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I am submitting herewith a dissertation written by Jennifer Lynn Mabry entitled "The Effects of Motivational Interviewing on Heart Failure Self-Care during Transitional Care in an Appalachian Population." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Nursing.

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Katherine Newnam, Robin Harris, Kathy Brown

Accepted for the Council:

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Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

The Effects of Motivational Interviewing on Heart Failure Self-Care during Transitional Care in an Appalachian Population

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Jennifer Lynn Mabry
May 2017

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Dedication

I dedicate this dissertation to my family who has provided emotional and physical support over the past four years of my doctoral journey. To my husband, Greg, you have loved and encouraged me to finish this journey strong. To my youngest son Luke, who has supported me for the past four years so "mom can finish her schoolwork," I am proud of the young man you are becoming. To my oldest son Wyatt, thank you for your support as well, and putting up with me while pursuing this degree. Thanks to my parents, Gary and Judy, for providing parental and housecleaning assistance so I could pursue my educational dream. Thank you to all, without each of you I would not have been able to finish.

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Abstract

Research has shown that patients who are successfully engaged in self-care for a chronic illness have a higher quality of life and reduced hospitalizations than those who are not. According to the National Center for Health Statistics, transitional care in the home setting has seen a 51% increase in mortality over the last 15 years (Reeder et al., 2015). This finding contrasts with the reported decline in hospital readmissions for chronic illnesses. With the lack of agreement on best practices for patient discharge education, transitional care has proven to be a weakness in chronic illness care that requires further research.

The first purpose of this study was to determine whether the intervention—consisting of four brief, nurse-directed motivational interviewing (MI) sessions administered face to face within 48 hours of discharge and during scheduled telephone follow-ups at 48 hours, 10–14 days, and 21–days post-discharge—in addition to standard discharge practice, significantly increased self-care in chronically ill HF patients living in rural Appalachia. The second purpose was to determine if participants who received the intervention had a different 30-day hospital readmission rates compared to patients who received only the standard discharge practice.

In this study, the sample (n=78) was randomized to a control group (n=38) and an experimental group (n=40). Both groups received standard HF discharge care provided by the facility, and completed the Self-Care in Heart Failure Index version 6.2 (SCHFI) and a demographic questionnaire. Both groups completed the post-discharge SCHFI at 21 days.

Data analysis, performed with a one-way Analysis of Covariance (ANCOVA), showed that the experimental group had statistically significant increases in self-care maintenance (p=.010) and self-care management (p=.002) after controlling for educational level and number of comorbidities. The difference in 30-day hospital readmission rates between the groups was not statistically significant (p=.100). While further research is needed to examine best practices for encouraging effective HF self-care in the transition period between hospital and home, this study's MI intervention showed promise in this area.

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List of Abbreviations

AAHFN	American Association of Heart Failure Nurses
ACCF	American College of Cardiology Foundation
ACA	Patient Protection and Affordable Care Act
AHA	American Heart Association
AHoA	American Hospital Association
AHRQ	Agency for Healthcare Research and Quality
ANCOVA	Analysis of covariance
APRN	Advanced Practice Registered Nurse
CG	Control group
CMS	Centers for Medicare & Medicaid Services
EF	Ejection fraction
EG	Experimental group
EHR	Electronic health record
HF	Heart failure
HFSA	Heart Failure Society of America
HIPPA	Health Insurance Portability and Accountability Act
IOM	Institute of Medicine
IRB	Institutional Review Board
JC	The Joint Commission on Accreditation of Health Care Organizations
MI	Motivational interviewing
NDM	Naturalistic decision making
NICE	National Institute of Health and Clinical Excellence
NYHA	New York Heart Association
PI	Principal Investigator
RA	Research Assistant
RCT	Randomized control trial
SCHFI	Self-Care in Heart Failure Index version 6.2
SDT	Self-Determination Theory
U.S.	United States

Chapter 1: Introduction

The worldwide prevalence of preventable chronic disease increased over the last decade by approximately 17% according to the World Health Organization (Go et al., 2013). In the United States (U.S.), the lifetime risk of being diagnosed with a serious, life-limiting condition is 20% (Lloyd-Jones et al., 2010). The Centers for Disease Control and Prevention (CDC) defines a chronic disease as one that lasts more than three months and cannot be prevented by a vaccine or cured with a medication (CDC, 2016). Approximately 50% of the adult population in the U.S. has a chronic disease (CDC, 2016). The most common chronic diseases are arthritis, heart disease, and cancer. Of these chronic diseases, heart disease and cancer comprise 48% of the total chronic illness burden in the U.S. (CDC, 2016).

Heart failure (HF), a subcategory of heart disease, accounts for more than 1 million of the 35 million annual hospitalizations in the U.S. (American Hospital Association [AHoA], 2017). HF is defined as a progressive weakening of the heart muscle mainly caused by a previous preventable illness (Roger, 2013). HF symptoms include shortness of breath, fatigue, and weight gain. Individuals with HF must recognize and act on these somatic changes to prevent further complications. Hospitalizations due to worsening HF symptoms are estimated to cost $44 billion annually (Roger, 2013). Hospital readmission rates for HF patients continue to be 20–30% despite ongoing efforts aimed at discharge and transitional care education (Granger, Sandelowski, Tahshjain, Swedberg, & Ekman, 2009).

Self-care is defined as "the ability to care for oneself and the performance of activities necessary to achieve, maintain, or promote optimal health" (Richard & Shea, 2011, p. 256). Self-care can be viewed on a spectrum ranging from complete independence when managing health to complete reliance on medical care (Wilkinson & Whitehead, 2009). Independent HF self-care

occurs when patients recognize changes in their bodies, interpret these changes correctly, institute self-care strategies to manage symptoms, and adhere to prescribed treatments (Riegel & Dickson, 2008). Successful maintenance and management of HF requires several self-care activities: monitoring weight, eating a low-sodium diet, maintaining an appropriate activity level, taking discharge medications as directed, knowing how to address worsening symptoms, and attending follow-up appointments (The Joint Commission on Accreditation of Health Care Organizations [JC], 2010). This study used an intervention, provided at hospital discharge, designed to promote self-care understanding and treatment compliance for HF patients.

This chapter covers the study's background, statement of the problem, and purpose. Next, is a summary of the theory used to guide the study, as well as an explanation of the study's theoretical definitions, research hypotheses, operational definitions, assumptions, propositions, limitations, and the study's significance to nursing science.

Background

The AHoA (2007) predicts that approximately 37 million people will be diagnosed with at least one chronic disease by the year 2030. This expectation is due in part to the rise in the aging population as well as their continued tobacco use, lack of exercise, and poor diet adherence (AHoA, 2007). According to The Institute of Medicine's (IOM, 2012) report *Living well with chronic illness: A call for public health action*, cardiovascular disease was a growing burden to low- and middle-income patients that was likely to affect future generations. Of individuals diagnosed with HF, 75% have preventable diseases such as hypertension (Go et al., 2013). According to hospital discharge records, HF is the most common chronic disease in persons aged 65 and older, affecting approximately 5.1 million individuals (Go et al., 2013). The total cost of

caring for HF patients in 2013 was estimated at $32 billion, and this number is expected to increase 120% or $70 billion annually by 2030 (Go et al., 2013).

The administrators of inpatient facilities are looking for evidence-based strategies to improve patient outcomes during the first 30-days following hospitalization in order to reduce insurance reimbursement penalties related to rehospitalizations. In 2012, the Centers for Medicare & Medicaid Services (CMS) began penalizing hospitals for 30-day readmissions related to HF and five other tracked conditions (Rizzo, 2013). This policy started with a 1% penalty in 2012, which increased to 3% in 2015 (Rizzo, 2013). The cost of an HF readmission in 2009 was $13,000, and this figure increased to $15,667 in 2012 (Pyenson, Fitch, & Pelizzari, 2015). The high cost caring for HF patients and the added burden of rehospitalization penalties have driven researchers to look for ways to improve outcomes during the transitional care period from hospital to home.

Several public and private governing institutions support research related to self-care practices that improve patient outcomes. The IOM supports individualized behavioral research to identify best practices for achieving physical, mental, and social well-being (IOM, 2012). The National Institute for Nursing Research identified the need for research targeting self-care management of chronic conditions in their 2015–2016 exploratory grant program announcement. Finally, the 2013 HF practice guidelines from the American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) mentioned the need to close research gaps by targeting patients' personal care preferences, individualized transitional care support, somatic symptom recognition, decision making about when to seek treatment, and specific behavioral approaches to meet these needs (Yancey et al., 2013). The National Institute of Health and Clinical Excellence (NICE) noted that discharge interventions targeted at supporting self-care are

critical to decreasing readmission rates in the high-risk period immediately following hospital discharge (NICE, 2010).

Encouraging self-care behavior changes in HF patients is a complex process (Riegel & Carlson, 2002). Self-care decisions are affected by the complexity of the problem as well as a person's environment, knowledge of the situation, experience with previous self-care, and cultural influences surrounding the decision-making process (Riegel & Dickson, 2008). These individual factors develop over time and are influenced by healthcare providers. Furthermore, HF patients have a 30% higher 30-day readmission rate for symptom management when compared to patients with other preventable chronic illnesses such as pulmonary and endocrine conditions (Goodman, Firouzi, Banya, Lau-Walker, & Cowie, 2013). Because HF symptoms vary in onset, intensity, and duration, each self-care plan should address each patient's individual needs. Promoting individualized care plans based on mutually agreed upon goals, changing ambivalence, and frequent follow-up sessions can lead to improved patient self-care outcomes (Miller & Rollnick, 2002).

