



A pilot test of an integrated self-care intervention for persons with heart failure and concomitant diabetes

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ABSTRACT

Studies show 30% to 47% of people with heart failure (HF) have concomitant diabetes mellitus (DM). Self-care for persons with both of these chronic conditions is conflicting, complex, and often inadequate. This pilot study tested an integrated self-care program for its effects on HF and DM knowledge, self-care efficacy, self-care behaviors, and quality of life (QOL). Hospitalized HF-DM participants ($N = 71$) were randomized to usual care or intervention using a 1:2 allocation and followed at 30 and 90 days after intervention. Intervention was an integrated education and counseling program focused on HF-DM self-care. Variables included demographic and clinical data, knowledge about HF and DM, HF- and DM-specific self-efficacy, standard HF and DM QOL scales, and HF and DM self-care behaviors. Analysis included descriptive statistics, multilevel longitudinal models for group and time effects, post hoc testing, and effect size calculations. Sidak adjustments were used to control for type 1 error inflation. The integrated HF-DM self-care intervention conferred effects on improved HF knowledge (30 days, $p = .05$), HF self-care maintenance (30 and 90 days, $p < .001$), HF self-care management (90 days, $p = .05$), DM self-efficacy (30 days, $p = .03$; 90 days, $p = .004$), general diet (30 days, $p = .05$), HF physical QOL ($p = .04$), and emotional QOL scores ($p = .05$) at 90 days within the intervention group. The participants in the usual care group also reported increased total and physical QOL. Greater percentages of participants in the intervention group improved self-reported exercise between 0 and 30 days ($p = .005$ and moderate effect size $ES = .47$) and foot care between 0 and 90 days ($p = .03$, small $ES = .36$). No group differences or improvements in DM-specific QOL were observed. An integrated HF-DM self-care intervention was effective in improving essential components of self-care and had sustained (90 day) effects on selected self-care behaviors. Future studies testing HF-DM integrated self-care interventions in larger samples with longer follow-up and on other outcomes such as hospitalization and clinical markers are warranted.

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Heart failure (HF) is a serious epidemic affecting over 5.7 million people in the United States (Roger et al., 2012). The societal and patient burden of HF is enormous, partially because of the high rate of rehospitalizations, which is reported to be 30% by 90 days (Butler & Kalogeropoulos, 2012) and 45% within 6 months (Ross et al., 2010). A striking 40% to 60% of rehospitalizations are believed to be preventable by greater provider attention to standards of care and better patient self-care (Heart Failure Society of America, 2010). An estimated 25.6 million adults have diabetes, and the national Medicare claims reflect that the annual incidence in the United States increased 23% between the years of 1995 and 2004 with prevalence increasing by 62% (Centers for Disease Control and Prevention, 2011; Sloan, Bethel, Ruiz, Shea, & Feinglos, 2008). Nearly one third to one half of people with HF have concomitant diabetes mellitus (DM) (Adams et al., 2005; Greenberg et al., 2007; Masoudi & Inzucchi, 2007; Sarma et al., 2013). There is a 40% to 80% increased risk of mortality among HF patients with DM, and a reported 1.6-fold increase in the relative risk for rehospitalization over those without DM (Bobbio et al., 2003; De Groote et al., 2004; Domanski et al., 2003; Dries, Sweitzer, Drazner, Stevenson, & Gersh, 2001; From et al., 2006; Gorelik et al., 2005). This is because of both worsening HF and higher burden of other comorbidities, such as ischemic heart disease. Therefore, patients with concomitant HF and DM represent an increasing population with greater adverse outcomes, prompting us to intervene in this high-risk group.

HF-DM patients are confronted with intense, and often conflicting, expected self-care. Self-care behaviors for HF patients include following a low-sodium diet; taking HF medications; performing and interpreting daily weights; partaking in physical activity; and monitoring symptoms of dyspnea, fatigue, and edema (Heart Failure Society of America, 2010). DM patients are taught to manage a diabetic diet, take DM medications, monitor blood glucose, perform daily physical activity, and monitor symptoms of hypoglycemia and foot problems (Kerr et al., 2007). HF patients with the comorbidity of DM are at greatest risk of being readmitted because of fluid overload, inadequate glycemic control, and other problems that might be preventable with better self-monitoring, self-care, and problem solving. In addition to knowledge about self-care, self-efficacy has been associated with greater self-care behaviors in patients with HF and DM (Cha et al., 2012; Dickson, Buck, & Riegel, 2013; Wu et al., 2013). Little evidence exists to guide the integration of HF and DM patient teaching or support patients' understanding of their comorbid self-care such as how to follow a low-sodium, diabetic diet;

managing HF and DM medications and interactions; self-monitoring HF-DM symptoms; and choosing a provider to contact for changes. The presence of HF may actually lead to less DM self-care prioritization and ability (Kerr et al., 2007; Piette & Kerr, 2006). Thus, tested processes and tools for comorbidity self-management and care do not exist and are important to improve the quality of care and outcomes. The purpose of this pilot study (IMPROVE HF-DM) was to develop and test an integrated self-care education and counseling program for its short-term effects on self-care antecedents and behaviors and to examine the feasibility of such an integrated intervention. The hypothesis tested was that the HF-DM patients randomized to the intervention group would experience greater improvements in HF- and DM-specific knowledge, self-care efficacy, self-care behaviors, and quality of life (QOL).

Methods

Theoretical Framework

This study was designed around an integrated theoretical framework developed to guide HF self-care studies (Dunbar, Clark, Quinn, Gary, & Kaslow, 2008). The framework synthesizes concepts from patient self-management theories and adult patient education concepts for learning and retention. The theoretical relationships of the variables are organized around antecedents and outcomes of self-care behaviors. Antecedents are individual and family factors and include sociodemographic, clinical, knowledge and skills, and behavioral factors. Within behavioral factors, self-efficacy is noted as a powerful indicator of self-care performance and predictor of HF hospitalization (Riegel et al., 2011; Sarkar, Ali, Whooley, 2009). The interventions designed for this study targeted the selected antecedents of self-care behaviors of knowledge and self-efficacy through an integrated comorbidity self-care education and counseling intervention. Short-term reinforcement, follow-up, and support were also designed to foster HF and DM knowledge and self-efficacy. The framework suggests that improved self-care and simultaneous adherence to multiple self-care behaviors leads to improved outcomes in terms of health status and QOL and lower resource use (Dunbar et al., 2008; Marti et al., 2013). We examined the primary effects of the intervention by indicators of HF- and DM-specific knowledge, self-efficacy, self-care or self-management behaviors, and perceived QOL. The intervention also incorporated the chronic care model's concepts of self-management support (patient

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