling (Kim) or phone follow-up (Kim et al., 2004) were adopted as a major or an adjunct strategy. Other intervention contents such as psychobehavioral counseling or other self-management strategies such as adherence to the recommended physical activity or dietary sodium intake, or medication compliance were least adopted.

#### 2) Providers and implementation fidelity

Intervention protocols were developed and validated by multidisciplinary professionals who had expertise in HF patient care and research. These were identified as HF physicians, professors in Nursing with their scholarly expertise in HF and nurses with clinical expertise in HF self-management (Kim, 2007), HF physician and professors in Nursing (Song, 2005), and professors in Nursing with their scholarly expertise in HF (Kim et al., 2004). Providers who delivered the interventions were identified as follows: principal investigator (Song) and trained research assistants (Kim et al., Kim). Trained research assistants predominantly implemented the intervention protocols including education about HF self-management and telephone counseling for symptom management.

However, intervention fidelity strategies were minimally addressed. Primarily there is a lack of information about research members and whether they were experienced professionals in the delivery of intervention, and training and monitoring procedures that are essential to ensure the fidelity of intervention implementation. Components that constitute the interventions were described but content fidelity that is a feature of services in the intervention protocol was not specified (Dumas, Lynch, Laughlin, Phillips Smith, & Prinz, 2001). Structured approaches to delivery of intervention components to which interventionists can adhere were not adequately described. Therefore determination could not be made whether the interventions were professionally led by the personnel (s) who possessed expertise in HF patient care, nor could the quality of delivery that content areas in the intervention were delivered as designed be ensured. Further, there was no method to determine whether these providers were double-blinded to the groups of participants that might threaten the internal validity in an experiment.

**Table 1. Sample Characteristics of Intervention Studies for Heart Failure Patients**

Intervention studies	Sample size	Age (years)	Female (%)	Clinical characteristics				Optimization of medication
				LVEF (%)	NYHA class (%)	Duration of HF (month)	Comorbidity (%)	
Kim, 2007	N=41 Intervention=21; Control=20 Quasi-experimental	63	37	32	NA	NA	· Hypertension (42) · Diabetes mellitus (44)	NA
Song, 2005	N=33 Intervention=17; Control=16 Group assignment: Not specified	66	55	NA	II (58) III (42)	40	· No comorbid conditions (61) · Hypertension (32) · Diabetes mellitus (33)	NA
Kim, Kim, & Jang, 2004	N=20 Intervention=8; Control=12 Quasi-experimental	NA	35	NA	NA	NA	NA	NA

NA=not available; LVEF=left ventricular ejection fraction; NYHA=New York Heart Association; HF=heart failure.

**Table 2. Content and Components of the Intervention Studies and Routine Care for Heart Failure Patients**

Studies	Intervention			Routine care for control group	Prior HF education		
	Provider	Setting	Content				
Kim, 2007	Trained research assistant	In hospital	Symptom focused self-management	Self-management booklet given	NA		
Song, 2005	Principal investigator	Home	Symptom monitoring	· Education: basic self-management guidelines · Coping behaviors by symptoms: monitoring, recognition in change, and action · Counseling: telecounseling after discharge · Telemonitoring: symptom monitoring using the symptom checklist developed by the PI	· 2 times (40~50 min/per) · Weekly telecounseling: for 1 mo; biweekly for 2~3 mo; and monthly for 4~6 mo after discharge	No usual or routine care description	85% no prior education
Kim, Kim, & Jang, 2004	Trained research assistant	Outpatient	Self-management	· Education using booklets about symptom management strategies and basic self-management · Telecounseling	· Single education · One phone call 2 wks after the intervention	Self-management booklet review	NA

NA=not available.

### 3) Routine care

Comprehensive description of the usual or routine care that patients in the comparison group received was provided in one study (Kim, 2007). Patients in the comparison group received basic self-management guidelines, including medication, diet, activity, and lifestyle changes in smoking and drinking (Kim). Prior history of receiving HF education or other forms of interventions that might affect outcomes of interventions was assessed in one study (Song, 2005).

### 3. Outcomes, efficacy, and follow-up

Table 3 presents outcomes and efficacy of HF self-interventions, and follow-up care/or assessments pre-and-post interventions. Positive effects of the interventions on significantly better outcomes were reported that included greater health perception (Kim, 2007), greater self-management compliance (Kim et al., 2004; Song, 2005), greater self-efficacy (Kim et al.), and lower symptom experience (Kim). None of the interventions evaluated cardiac events (readmission or emergency visits), mortality, or health-care cost that were often targeted as critical outcomes of HF management—particularly aimed at promoting self-care in the United States (Riegel, Carlson, Glaser, & Romero, 2006; Riegel et al., 2009; Yu et al., 2006). Known covariate factors that affected health outcomes were not sufficiently reported or adjusted including HF severity (indicated by left ventricular ejection fraction or NYHA classes), comorbidities, cognitive function, depressive symptoms, or social support (Moser & Watkins, 2008).

Outcome measures that investigators largely developed for the studies were identified as follows: symptom experience and self-management compliance (Song, 2005), health perception and symptom pres-

ence (Kim, 2007), and self-efficacy and self-management compliance (Kim et al., 2004). The use of existing valid and reliable measures, including functional status (Korean Activity Scale/Index) and quality of life (Minnesota Living with Heart Failure Questionnaire-Korean), was found in one study (Kim).

Facilitating patient self-management behaviors in one study (Kim, 2007), telecounseling was offered weekly for 1 month, followed by biweekly for 2~3 months and monthly for 4~6 months after discharge. Follow-up assessments were obtained at 1, 3, and 6 months after symptom-focused self-management intervention during the hospitalization. Two other studies assessed outcomes pre and 4-week post interventions with one study offering one telephone call to encourage patients to adhere to the self-management program at 2 weeks post-intervention (Kim et al., 2004) and no further follow-up care given in the other (Song, 2005). Sustained benefits of the interventions were not evaluated through long-term follow-up for at least 12 months.