Statement of Problem

Educating patients about self-care at hospital discharge has been the hallmark of chronic illness management. A review of studies about HF patient education noted that most discharge teaching is designed to enhance self-care by increasing patients' knowledge and understanding (Riegel et al., 2006). Current standardized discharge care typically involves the provider giving the patient verbal and written instructions about self-care, follow-up appointments, and updated medication lists. Because these instructions are provided on the day of discharge in a task-oriented succession, the patient often is not given the opportunity to reflect on the information and ask questions about their self-care. Health literacy, another important aspect of

understanding written instructions, generally is not established by the provider before giving patients standardized discharge teaching (Baker et al., 2011). Moreover, the provider and patient do not devote adequate time to set self-care goals. Allowing time for goal setting at discharge and before transitional care periods can allow patients and providers to explore self-care preferences and individualize medical treatments (Riegel, Vaughn Dickson, Goldberg, & Deatrick, 2007).

The transitional care period consists of the first 30-days after patients are discharged from an inpatient facility and is considered the time when patients are most vulnerable to readmission (Otsu & Moriyama, 2011). Regalbuto, Maurer, Chapel, Mendez, and Shaffer (2014) reported that only 10% of the HF patients in their study understood all of the discharge instructions provided, and that this low figure contributed to these patients having a higher than normal 30-day readmission rate. An intervention specifically targeting the transitional care period, including the first three weeks of home care, has been shown to reduce hospital readmissions and improve clinical outcomes (Yancey et al., 2013).

While it seems counterintuitive, multiple studies have shown that patients with more knowledge about their illness do not necessarily have better self-care compliance or health outcomes (González et al., 2005; Goodman et al., 2013; Reeder, Ercole, Peek, & Smith, 2015; Riegel & Carlson, 2002; Riegel et al., 2006; Riegel, Jaarsma, & Strömberg, 2012; Shao, Chang, Edwards, Shyu, & Chen, 2013; Shively et al., 2013). Reeder et al. (2015) suggested the need for research aimed at producing interventions that help patients recognize, interpret, and apply self-care strategies for symptom management, as well as increase a patients' confidence in self-care.

The motivational interviewing (MI) coaching method is an evidence-based approach to discharge education that elicits a patient's established intrinsic motivation to change a specific

health-related behavior (El-Mallakh, Chelbowy, Wall, Myers, & Cloud, 2012; Miller & Rollnick, 2002). Miller and Rollnick, the behavioral health counselors who created this method, emphasized that active listening to the client reduces their ambivalence to change. Some of the main principles for MI providers are to develop discrepancy in the client, express empathy, reduce ambivalence, and support self-efficacy (Miller & Rollnick, 2002).

The rural HF Appalachian population's socioeconomic determinants, cultural influences, and self-care behaviors are distinct from those of urban HF patients. These documented differences include a lack of access to primary care providers, lower health literacy, increased poverty level, and lower overall educational level (Pollard & Jacobsen, 2016). Appalachian people also value family-based healthcare knowledge, often have a fatalistic view of their health, and value mutual trust in a provider/patient relationship (Behringer & Friedell, 2006). MI has been used to increase self-care behaviors in urban and suburban HF populations (Paradis, Cossette, Frasure-Smith, Heppell, & Guertin, 2010; Riegel et al., 2006). No studies published to date have examined using MI to increase self-care in a rural Appalachian population with HF.

Purpose of Study

The first purpose of this study was to determine whether the intervention—consisting of four brief, nurse-directed MI sessions administered face to face within 48 hours of discharge and during scheduled telephone follow-ups at 48 hours, 10–14 days, and 21–days post-discharge—in addition to standard discharge practice, significantly increased self-care in chronically ill HF patients living in rural Appalachia. The second purpose was to determine if participants who received the intervention had a different 30-day hospital readmission rates compared to patients who received only the standard discharge practice.

Philosophical Perspective

In her work entitled *The Nature of Nursing,* Virginia Henderson asserted that the nurse's primary focus should be fostering patients' independence. She went on to state that "the sooner a person can care for himself, find health information, or even carry out prescribed treatments, the better off he is" (Henderson, 1964, p. 63). Because individuals in an illness state often are struggling just to maintain homeostasis, they frequently seek additional care when faced with a change in wellness. According to Henderson, health is not the absence of illness, but a continuum from wellness to illness that patients travel during their lifetime. Henderson defines health as the highest achievable level of wellness a patient can obtain. The nurse's duty is to help the patient obtain the highest level of health the person is able and wishes to achieve.

For this study, quantitative research methods were used to discover new truths. According to the post-positivist view, truth exists within a context and knowledge is conjectural (Creswell, 2007). Post-positivist assumptions state that a theory is tested by examining the relationship between variables. Post-positivism also examines the world through a lens of structured observation and measurement, cause and effect, and measurable variables (Creswell, 2007). For this study, a MI intervention was examined and its relationship to self-care and 30-day hospital readmissions in patients recently hospitalized with HF complications was determined.

The principal investigator (PI) also employed a pragmatic approach. Pragmatism values practical consequences and posits that the ultimate truth in ideas is their power to work in the real world (Sahakian & Sahakian, 1965). In other words, researchers should ask questions that have solid consequences and issue concrete results. Philosopher John Dewey described pragmatism as a philosophy of "if an idea works, then it is designated as truth" (Sahakian &

Sahakian, 1965). Knowledge alone is not useful unless it is workable and resolves a problem (Stokes, 2012). Knowledge is not the only component needed for successful self-care. Health experience, skill in caring for oneself, and congruence with cultural values also are crucial dimensions of an individual's self-care abilities. Conducting heuristic inquiry using a patient's experience influences this study's aims and is congruent with the theory chosen to guide the intervention. Dewey described theories as instruments for truth that are observable and measureable (Stokes, 2012). Predicting an endpoint also is possible after examining previous experience. Such causal predictions result from observational, metaphysical, or empirical testing. According to pragmatic philosophers, coherence is the most valid test of truth, and it requires the systematic explanation of all the facts of the experience or phenomenon (Sahakian & Sahakian, 1965).

Theoretical Framework

Self-care has been an elemental concept for promoting or maintaining optimal patient health. A lack of self-care engagement has been a common theme for explaining patients' non-adherence to treatment regimens as well as poor health outcomes for several chronic illnesses (Goodman et al., 2013). Self-care can be considered a continuum ranging from complete independence in managing health to complete reliance on medical care. It also is situation specific and influenced by a variety of individual and cultural characteristics (Riegel & Dickson, 2008). To achieve optimal self-care, patients must have the cognitive ability to make decisions and perform activities (Richard & Shea, 2011). In her self-care deficit theory, Dorthea Orem defined self-care as the "activities performed by individuals or communities to achieve, maintain, or promote maximum health" (Orem, 1995, p. 16). Self-care agency is defined by Orem as a person's ability to perform self-care activities, and a deficit occurs when self-care demands

exceed self-care agency. According to Orem, nurses recognize this deficit and meet individuals' needs either by acting or doing for them, guiding them, supporting them physically or psychologically, providing an environment to promote their personal development, and/or teaching them (Orem, 1995). Orem focused on acute rather than chronic illnesses, and did not include the sociocultural contexts influencing self-care today. Orem also assumed that patients would want to participate in self-care, and would do so only when there was a self-care deficit.

Congruent with Orem's theory of self-care deficit, Riegel and Dickson developed the situation-specific theory of heart failure self-care in 2008 from their practical clinical cardiac experience, previous self-care research, and subjective data obtained from colleagues and research participants. These researchers determined that it would be extremely difficult for a patient with a complex chronic illness, such as HF, to master self-care without nursing intervention. Nurses help patients monitor symptoms, set goals, and individualize treatment adherence strategies. Riegel and Dickson (2008) also developed the self-care of heart failure model that explains the relationships between the concepts of self-care maintenance and self-care management, with self-care confidence as a mediator for successful self-care (Figure 1). Self-care confidence connects individual self-care to patient outcomes. Individuals with high self-care confidence, maintenance, and management have improved clinical outcomes. These three concepts are situation dependent on the person, environment, and simultaneously occurring problems (Riegel & Dickson, 2008).

After developing the situation-specific theory of heart failure self-care, Dr. Riegel and two Swedish researchers expanded it into a middle-range theory entitled self-care of chronic illness. The theoretical basis for this theory evolved from the researchers' clinical practice and experience with HF patients (Riegel et al., 2012).

