

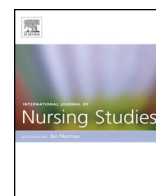


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Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns



Predictors of hospitalization and quality of life in heart failure: A model of comorbidity, self-efficacy and self-care

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ARTICLE INFO

Article history:

Received 30 January 2015

Received in revised form 26 June 2015

Accepted 30 June 2015

Keywords:

Comorbidity

Self-efficacy

Self-care

Explanatory model

Heart failure

ABSTRACT

Background: Comorbidity is associated with decreased confidence or self-efficacy to perform self-care in heart failure patients which, in turn, impairs self-care behaviors. Comorbidity is also associated with increased hospitalization rates and poorer quality of life. Yet the manner in which comorbidity and self-efficacy interact to influence self-care, hospitalization, and quality of life remains unclear.

Objectives: The purpose of this study was to test an explanatory model. The research questions were (1) What is the contribution of comorbidity to heart failure self-care behaviors and outcomes (i.e. hospitalization, quality of life)? and (2) Is comorbidity a moderator of the relationship between self-efficacy and heart failure self-care behaviors?

Design: This was an analysis of an existing dataset of 628 symptomatic, older (mean age = 73, standard deviation (SD) = 11) male (58%) Italian heart failure patients using structural equation modeling and simple slope analysis.

Results: Higher levels of self-care maintenance were associated with higher quality of life and lower hospitalization rates. Higher levels of comorbidity were associated with lower levels of self-care management. Comorbidity moderated the relationship between self-efficacy and self-care maintenance, but not self-care management. Post hoc simple slopes analysis showed significantly different slope coefficients ($p_{diff} < .05$). Specifically, in patients with less comorbidity, the relationship between self-efficacy and self-care was significantly stronger than in patients with higher comorbidity.

Conclusions: Self-efficacy is important in the self-care maintenance process at each level of comorbidity. Because higher comorbidity weakens the strength of the relationship between self-efficacy and self-care maintenance, tailoring interventions aimed at improving self-efficacy to different levels of comorbidity may be key to impacting hospitalization and quality of life.

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What is already known about the topic?

- Comorbidity is associated with longer lengths of hospital stay, more hospital stays per year, and higher overall costs of care.

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- Understanding the interplay of known antecedents of adequate heart failure self-care is necessary to begin to address rising hospitalization rates associated with comorbidity.
- In earlier work we established that there is interaction between comorbidity, self-efficacy, and heart failure self-care.

What this paper adds

- An explanatory model of the interaction of known predictors of hospitalization and quality of life with empirically verified parameters.
- Comorbidity moderates the relationship between self-efficacy and self-care maintenance but not self-care management.
- As the level of comorbidity increased, the relationship between self-efficacy and self-care maintenance decreased.

1. Introduction

Comorbidity, defined as two or more chronic conditions, is associated with longer lengths of hospital stay, more hospital stays per year, and higher overall costs of care (Rijken et al., 2013; Steiner and Friedman, 2013). In Italy, where this study was conducted, approximately 50% of the general population between the ages of 65–74 has at least two chronic conditions (I. Stat, 2015). This number jumps to 68% in heart failure populations (Cocchieri et al., 2015) with hospitalization accounting for 53% of the average costs (Valle et al., 2006). It has been estimated that comorbidity is responsible for 70–80% of health care costs in Europe or approximately 700 billion Euros in 2013 (Rijken et al., 2013). In comorbid heart failure populations the need for concurrent adherence to multiple self-care regimens and management of overlapping symptom profiles is common (Dickson et al., 2013). Failures in self-care result in health system utilization and increased health care costs (Ditewig et al., 2010).

Heart failure self-care is a 2 stage process (Riegel and Dickson, 2008). First, self-care maintenance captures the day-to-day treatment adherence and monitoring behaviors. Then self-care management includes recognition of a change in homeostasis and response mobilization. The self-care process is influenced by self-efficacy (Peters-Klimm et al., 2013; Riegel and Dickson, 2008). Heart failure patients derive event-free survival benefits from above average self-care and decreased hospitalization rates and improved quality of life from adequate self-care (Buck et al., 2012; Lee et al., 2011; Vellone et al., 2014) suggesting that the cost of heart failure may be mitigated by improving self-care.

However, recent attempts to decrease hospitalizations using self-care interventions have resulted in mixed outcomes (Davis et al., 2012; Delaney et al., 2013; Dracup et al., 2014; Inglis et al., 2011). In two, single site small RCTs, an in-person self-care intervention did not change readmission rates in the first study (Davis et al., 2012) and in the second, a technology intervention reduced 90 day

hospital readmissions (Delaney et al., 2013). In a larger, multi-site three-arm RCT testing the impact of stepped self-care interventions on readmission, no significant differences were found when either intervention arm was compared with usual care (Dracup et al., 2014). Furthermore, a large meta-analysis of heart failure education and monitoring studies conducted in 10 countries found significant improvement in hospitalizations in 30 studies but also found a bias toward positive outcomes (Inglis et al., 2011). One possible explanation for this outcome heterogeneity may be the role of comorbidity in the study. In each of these studies comorbidity functioned, if measured, as a sample descriptor rather than an independent variable in multivariate analysis. So it is unclear what part, if any, comorbidity may have played in the response to the interventions. Our study seeks to clarify this important point.

In earlier work, we established that there is interaction between comorbidity, self-efficacy and heart failure self-care in smaller samples (Dickson et al., 2011, 2013). Specifically, we found that comorbidity decreases self-efficacy. Self-efficacy, in turn, decreases self-care behaviors. Yet the manner in which comorbidity and self-efficacy interact to influence self-care remains unclear. Building on this earlier work, our goal in this study was to create an explanatory model for the manner in which comorbidity, self-efficacy and heart failure self-care interact and test it structurally with meaningful outcomes – hospitalization and quality of life.

Therefore, the specific aim of this study was to test an explanatory model of known predictors of hospitalization and quality of life. The research questions were (1) What is the contribution of comorbidity to heart failure self-care behaviors and outcomes (i.e. hospitalization, quality of life) adjusting for age and gender? and (2) Is comorbidity a moderator of the relationship between self-efficacy and heart failure self-care behaviors? Knowing the interaction among self-efficacy, comorbidity and self-care would clarify the mechanism by which hospitalization and quality of life are affected. This is important as self-efficacy is potentially modifiable and interventions designed to improve self-efficacy may differ when patients have different levels of comorbidity.

2. Methods

2.1. Study design and setting

This was a secondary analysis of a large cross-sectional database that described self-care in Italian heart failure patients (Cocchieri et al., 2015). In the parent study, a convenience sample of 1192 adults with heart failure was enrolled from cardiovascular centers located across 28 provinces in northern, central, and southern Italy. Data were collected between January 2011 and November 2012.

2.2. Sample

The inclusion criteria parent study were (1) adults over age 18; (2) diagnosis of heart failure by a cardiologist, confirmed by echocardiogram and clinical evidence of

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