## DISCUSSION

To our knowledge, this is the first study to summarize self-management intervention studies for Korean HF patients. Positive effects of HF self-management interventions on health outcomes were highlighted from the three pivotal studies in review that increased self-management compliance and decreased symptom experiences. More importantly, the results of the present review provide insights into the current state of HF self-management in South Korea. Gaps in knowledge and directions for future intervention emerge that are consistent with the priorities of further research suggested by Riegel and colleagues (Riegel et al., 2009),

**Table 3.** Outcomes and Efficacy of the Interventions for Heart Failure Patients and Follow-up Care

Studies	Outcomes and efficacy of intervention	Follow-up care
Kim, 2007	Symptom experience ( $p=.014$ ) Health perception ( $p<.001$ ) Functional status Quality of life	Telecounseling: weekly for 1 mo, followed by biweekly for 2~3 mo and monthly for 4~6 mo after discharge (length of follow-up: 6 mo)
Song, 2005	Symptom experience Self-management compliance ( $p<.001$ )	NA
Kim, Kim, & Jang, 2004	Self-efficacy ( $p=.04$ ) Self-management compliance ( $p=.03$ )	One telephone call made at 2 weeks post-intervention

NA=not available.

and recent integrative reviews of the literature (Holland et al., 2005; Yu et al., 2006). We expect the present study to facilitate translating research results into clinical practice and to develop novel interventions for HF patients narrowing the gaps in knowledge.

Little empirical evidence of HF self-management was available in South Korea while benefits of HF self-management for various health outcomes have been well-documented worldwide (Yu et al., 2006). A recent meta-analysis that used 30 clinical trials of HF self-management interventions categorized intervention studies into four groups including provision of home visits, home physiological monitoring or televideo link, telephone follow-up with no home visits, and in-hospital or outpatient interventions only. These multidisciplinary HF self-management interventions reduced both all cause hospital admissions by 13% (RR = 0.87,  $p = .002$ ), admission for HF exacerbation by 30% (RR = 0.70,  $p < .001$ ), and all cause-mortality by 21% (RR = 0.79,  $p = .002$ ); also larger effect size was obtained when the interventions were delivered at least partly in the home (RR = 0.70,  $p < .001$ ) (Holland et al., 2005).

In another integrative review of HF self-management programs that used 21 randomized clinical trials, 12 programs conducive for outcomes of re-hospitalization, mortality, and cardiac events used the multifaceted approach - including intensive in-hospital phase of education, optimization of medication, self-care strategies, psychological counseling, and ongoing surveillance and symptom monitoring (Yu et al., 2006). Delivery approach of follow-up care after the interventions is also crucial to enhance the outcomes of older individuals with HF that both in person and in telephone follow-up care were adopted into successful HF self-management programs.

Three studies we reviewed were important in that their novel contribution to nursing interventions for HF self-management produced favorable outcomes as well as disclosed issues in needs for further investigation and priorities in research. Two methodological flaws of these interventions were small sample sizes and consequently low statistical power, as well as lack of true experimental designs. Self-management compliance was the main health outcome in three interventions and the benefit of the intervention on quality of life was reported in one study (Kim, 2007). Few studies evaluated the effects of HF self-management interventions on reduction in hospitalization or emergency visits, mortality, or cost for HF care; areas greatly in need of further empirical evidence (Riegel et al.,

2009). Heart failure self-management interventions should be tested in a larger sample with their efficacy being tested for various outcomes, including morbidity, mortality, and health care cost.

Long-term follow-up in excess of 12 months in randomized trials is essential to detect the sustained impact of interventions particularly on mortality (Clark et al., 2009). In addition, three studies evaluated outcomes mostly using the measures developed by the authors. Reliability and validity of these measures were not addressed with reliability estimated using the Cronbach's  $\alpha$  being reported only. Valid, reliable outcome measures should be employed in the future study that allows us to compare the efficacy of HF self-managements for Koreans to that of HF self-management interventions globally.

Professionally-led interventions designed by one or two professionals have focused on strategy and skill building of symptom management. It is important that those members of the multidisciplinary teams whose expertise in HF offer comprehensive service, when designing and delivering the interventions, to meet the wide ranging needs of these vulnerable patients. Both interventions and the usual or routine care should be delineated in terms of standardization of the procedure across settings and personnel, and adherence of the providers to the protocol or deviation from the protocol (Clark et al., 2009).

Heart failure self-management interventions mostly adopted informational booklet and telephone follow-up. These strategies are convenient to meet patient educational needs and concerns about self-management skills but may be inadequate to affect other health outcomes. For designing effective HF self-management collaborative diverse intervention strategies in delivery are recommended. Previously utilized approaches in nursing included relaxation techniques, cognitive restructuring, participation in support groups, nurse pager or telephone hotline, or application of informational technology to various self-care behaviors (Edelman, Lemon, & Kidman, 2003). Particularly, the application of information technology enables patients with chronic diseases to exchange health information and facilitates self-management activities (Solomon, 2008).

## CONCLUSION

Limited evidence was found reporting benefits of self-management for HF patients in South Korea; two of the studies reporting improved self-management compliance,

and one study reporting both increased self-management and quality of life. Gaps in our HF self-management and directions for future research are discussed that include the most advantageous approaches for managing a complex HF syndrome and increasing survival and quality of life of HF patients. More clinical evidence of HF self-management is urgently needed to establish guidelines that are compatible to Korean HF patients.

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