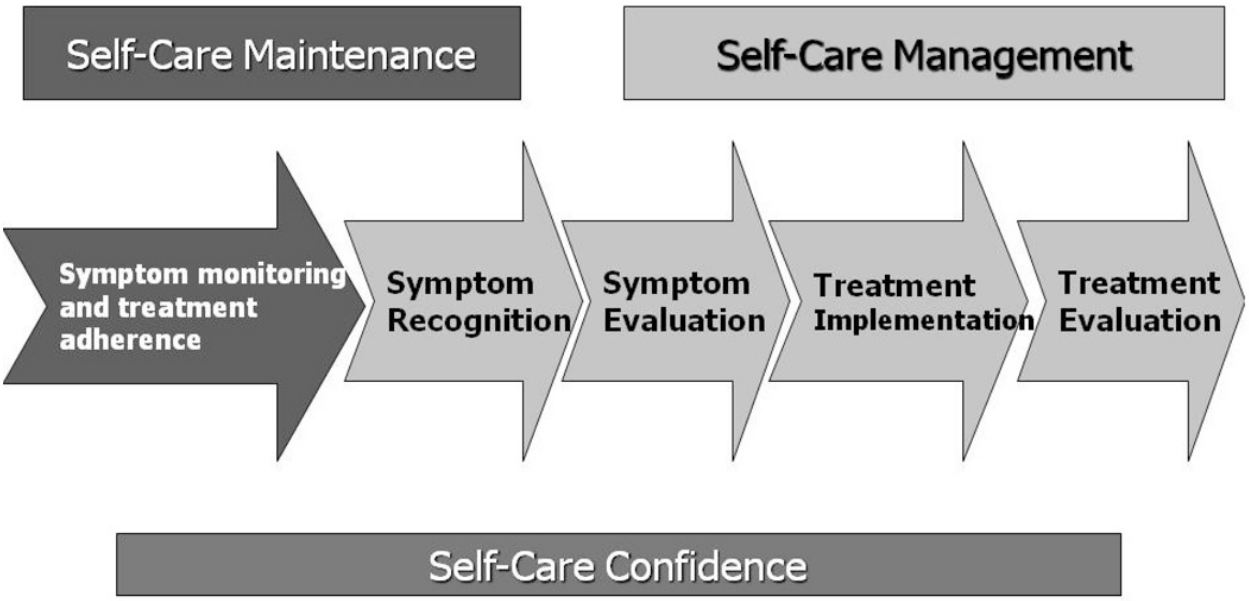

Figure 1. Self-care in heart failure model.

From "A situation-specific theory of heart failure self-care" by B. Riegel and V. V. Dickson, 2008, Journal of Cardiovascular Nursing, 23, p. 192. Copyright 2008 by Lippincott Williams & Wilkins. Reprinted with permission.

The current study's assumptions and propositions are from the middle-range theory of self-care of chronic illness.

Cognitive ability is another significant contributor to self-care. Riegel and Dickson (2008) described naturalistic decision making (NDM) as the process people use to make cognitive decisions in real time. This process involves "focusing on the process rather than on the outcome; making decisions within context to situation; [and] basing practical decisions on the empirical information available at the moment" (p. 192). Several factors are crucial to the NDM process in self-care: the patient's knowledge level, experience, skill, and the self-care action's compatibility with their values (Riegel & Dickson, 2008) (Figure 2).

Figure 2. Components of naturalistic decision making (NDM) for heart failure patients.

The person, problem, and environment interact with the individual's knowledge, experience, skill, and cultural values to influence self-care decisions. From "A situation-specific theory of heart failure self-care" by B. Riegel and V. V. Dickson, 2008, Journal of Cardiovascular Nursing, 23, p. 193. Copyright 2008 by Lippincott Williams & Wilkins. Adapted with permission.

The three theoretical propositions that emerged from the self-care in heart failure model and the NDM process are as follows:

1. symptom recognition is the key to successful self-care management;
2. self-care is influenced by patients' knowledge, experience, skill, and each self-care action's compatibility with their values; and
3. confidence mediates and/or moderates the influence of self-care on outcomes (Riegel & Dickson, 2008, p. 193).

The Self-Care in Heart Failure Index version 6.2 (SCHFI) is a survey instrument developed to measure the self-care concepts that are fundamental to the self-care in heart failure theory (Riegel, Carlson, & Glaser, 2000).

Self-determination theory (SDT), a macro theory of human motivation and personality, was developed by Ryan and Deci (2000) to explain how individuals develop personality and their subsequent self-motivated behavior changes. SDT explains how people internalize and integrate extrinsic motivations to self-regulate behaviors autonomously. Individuals'

environments (how they were praised rewarded, or given feedback) directly affects their intrinsic motivations. Therefore, autonomous behavior regulation is more enduring than controlled behavior regulation. The SDT authors stated that all behaviors fall along a continuum of autonomy. The patient is more compliant to treatment if they perceive their provider is supportive of their autonomy rather than controlling or paternalistic. To achieve lasting behavior changes, patients also must have autonomous self-regulation of both intrinsic and well-internalized extrinsic motivations. The most autonomous extrinsic motivation involves behavior the patient is willingly involved in and incorporates into their core values and beliefs. As patient educators, nurses can function as facilitators that help provide this extrinsic motivation. Nurses also partner with patients to help them make their own decisions about specific health behaviors. Behavior change will not occur unless the patient accepts that they have the capability and resources to implement a change successfully. Nurses can to support patient self-efficacy for behavior changes through MI methods.

MI is a simple counseling technique grounded in the SDT that promotes patient volition. The SDT describes three basic psychological needs that influence behaviors: competence in ability, autonomy in action, and feeling a sense of relatedness to others. The MI technique is responsive to the patient's feelings, patient centered, non-judgmental, and can be delivered in a brief 15-minute session. The structure of the MI method also allows the person administering it to determine patients' competency, support their autonomy through listening and affirmations, and express empathy to relate to them. Both the SDT and MI focus on the patients' "change talk" that moves them toward autonomous health-behavior actions (Markland et al., 2005, p. 815) (Figure 3).

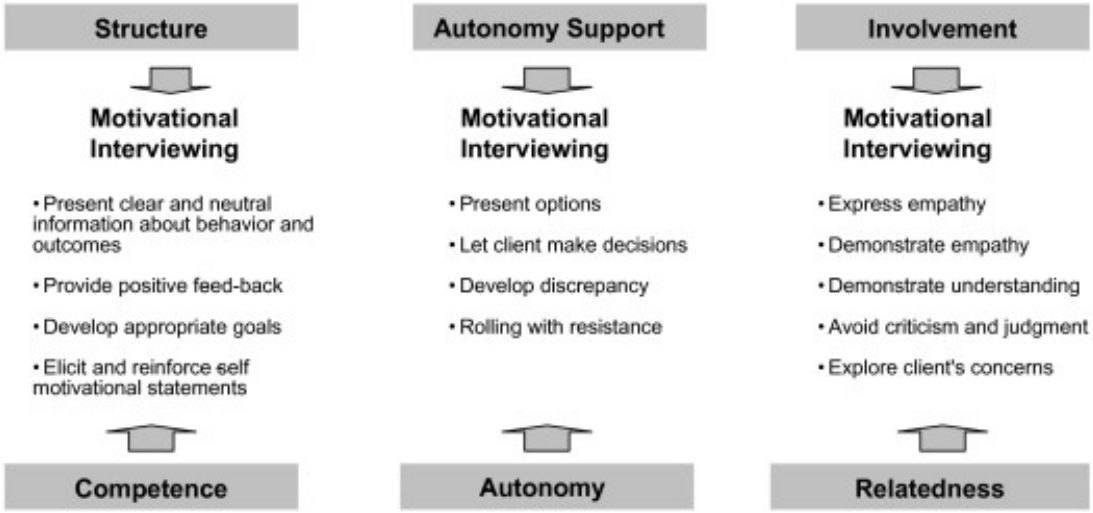

Figure 3. Self-determination theory and motivational interviewing.

From "Motivational interviewing and self-determination theory" by D. Markland and R. M. Ryan, 2005, Journal of Social and Clinical Psychology, 24, p. 821. Copyright 2005 by Guilford Publications. Reprinted with permission.

Theoretical and Standardized Definitions

Self-care – "a rational process, involving purposeful choices and behaviors, reflecting knowledge and thought. A naturalistic decision-making process involving the choice of behaviors that maintain physiologic stability (maintenance) and the response to symptoms when they occur (management)" (Riegel & Dickson, 2008, p. 190).

Naturalistic decision making – "the automatic, impulsive, contextual decisions that people make in complex, real-world situations" (Riegel et al., 2012, p. 197).

Self-care maintenance – "symptom monitoring and treatment adherence (following the advice of provider) as well as symptom interpretation and recognition" (Riegel & Dickson, 2008, p. 192).

Self-care management – "the decision-making response to symptoms when they occur. This involves symptom evaluation, treatment implementation, and treatment evaluation" (Riegel & Dickson, 2008, p.192).

Self-care confidence – "a mediator/moderator between support and self-care in patients with HF. Therefore, social support improves self-care confidence and thereby improves patients' abilities to perform self-care" (Riegel & Dickson, 2008, p.195).

Transitional care – "a broad range of time-limited services designed to ensure healthcare continuity, avoid preventable poor outcomes among at-risk populations, and promote the safe and timely transfer of patients from one level of care to another" (Naylor, Aiken, Kurtzman, Olds, & Hirschman, 2011, p. 747).

Motivational interviewing – a "client-centered, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence" (Miller & Rollnick, 2002, p.25).

Heart failure – "when the heart is unable to generate an adequate cardiac output, causing inadequate perfusion of tissues or increased diastolic filling pressure of the left ventricle, or both, so that pulmonary capillary pressures are increased" (Huether & McCance, 2012, p.622).

New York Heart Association (NYHA) Functional Class – Classification of HF widely used for functional status and subjective severity of symptoms.

- Class I patients have no limitation of physical activity and no HF symptoms such as fatigue, palpitations, or shortness of breath with ordinary activities.
- Class II patients have slight limitation of physical activity and are comfortable at rest while ordinary physical activity results in mild fatigue, palpitations, and shortness of breath.

- Class III patients have marked limitations with physical activity, are still comfortable at rest, but less than ordinary activity results in fatigue, palpitations, and shortness of breath.
- Class IV patients are unable to carry out any physical activity without discomfort and have symptoms of HF at rest. Any physical activity by Class IV patients results in an increase of discomfort (AHA, 2015).

Research Hypothesis

This study's theoretical hypothesis, grounded in the situation-specific self-care in heart failure theory, stated that patients in the experimental group (EG) who undergo a nurse-led MI intervention in addition to standard practice HF discharge care will have a statistically significant increase in their self-care level during the first 30-day transitional period (following discharge) after controlling for educational level and number of comorbidities, compared to the control group (CG) as measured by the SCHFI. The first null hypothesis stated that there will be no statistically significant difference between the self-care level of the CG and EG as measured by the SCHFI after the nurse-led MI intervention during the first 30-day transitional care period.

The second hypothesis was that EG patients who undergo the nurse-led MI intervention in addition to the standard HF discharge care will have a statistically significant decrease in their rate of 30-day hospital readmission compared to CG patients receiving standard practice discharge care only. The second null hypothesis stated that there will be no statistically significant difference in 30-day hospital readmission rates between groups.

Operational Definitions

This study's independent variable was the intervention that consisted of a brief (15-30 minute) nurse-led MI session for improvement of self-care delivered face to face to EG patients within 48 hours of discharge, and three times by telephone at 48 hours, 10–14 days, and 21 days

post-discharge. The ACCF and the AHA list MI as a level of evidence B in their 2013 recommendations for discharge follow-up. The ACCF and AHA jointly developed levels of evidence for practice guidelines in order to have a standardized classification system to support practice from published research. The levels range from A to C, with level B indicating data derived from one or more of the following types of research: a quality randomized control trial (RCT), a meta-analysis of moderate quality RCT, or quality nonrandomized studies (Halperin et al., 2016). The ACCF and AHA support MI in the transitional period from hospital to home to reduce readmissions from HF symptoms (Yancey et al., 2013).

The MI intervention centers on change talk and uses the "OARS method" of **O**pen-ended questions, **A**ffirmation statements, **R**eflective listening, and **S**ummarizing reasons for change (Emmons & Rollnick, 2001). The brief MI intervention will focus on helping patients develop individualized goals to use the ACCF/AHA evidence-based HF treatments while at home as recommended by published literature and the concepts of the self-care in heart failure theory (Appendix A). Self-care goals specific to HF included daily weight monitoring, medication adherence, physical activity, smoking cessation, and sodium and fluid dietary restrictions (Yancey et al., 2013).

Standard care includes giving patients a booklet entitled *Heart Failure 2016* that was developed by the participating regional hospital. This booklet is based on the HF zones developed through funding from the Robert Wood Foundation on Chronic Illness Care, and funded and endorsed by the Agency for Healthcare Research and Quality (AHRQ) and the Cleveland Clinic (Appendix B) (AHRQ, 2008). The booklet contains information about diet, medications, exercise, follow-up appointments, and symptom zones indicating when to call a provider. The standard care for patients with the primary diagnosis of HF was provided to both

study groups by the hospital facility near the time of discharge. A clinical pharmacist, nutritionist, and a nurse case manager were available to consult with the patient prior to discharge regarding medication adherence and healthcare needs for returning home. The bedside nurse initiated these consults when patients expressed having barriers to self-care.

Self-care for both groups was measured 48 hours prior to discharge and at day 21 by the PI using the SCHFI included in Appendix C (Riegel, Lee, Dickson, & Carlson, 2009). The SCHFI instrument measures the three theoretical self-care concepts in Riegel and Dickson's self-care in heart failure theory: self-care maintenance, self-care management, and self-care confidence (Riegel et al., 2009). Please refer to Chapter 3 for a detailed description of the study instrument.

Assumptions

Assumptions are premises accepted without proof. This study had three assumptions, all based on its theoretical framework.

1. Self-care associated with a chronic illness such as HF is circumscribed and influenced by others.
2. Self-care decision making involves a sufficient capacity for working memory and the ability to keep focused attention, think, and understand and weigh information.
3. Self-care for patients with multiple comorbid conditions may be conflicting when self-care is considered for each illness separately. Additionally, patients trying to incorporate advice from multiple providers experience complexity in their decision making (Riegel et al., 2012).

Propositions

Propositions are the testable predictions of a theoretical framework. This study had seven propositions from the middle-range theory of self-care in chronic illness (Riegel et al., 2012) that was formed from the situation-specific theory of heart failure self-care.

1. There are core similarities in self-care across different chronic illnesses such as self-care monitoring.
2. Personal experience with illness or caring for someone with a similar illness or self-care needs increases the quality of self-care performed. The process of self-care is learned experientially.
3. Patients who engage in self-care that is purposive but unreflective have a limited ability to master self-care in complex situations. Reflective self-care can be learned.
4. Misunderstandings, misconceptions, and lack of knowledge all contribute to insufficient self-care. This proposition refers to the knowledge-building relationship between patient and provider.
5. Mastery of self-care maintenance precedes mastery of self-care management, because self-care maintenance is less complex than the decision making required for self-care management.
6. Self-care monitoring for changes in signs or symptoms is necessary for effective self-care management, because one cannot decide what to do about a change unless it has been noticed and evaluated.
7. Individuals who perform evidence-based self-care have better outcomes than those who perform self-care that is not evidence-based (Riegel et al., 2012).

Limitations

This study has six limitations.

1. Self-reported compliance with self-care may create a threat to internal validity.
2. Using the same instrument pre- and post-intervention may threaten external validity due to potential pretest learning from the instrument itself.
3. Having a novice PI deliver the MI intervention may affect its fidelity. To address this concern, a counselor familiar with MI methods reviewed a pilot transcript of the intervention prior to the enrollment of study participants. The counselor also was consulted during the study as needed for direction in using the MI method.
4. Using a convenience sample of rural HF Appalachians from one regional hospital limits the generalizability of the study's results.
5. External validity is limited by the study's inclusion criteria: English speaking rural Appalachian HF patients 40–85 years of age in NYHA functional classes II–IV.
6. The fact that the healthcare facility began a transitional care program to encourage follow-up and medication adherence at the end of this study's enrollment was a confounding variable. Therefore, six participants who were enrolled in both programs were removed from this study's statistical analysis.

Significance for Nursing

Using the situation-specific nursing theory of self-care in heart failure to test the previously outlined assumptions and propositions will explicate scientific findings related to self-care in HF patients. Working with a rural regional hospital and the Appalachian population also will add evidence for healthcare providers caring for this specialized population. Past studies

have been carried out in urban areas with other diverse populations. This was the first study in the rural Tennessee Appalachian region using MI as an intervention to improve HF self-care.

Using MI to improve self-care based on SDT concepts also is a unique feature of this study. Previous studies have used MI to reduce ambivalence to behavior change, but none has used a nurse-led MI in an Appalachian population (Masterson Creber , Patey, Lee, Kaun, Jurgens, & Reigle, 2016; Paradis et al., 2010; Riegel et al., 2006). This study is significant to nursing science as its results could be used to design interventions to help improve outcomes for patients with a chronic illness during the transitional period from hospital discharge through the first 30 days at home.

Chapter Summary

This unique study with Appalachian patients who have been hospitalized with exacerbations of HF symptoms will contribute to the nursing science in the field of HF self-care. The PI presented the problem statement, significance of HF self-care, operationalized definitions, and provided theoretical assumptions and propositions for the theory of self-care in heart failure to support the proposed nurse-led MI intervention. The primary and secondary aims of the research were explicitly stated in the hypotheses. Limitations of the study that are threats to its internal and external validity also have been listed.

Chapter 2: Literature Review

A current state of the science was performed prior to this study to explore and summarize research about self-care in the HF population. The literature search was performed in stages from August 2013 to May 2016. The electronic databases of PubMed-Medline, Cumulative Index for Nursing and Allied Health Literature (CINAHL), Google Scholar, and Cochrane Library were searched using different combinations of search terms. These search terms included self-care, HF, motivational interviewing, Appalachian population, and chronic illness. The search was limited to primary research studies with adult populations >18 years of age that were available in English and published in peer-reviewed journals between 2002 and 2016.

The initial search identified 462 eligible articles. After eliminating duplicates and screening articles using titles, abstracts, and keywords, the PI reviewed the full text of the remaining 80 articles. Sixteen articles were excluded for the following reasons: eight were literature reviews, five were poorly described studies, and three did not specify HF as a chronic illness. The author examined the 64 remaining publications looking for studies that focused on nursing, targeted interventions during discharge or in the transitional care period, and aimed at improving HF self-care. Studies with both qualitative and quantitative research methods were included. This third step reduced the literature to 25 articles with four themes: self-care barriers and facilitators, study interventions based on theoretical assumptions, non-theoretical study interventions, and the use of MI as an HF self-care intervention. Of these 25 articles, nine used inductive qualitative designs, 14 used deductive quantitative designs, and two used a mixed-method approach. The studies took place from both inpatient and outpatient clinics and originated in several counties: U.S. (n=16), Europe (n=3), Canada (n=2), Taiwan (n=2), Japan (n=1), and Australia (n=1).

Self-Care Barriers and Facilitators

In the early 1990's, HF patient education focused on giving patients self-care information based on evidenced-based guidelines during a hospitalization for an acute HF exacerbation. The ineffectiveness of this approach was noted when these patients were being readmitted on a frequent basis despite having received educational resources and reinforcement teaching. Most HF discharge education was a one-size-fits-all solution that encouraged patients to be involved in their own self-care. In contrast, the results of current published research indicate that specific, personally tailored, and confidence-building educational interventions are more effective (Britz & Dunn, 2010; Stevenson, Pori, Payne, Black, & Taylor, 2015; Wingham, Harding, Britten, & Dalal, 2014). Moreover, simply providing knowledge is not an effective method for increasing HF self-care among patients and caregivers (Clark et al., 2009). In their study, Clark et al. (2009) noted that individual and cultural determinants must be addressed in a contextual fashion to promote effective self-care. This approach requires an open dialogue between the educator and the patient. To promote self-care, Clark et al. (2009) promoted the consideration of other self-care determinants including an individual's faith, work ethic, beliefs, and values.

In one of the earliest studies, Riegel and Carlson (2002) sought to uncover the barriers and facilitators to HF self-care. This qualitative study predates the development of Riegel and Dickson's (2008) situation-specific theory of heart failure self-care. One of the early study's main objectives was to determine why HF patients have difficulty mastering self-care. Twenty-six chronic HF participants underwent structured interviews with open-ended questions. After performing a content analysis of the data, the researchers noted several common challenges among those living with HF: physical limitations, complicated treatment regimens, lack of knowledge, negative emotions, multiple comorbidities, and personal struggles. Symptom

recognition and following treatment regimens were identified as self-care barriers. The facilitators to self-care were discovering practical adaptations to living with HF, maintaining control, and depending on others, especially healthcare providers (Riegel & Carlson, 2002). These participants were typical HF patients: elderly, retired, poor, and functionally compromised due to HF. Finally, Riegel and Carlson, (2002), concluded that "patient education is doomed if the patient is not motivated to learn the information" when significant barriers exist (p.293). This study provides support for MI in that the authors suggest that healthcare providers focus on essential behavioral changes that are important to the individual, instead of providing comprehensive HF patient teaching (Riegel & Carlson, 2002).

Granger et al. (2009) also explored barriers to HF self-care. In their qualitative study, 10 patient-provider pairs were asked individually about how a recent information exchange regarding HF illness was experienced and understood. From the data, the researchers noted a pervasive theme: both providers and patients regarded managing HF as an experience requiring "work" (Granger et al., 2009). Interestingly, while the patients described knowing the HF self-care regimen, they seemed to lack the ability to personalize and incorporate these recommendations. In contrast, the providers felt the patients did not understand the regimen despite feeling that the instructions were "easy" (Granger et al., 2009, p. 311). The researchers concluded by offering several suggestions to help providers bridge the gap in understanding between them and their patients: practicing cultural sensitivity, listening to the patient, personalizing instructions, and encouraging confidence.

In a later mixed-methods study conducted in the U.S. by Riegel et al. (2007), the authors set out to describe and understand how HF self-care expertise is developed. The barriers to self-care in these patients were comorbid conditions, functional impairment, impaired cognition,

depression, and poor social support. It was discovered that approximately one in 10 HF patients could be expected to develop expert self-care despite these barriers. The most significant finding for promoting self-care expertise in HF patients was having the support of engaged supporters such as family members (Riegel et al., 2007).

Similarly, several more recent qualitative studies have identified the need for tailored education focused on overcoming specific barriers by increasing patients' self-care motivation and confidence (Klymko, Artinian, Price, Abele, & Washington, 2011; Reeder et al., 2015; Riegel et al., 2007; Williams & Manias, 2013). Despite two of the studies being conducted with different chronic illness populations—one in Australia, and the other focused only on African-American women—the results from both concluded that social support, individualized treatment regimens, and supportive interventions warranted further research (Klymko et al., 2011; Williams & Manias, 2013). Furthermore, the authors of a study of U.S. veterans with HF described that individualized discharge strategies were valued by the patients for preventing hospital readmissions. These patients did not perceive any barriers to accessing care. However, they frequently mentioned recognizing the symptoms of dyspnea and fatigue, indicating that the association between these symptoms and readmission needed to be emphasized more frequently and effectively (Stevenson et al., 2015). Despite the diverse populations in each of these studies, the recommendation for overcoming self-care barriers was the same: provide personal, specific, and individualized discharge education interventions to increase patients' self-care motivation and confidence.

Theoretical Interventions to Improve Self-Care

Six research studies used a theoretical model to guide an intervention or interpret results. The first was a descriptive correlational study designed to determine which self-care deficits

among HF patients at the time of discharge are related to a decrease in their perceived quality of life (Britz & Dunn, 2010). Thirty subjects enrolled and completed the SCHFI as well as the Minnesota Living with Heart Failure questionnaire. Orem's self-care deficit theory guided the inquiry. Compared to the male participants, the results described a significant relationship ($p<.05$) between self-care and the female participants as they had greater confidence scores. Self-care confidence also was associated with total quality of life ($p<.05$) and better self-reported overall health ($p<.05$). Subsequently, it also was noted that participants who reported better overall health had fewer chronic comorbid conditions. The authors encouraged providers to offer HF patients self-care education focused on building self-care confidence, a trait congruent with the self-care deficit theory and the self-care in heart failure theory (Britz & Dunn, 2010).

In addition to self-care confidence, patients need to develop symptom awareness and monitoring strategies. Researchers in Northern Taiwan completed a RCT to promote self-management of HF (Shao et al., 2013) using Bandura's self-efficacy theory as the study's basis. The study examined a 12-week, nurse-led, HF outpatient program that focused on low-salt diet, fluid control, and recognition of HF-related symptoms. The EG improved in self-efficacy for diet and fluid intake and had decreased HF symptoms compared to the CG. However, the two groups' healthcare utilization did not differ after the 90-day intervention (Shao et al., 2013).

In a RCT conducted in the US, intensive symptom training using the HF-SMART intervention increased patients' symptom monitoring and response, which resulted in an early but not sustained 90-day event-free survival benefit between groups (Jurgens, Lee, Reitano, & Riegel, 2013). The study was guided by Riegel's self-care in heart failure theory, which was used to develop the HF-SMART intervention. This intervention consisted of symptom monitoring and response education to decrease the patients' uncertainty about the meaning of their symptoms.

One study limitations noted by the authors was the fact that patient symptom recognition and interpretation is contextual and based on experience. Additionally, the investigators noted that adherence to the intervention could possibly be enhanced by the addition of social support and the increase in the interactions with the patient during the first 30 days. In this study, only one home visit was performed during the 30-day transitional period after discharge. This visit took place within 7–10 days of discharge to reinforce self-care teaching (Jurgens et al., 2013).

Similarly, two other U.S. studies examined self-care interventions with a focus on HF patients' quality of life (Artinian et al., 2003; Evangelista et al., 2015). The first was a pilot study that used Orem's self-care deficit theory. The researchers compared the effects of a web-based monitoring system for medication compliance to usual care alone in 18 patients randomized into two groups. The effects compared included compliance with self-care behaviors, medication adherence, quality of life, exercise capacity, and NYHA functional status (Artinian et al., 2003). Of these elements, only quality of life improved in the EG after ninety days. Using a web-based monitoring system generated no statistically significant improvements in the self-care behaviors of medication compliance, daily weighing, or blood pressure monitoring. The second quality-of-life study involved remote symptom monitoring in HF patients (Evangelista et al., 2015). Twenty-one older patients were enrolled and trained to use a remote monitoring system (RMS). The patients then were compared to a similar cohort receiving only standard care. During this study, a research nurse who followed the EG for three months while they used the RMS equipment provided feedback for any alerts encountered during the study. The SCHFI, Patient Activation Measure, and Minnesota Living with Heart Failure questionnaire were collected at discharge and again at 90 days. Results of the six-month study revealed moderately strong

associations between increased patient activation and the variables of self-care and quality of life (Evangelista et al., 2015).

The final theory-based RCT used social-cognitive and adult-learning theories to guide a telephone reinforcement intervention in an outpatient setting to improve knowledge, self-care behaviors, and HF symptoms. The patients in the EG (n=608) received five to eight brief telephone calls from a health educator over a four-week period to guide them in better self-care skills. The participants were not allowed to choose what was discussed at each telephone intervention, and participant received the same educational counseling each week. Compared to the CG who received a single educational session, the telephone reinforcement group demonstrated an increase in self-care behaviors ($p<.001$), general HF knowledge ($p<.008$), and dietary salt knowledge ($p<.001$). The most interesting aspect of this study was the inclusion and documentation of each participant's literacy level. The significant improvements in the three mentioned areas were achieved regardless of the patient's literacy, and those with inadequate/marginal literacy improved somewhat more in the EG compared to the CG. This was a promising finding, as this study—like the current study—also used a telephone reinforcement intervention to improve self-care in a rural population. The authors concluded that, despite their attempt to eliminate non-essential information from the intervention, using less educational content along with a greater emphasis on improving self-care behaviors likely would be even more effective than the intervention used in the study (Baker et al., 2011).

Non-theoretical Interventions to Improve Self-Care

Five non-theoretical quantitative research studies used interventions to improve self-care. The interventions included nurse-led home healthcare through web-based interactions, a nurse-led outpatient HF program, and telephone reinforcement of hospital discharge education.

Brennan et al., (2010) conducted a three-year study to determine if a nurse-led, technology-enhanced homecare practice model would increase self-care management of chronic heart disease compared to usual care. The six agencies providing the web-based intervention were randomized. There were 282 patients enrolled in the intervention arm of the study. The usual care included paper-based education, a patient symptom grid, and telephone communication, while the web-based intervention was delivered online, including all symptom monitoring. There were no statistically significant differences between the two groups related to accessing providers or hospital readmission rates.

An RCT completed in Japan examined whether a nurse-led HF self-management program implemented over six months with monthly nurse-directed sessions at outpatient meetings would increase self-care and quality of life (Otsu & Moriyama, 2011). Data was collected on the patients (n=102) at three, six, nine and 12 months (six months after intervention). At 12 months, the results of this HF program indicated a statistical difference in the EG and CG regarding self-reported shortness of breath ($p<0.05$) and symptom deterioration ($p<0.05$). The patients' satisfaction level with the program was 78.4%. Additionally, the authors reported no participant fatalities or hospitalizations due to deterioration of HF symptoms during the study's six-month intervention period. It is noteworthy that no NYHA functional class IV participants were enrolled in the study, and most enrollees were an NYHA functional class II (n=81). Enrolling less symptomatic patients could have skewed the study data (Otsu & Moriyama, 2011).

Three studies used telephone reinforcement of discharge teaching to improve self-care, reduce symptom distress, and prevent readmissions. For one study, medical student volunteers completed weekly telephone contacts for 30 days (Sales et al., 2014). The second study used telephone contact and home visits over a 90-day period post discharge (Shively et al., 2013),

while the third study provided telephone or face-to-face contact monthly for six months (Wang, Lin, Lee, & Wu, 2011).

The study providing weekly telephone calls by trained volunteers post-discharge decreased thirty-day readmission rates, reduced worsening NYHA functional class, and reduced morbidity in the EG compared to the CG ($p < 0.05$) with a relative risk reduction of 63% (Sales et al., 2014). The authors used a cost-effective method to provide follow-up phone education: medical students trained to provide HF education. A similar study could be conducted using undergraduate or graduate nursing students to provide the telephone teaching. The authors also mentioned that smokers, patients with hypertension, and elderly patients had higher readmission rates overall (Sales et al., 2014).

The ninety-day telephone and home visit follow-up HF program was conducted in Taiwan (Shively et al., 2013). Advanced practice nurses were used to contact patients in the intervention arm. There were no statistically significant differences between the EG and CG regarding hospital readmissions. However, the author noted that very few participants would allow a nurse to come into their home to collect data at the 90-day point. There were significant differences in symptom distress ($p<0.01$), 6-minute walk test results ($p<0.01$), and quality of life ($p<0.05$) between the two groups in this small sample (n=27) (Wang et al., 2011).

The final telephone intervention study, conducted over a six months, had a 12-month follow-up period to examine HF patients' self-management skills (Shively et al., 2013). The patients were contacted monthly for six months, and their activation level was assessed at baseline to stratify the CG and EG. The stratification of activation levels was used to determine the level of self-care intervention provided. Self-management behaviors were explored, personalized, and reinforced at each telephone or face-to-face contact. Results showed that the

engagement levels of the EG participants significantly increased over time compared to the CG ($p<0.05$). Moreover, EG patients had fewer hospitalizations even though their engagement levels at baseline ranged from low to high (Shively et al., 2013). Regardless of a telephone intervention's timeframe for improving self-care management—30-days, 90-days, or a six-months—the results from each of these three studies indicated the importance of individualizing discharge planning and engaging the patient in their own caretaking for reducing hospital readmission rates and improving patients' quality of life.

Motivational Interviewing Intervention to Promote Self-care

In a recently published systematic review of literature, Copeland, McNamara, Kelson, and Simpson (2015) examined studies using the MI technique to change health-behavior outcomes. The authors excluded articles dealing with addictions. The authors indicated that most of the studies (n=37) had a poor overall quality and rigor. However, after developing a causal link diagram from a narrative synthesis, they reported that MI was a promising strategy for changing health-related behaviors, regardless of the therapist's expertise. The overall themes of the MI interventions included change talk, self-monitoring, planning for change, and increasing motivation. The authors also stressed the need for high quality studies on this topic. Following is a description of four studies that used a nurse-led MI intervention to increase self-care in the HF population.

One of the earliest nursing studies using MI to improve HF self-care used a mixed-methods, pre-post design (Riegel et al., 2006). Riegel and Dickson's situation-specific heart failure self-care theory guided the study. The study's patients (n=15) were enrolled in a HF program that used an MI intervention designed to enhance standard care in the first 90 days after hospital discharge. An advanced practice nurse experienced in MI and family counseling

conducted the intervention during an average of three home visits (median 3, mode 3, range 1–6). Results showed that 71.4% of the participants improved in self-care after receiving the intervention as measured by the SCHFI. Three themes emerged from the transcribed home-visit interactions: communication (reflective listening, empathy), making it fit (cultural, overcoming barriers, developing action plan), and bridging the transition from hospital to home (developing self-care skills, activating support). From the results, the authors recommended that further research be conducted with MI as an intervention to promote self-care in HF (Riegel et al., 2006).

A European study in patients with HF used MI as an intervention to increase physical activity and quality of life over a five-month period (Brodie, Inoue, & Shaw, 2008). Sixty patients were randomly assigned to three groups: MI intervention, standard care, or both MI and standard care. A researcher highly experienced with the MI counseling technique delivered the intervention by providing weekly one-hour, home-based sessions for eight weeks. Results indicated that the EG had a statistically significant ($p<0.05$) increases in health and HF knowledge. The results also showed a general trend of improved self-efficacy and motivation. The authors conducted this study because there was very little focus on "how" information is presented to HF patients. They concluded that transitional care education should be focused not only on content and comprehensibility, but also on using a skillful communication method, such as MI. They also suggested further studies using MI to encourage listening, elicit change talk, and facilitate behavior change instead of just delivering evidence-based self-care facts. Finally, they noted that while the MI technique does not require extensive training, nurses would need to re-examine their counseling habits when planning discharge and transitional care education for HF patients (Brodie et al., 2008).

Similarly, MI was used in a Canadian study to strengthen conviction and confidence and improve self-care in HF patients. Riegel and Dickson's theory of heart failure self-care guided the research intervention choice and outcome measures. The nurse-delivered MI intervention was provided over a 30-day period and involved one face-to-face initial counseling session and two telephone reinforcements. The effect of the intervention was assessed on five self-care outcomes from the SCHFI. Although this study had a small sample size (n=30), there were statistically significant results in self-care confidence for performing specific HF behaviors ($p<0.005$) (Paradis et al., 2010).

Finally, Masterson Creber et al., (2016) conducted an RCT in the U.S. with a larger sample (n=67) at a single center. The sample was predominately male (70%), African American (54%), NYHA functional class III/IV (87%), with a low education level of high school or less (63%). The nurse-delivered MI intervention consisted of a single, home visit and three to four telephone calls over a ninety-day period. Although no explicit theory was described, the SCHFI was used to measure primary outcomes. There were no statistically significant differences in self-care maintenance, confidence, physical symptoms, or quality of life at the end of ninety-days, but the data trended toward improvements in self-care maintenance for the EG (Masterson Creber et al., 2016).

Chapter Summary

The literature review presented in this chapter highlighted the published research regarding self-care in HF. Self-care barriers and facilitators have been explained, and interventions have been suggested. Both qualitative and quantitative studies were presented. Some had theoretical basis for the interventions chosen. The results from theoretical and non-theoretical research indicated that self-care interventions need to be patient centered,

individualized, adapted to the patient's situation (contextual), and assistive of lasting behavior change. MI has been shown to be an effective nurse-led intervention for reducing ambivalence to change. Four nurse-directed scientific studies using MI with HF patients were included in this review. There has not been a consensus as to how many times the MI needs to be completed and no studies were found that address MI with a rural HF Appalachian population.

Chapter 3: Methods

The first purpose of this study was to determine whether the intervention—consisting of four brief, nurse-directed MI sessions administered face to face within 48 hours of discharge and by telephone during scheduled follow-ups at 48 hours, 10–14 days, and 21–days post-discharge—in addition to standard discharge practice significantly increased self-care in chronically ill HF patients living in rural Appalachia. The second purpose was to determine if participants who received the intervention had different 30-day hospital readmission rates compared to patients who received only the standard discharge practice. This chapter presents the following study elements: study design, research hypothesis, variables, sample, setting, inclusion criteria, exclusion criteria, recruitment of participants, instrument, study procedures, intervention, data collection, data analysis, threats to validity, risks and protections, and ethical considerations.

Study Design

This quantitative study used a prospective, experimental research design. Once enrolled in the research study, the participants were randomized to an EG or CG using a random number table provided in SPSS. The EG received a nurse-led intervention that consisted of a brief face-to-face MI session within 48 hours prior to discharge. The three follow-up MI sessions were conducted via telephone at 24–48 hours, at 10–14 days, and at 21-days post discharge. The CG and EG both received evidence-based standard HF discharge instructions and care per the facility's protocol. All participants also were followed for inpatient readmission to the hospital facility for the first 30-days post discharge.

Research Hypothesis

The null hypothesis for this study stated that there would be no statistical difference in HF self-care between the EG and CG. The first directional hypothesis stated that the participants who received the nurse-led MI intervention in addition to standard HF discharge care would have a statistically significant increase in their self-care level compared to the CG as measured by the SCHFI. The second hypothesis was that the nurse-led MI intervention would show a statistically significant reduction in the 30-day hospital readmission rate for the EG compared to the CG.

Variables

The independent variable was the four, nurse-led brief MI session provided to participants randomized to the EG. The dependent variable was the composite scores for self-care on the SCHFI and readmission rates at 30-days post-discharge for all participants.

Sample

The total sample size recruited for this study was (n=78). The calculated sample size was based on an alpha of 0.05, power of 0.80, and effect size of 0.5 as determined by the statistical package G*power 3.1.9.2 for a one-tailed multivariate ANCOVA analysis. For adequate power, the minimum sample size was determined to be 72 (Faul, Erdfelder, Lang, & Buchner, 2007). This sample size was supported by the effect sizes noted in three previous studies published on MI use in HF patients (Masterson Creber et al., 2016; Paradis et al., 2010; Riegel et al., 2006). The PI recruited more participants than the required 72 in order to have sufficient power to account for possible attrition rates of 10–20% noted in previous studies. Study participants were English-speaking adults between 40–85 years of age with a diagnosis of systolic HF, who had current inpatient status at a regional, community-owned rural hospital in the Appalachian Upper Cumberland region of Tennessee.

Setting

The study's setting was a rural 247-bed community-owned hospital in the Upper Cumberland region of Tennessee, an area included in the Appalachian Mountain chain. This healthcare facility provides care for patients of all ages for the surrounding 14 counties. The facility has cardiology and vascular surgery specialties, but no HF clinic. The PI conducted the initial face-to-face MI intervention in each patient's hospital room within 48 hours prior to discharge. The PI then completed the three-subsequent brief MI interventional follow-ups through the patient's personal telephone for the EG only. All participants received telephone contact at 21-days post-discharge.

Inclusion Criteria

1. Adults between 40–85 years of age
2. A systolic HF diagnosis for longer than three months with confirmed ejection fraction (EF) of less than or equal to 40% confirmed via echocardiogram or cardiac catheterization
3. NYHA functional Class II to IV
4. English speaking
5. Possessing a working telephone for intervention follow-up and post-discharge SCHFI completion
6. Self-reported living most of life in the Upper Cumberland region of Tennessee
7. Discharged to home care with ICD-10 codes of 150.1 (Left ventricular failure), 150.2 (Systolic HF), or 150.9 (unspecified HF)

Exclusion Criteria

1. Diagnosed with dementia or cognitive impairment that would limit ability to follow instruction or make self-care decisions
2. Discharged to a long-term care facility or inpatient rehabilitation center
3. NYHA Class I (no symptoms with normal physical activity)

Recruitment of Participants

All participants were recruited from current, inpatient records of the regional healthcare facility. All participants were self-reported residents of the Appalachian region included in the 14 counties of the Upper Cumberland area. Patients who were admitted to any acute care floor meeting the inclusion criteria (n=93) were approached at the regional hospital facility by the research assistant (RA) to assess their interest in study participation and verify eligibility. The RA is a trained cardiac registered nurse with more than 20 years of nursing experience who worked primarily on the cardiac step-down floor as a charge nurse, and had legal access to the facility's electronic health records (EHR). The RA scanned the hospital's daily admission (n=830) and transfer records for eligible participants based on ICD-10 qualifying codes and inclusion/exclusion criteria. The RA then kept track of the possible discharge dates for these potential participants. Once the RA determined a patient was eligible to participate based on the inclusion criteria, she approached each patient in an informative, confidential, and non-coercive manner to explain the study's intent and provide a copy of the informed consent. If asked, the RA read the informed consent to the patient. The RA had a script that included the study's research process so she could explain the intent of the research consistently (Appendix D). When the participant verbally indicated interest in participating in the study, the RA notified the PI, who completed the informed consent process. The PI made the final eligibility determination

after reviewing and verifying inclusion/exclusion criteria using the patient's health records. In a face-to-face meeting at the regional facility 48 hours prior to discharge to home, the PI answered participant questions about the study and obtained informed consent (Appendix E). The informed consent, confidentiality statement, and the SCHFI were written at a 6th grade reading level to ensure that patients with low literacy levels could understand the research information. No individual was excluded from the study based on gender, ethnicity, or socioeconomic status.

Instrument

*Self-care of Heart Failure Index version 6.2***.**

The concepts of the situation-specific theory of heart failure self-care were measured by the SCHFI that was originally developed by Riegel et al. (2000) and revised to version 6.2 in 2009 (Riegel et al., 2009) (Appendix C). The instrument is comprised of 22-items on three separately scored scales: self-care maintenance, self-care management, and self-care confidence.

The scores are standardized to range from 0–100, where a minimum score of 70 indicates an individual is "good/expert" in self-care adequacy (Riegel et al., 2009). A score below 70 indicates poor self-care. Riegel et al., (2009) advocated using a half standard deviation (SD) to estimate the minimal change in score from pre- to post-testing that indicates a clinical benefit of increased self-care. Each researcher using the instrument determines which outcome to measure to determine clinical benefit. In this study, the outcomes measured were increased self-care scores on each of the three SCHFI scales as well as hospital readmissions. An instrument's responsiveness is determined by is its ability to detect not just statistical significance, but also clinical significance. Therefore, clinical significance will be reported with an 8-point increase in scores from pre- to post-survey (Riegel et al., 2009).

The SCHFI's construct validity has been supported with mixed-methods research noting that individuals with higher SCHFI scores have increased adherence to treatment, more awareness of somatic changes, an ability to manage symptoms of HF, and confidence in dealing with their illness (Riegel et al., 2009). Psychometric reliability and validity testing has been performed on the instrument in an Italian study using exploratory factor analysis and then validated with confirmatory factor analysis on each of the three constructs of self-care maintenance, management, and confidence (Vellone et al., 2013). Vellone et al.'s (2013), testing showed the validity of the individual scales through good to excellent fit indices: CFI=.92 for the self-care maintenance scale, CFI=.95 for self-care management scale, and CFI=.95 for the self-care confidence scale. In addition to construct validity, concurrent validity, internal consistency, and test-retest reliability also have been supported as being moderate to high in correlations through additional psychometric testing (Barbaranelli, Lee, Vellone, & Riegel, 2014; Vellone et al., 2013).

The strengths of this instrument include its use internationally, in multiple studies, and with all NYHA functional classes of HF. Furthermore, the tool's simplicity—with only 22 questions and three sections—presents a minimal participant burden. The chronic fatigue experienced by hospital patients is a consideration for this study's high-risk, chronically ill participants. The SCHFI's author noted that the instrument's scoring would remain the same whether it is administered orally or by telephone to health-illiterate patients (Riegel et al., 2009). The author's permission is not required to use this instrument, as it is published on a public domain (Appendix F).

Study Procedures

Participation in this study was voluntary. Review and approval of human subjects research was received from the University of Tennessee's Institutional Review Board (IRB) prior to initiating research at the facility. All persons who met inclusion criteria were invited by the RA to participate in the research (n=93). The RA gave each participant informed consent and confidentiality statement forms prior to their meeting with the PI to review the information privately. For individuals who asked, the informed consent and confidentiality statements were read aloud. Authorization for the study team to access the participants' EHRs was contained in the confidentiality section of the informed consent. Participants' signatures on the informed consent authorized the research team to access their EHR. The PI requested authorization to obtain protected health information from the hospital's electronic database from the facility's risk management department in accordance with the Health Insurance Portability and Accountability Act (HIPPA) of 1996. Seven potential participants declined to enroll, six were eliminated as they already were enrolled in the facility's transitional care program, and two were lost to follow-up, leaving 78 participants who completed study. All participants completed both a demographic questionnaire at baseline and a pre-SCHFI prior to discharge. All forms were assigned a number from a random number table to de-identify data and maintain confidentiality. The PI entered the de-identified data into an Excel spreadsheet. Only the PI had access to the demographic forms, pre- and post-intervention SCHFI forms, and participant telephone numbers. All forms were kept in a double-locked file drawer in the PI's office.

Participants were randomized to a CG and EG based on the random number table generated by the Statistical Package for the Social Sciences (SPSS) version 22 from IBM. The CG had n=38 and the EG had n=40. Both groups were given standardized care as defined by the

hospital facility including the *Heart Failure 2016* booklet that met JC core accreditation requirements (Appendix B). In addition to the standard discharge care, the EG received a nurse-led brief MI session regarding the self-care in heart failure theory concepts of self-care maintenance and management. In the first face-to-face MI session, lasting approximately 20 minutes, the PI worked with the participants using the MI method to identify at least one specific, individualized, client-centered HF self-care goal. The goals discussed included, but were not limited to, medication adherence, dietary sodium restrictions, exercise, and daily weighing. The most commonly discussed goal was dietary sodium restrictions. If the patient was a nicotine user, tobacco cessation also was discussed at the patient's request. At 24–48 hours, 10–14 days, and 21-days post-discharge, the PI contacted the EG participants for additional brief 15-minute MI sessions to reinforce their chosen self-care goals.

The discharge topics discussed were required by the hospital and the JC, and recommended by the ACCF/AHA as evidence-based HF discharge guidelines (Halperin et al., 2016; Regalbuto et al., 2014). To allow for completion of follow-up interventions in the EG and final SCHFI administration for all participants, a working telephone number was verified for each participant prior to discharge. All computer-based information was kept in an encrypted Excel spreadsheet housed on the password-protected secure University of Tennessee's Microsoft 365 Business OneDrive server.

Members of both groups were contacted by the PI at 21-days post-discharge to complete a second SCHFI. If the participant was unavailable at the first telephone contact, follow-up calls were made daily for up to five days (n=2). If there was no answer after five days, the patient was considered lost to follow-up. Toward the end of this study's enrollment process, the facility launched a transitional care program in which a nurse case manager and clinical pharmacist

contacted HF patients at high-risk for readmission. Before analyzing the study data, the PI met with the facility's transitional care nurse during and after recruitment to ensure no participants were enrolled in both the hospital program and the study.

Additionally, if a participant died after the study commenced, but before completing the second SCHFI, the significant other who answered the phone would have been referred to the hospital's counseling service. This protocol was not used as no participants died while enrolled in the study.

Intervention

The independent variable used in this prospective, experimental RCT was MI. The intervention was delivered only by the PI who had received individual training in the technique through the Motivational Interviewing Network of Trainers (MINT, 2016). The PI also researched the MI technique by reviewing books and articles by the technique's creators, Miller and Rollnick. In a systematic review of 37 research studies using MI to change specific health behaviors, the study authors concluded that the therapist's specific training did not negatively affect outcomes (Copeland et al., 2015). In an RCT to measure quality of life in HF, Brodie et al., (2008) also noted that extensive training was not necessary to deliver an MI session successfully. A positive clinical effect was noted in 75% of the studies after one brief MI encounter, but the intervention's effectiveness increases with contact time and frequency (Emmons & Rollnick, 2001). Emmons and Rollnick (2001) also noted that while a 20-minute videotaped training session was effective for teaching basic MI methods to generalist healthcare providers, further training in the MI method and familiarity with the study population would help to standardize MI delivery over time.

The MI behavior-change method is an evidence-based counseling technique that elicits a participant's intrinsic motivation to change a specific health-related behavior (El-Mallakh et al., 2012; Miller & Rollnick, 2002). The provider and patient interact in a partner-like relationship and explore any unresolved ambivalence to change by focusing on the patient's needs, abilities, desires, and current commitment to this change (El-Mallakh et al., 2012). At each session, the pros and cons of the client's current health behaviors also are explored in a supportive environment. The OARS technique—use of **O**pen-ended questions, **R**eflective listening, **A**ffirmation of the participant's belief statements, and **S**ummarization of the client's perspective of behavior change—was used in this study's MI intervention (Markland, Ryan, Tobin, & Rollnick, 2005) (Appendix A).

Following are the four main principles of MI:

1) Express empathy through reflective listening. This principle is the most important element of MI. When people feel understood and trust the counselor, they are more likely to share experiences. If they share experiences, the counselor is more likely to be able to determine where they need additional resources, information, and support for self-care. This principle minimizes resistance to change.
2) Develop discrepancy to allow the patient to identify their goals and values in the context of their current self-care behaviors. This goal of this strategy is to resolve discrepancies by changing behavior.
3) Roll with resistance to explore any opposition to behavior change. When a person vocalizes resistance or ambivalence to change, the counselor needs to reflect and respond differently, allowing the patient personal choice and control over their self-care. Arguing or asserting control over the situation will make the resistance worse.

4) Support self-efficacy to emphasize personal control. This is completed through delivery of counselor affirmation efforts, reflecting on past self-care success, and exploring current self-care resources. The more change talk is presented, the more likely a person is to change their behavior (Miller & Rollnick, 2002).

The MI intervention was delivered to the EG in a brief 15-minute, face-to-face session by the MI trained nurse (the PI) within 48 hours of discharge from the hospital to home. During this initial counseling session, the PI and the patient mutually agreed upon self-care behaviors to change. From the demographic intake and SCHFI, the PI and the EG participants mutually agreed on which health behavior (exercise, diet, medications, smoking cessation, or daily weighing) to discuss at the next MI intervention. The PI revisited the self-care goal during telephone follow-up conversations at 24–48 hours, 10–14 days, and 21 days post-discharge.

The PI who delivered the intervention is an Advanced Practice Registered Nurse (APRN) with seventeen years of adult outpatient care specifically in chronic-disease management. The PI's MI training consisted of approximately 60 hours of readings recommended by MINT society experts and the completion of an eight-hour DVD training video. The creators of the MI counseling technique have made learning the technique simple and allowed it be tailored for use by a variety of professionals (Miller & Rollnick, 2002). The PI used a pilot participant for fidelity testing of the MI technique prior to enrolling research participants. This pilot session was recorded and reviewed by a local expert in MI counseling. During the study, the PI also maintained an ongoing and open dialogue with a counseling expert in order to obtain feedback on the intervention's fidelity.

Data Collection

Baseline data collection consisted of four elements.

1) A demographic questionnaire that included gender, marital status, social support, educational level, total household income, race, insurance provider, number of comorbid chronic illnesses, number of medications taken at home, and current tobacco use in the past year (Appendix G).
2) Medical information related to HF from the EHR including EF and NYHA functional class.
3) Completion of the SCHFI (Appendix C) by all participants at 48-hours prior to discharge and at 21-days post-discharge
4) Documentation of follow-up telephone contact at 24–48 hours, 10–14 days, and 21-days post-discharge

The demographic intake data was determined after reviewing previous research studies about self-care success as noted in the Chapter 2 literature review. The presence of social support and marital status correlates with higher self-care ability (Riegel et al., 2007). Household income indicates the participant's poverty level. The race of the sample was compared to current race statistics for the Appalachian region to determine if the sample was a good representation of the overall population. Participant gender was collected to determine the number of males versus the number of females enrolled in the study. The number of comorbid conditions and medications were documented, as these factors are known to complicate chronic disease self-care management. For example, comorbidities and multiple medications may decrease patients' ability to prioritize disease symptoms and achieve adequate HF self-care (Riegel et al., 2007). Tobacco use in the past year was documented to allow the PI to provide cessation counseling when needed. Tobacco use is known to cause additional comorbidities and poor health outcomes in HF patients (Yancey et al., 2013). The covariates chosen in this research were the participants'

number of comorbidities and education level. Results from past research have documented the linear relationship between these covariates and self-care maintenance and management scores (Riegel, et al., 2007; Shao, et al., 2013; Wang et al., 2011).

The data management plan included the PI reviewing all forms to verify completeness. Each participant was assigned a number from a random number table for de-identification purposes and placed into the CG or EG. The participant number was placed on all data forms and surveys and kept in a secure double-locked drawer system. All data files were password protected and stored on the University of Tennessee's Microsoft 365 Business OneDrive secure server, accessible only to the PI. All HIPPA regulations for protection of personal health information were followed. Any missing data were obtained from the participant during the initial face-to-face session or telephone follow-ups. If the participant needed help filling out the required forms, the questions were asked orally. The option of oral delivery of the SCHFI and demographic intake sheet reduced potential issues with health literacy. For additional accuracy and consistency, the PI completed entry of all data into the Excel spreadsheets. The participants, hospital staff, and the RA were blinded during the random assignment to reduce any interaction bias.

Data Analysis

Parametric statistics were used for data normally distributed and meeting all assumptions. These assumptions included use of a ratio scale of data measurement, random sampling and normal distribution from the Appalachian population, use of two independent samples, and equal population variances in the two independent samples (Kellar & Kelvin, 2013). Descriptive statistics were used for age, gender, marital status, NYHA classification, EF percentage, number of comorbidities, educational level, and number of medications. The EG and CG were compared

at baseline to ensure the groups were homogenous. Inferential statistics were performed for interval and ratio data derived from the instruments. Race and insurance type were converted to binary nominal data after collection due to having only two values for each of these variables.

Using the G*power 3.1 statistical package with *a priori* assumptions, the minimum sample size to conduct the study for a significance level of 0.05, a power of 0.80, and effect size of 0.5 was determined to be n=72 (Faul et al., 2007). The final study sample size was 78 due to over-recruitment to account for attrition. This sample was distributed randomly into the EG (n=40) and CG (n=38) using a random number table. A one-tailed test was used to maximize the alpha level since the study has an *a priori* hypothesis (Kellar & Kelvin, 2013; Shadish, Cook, & Campbell, 2002). Covariates include the number of comorbid health conditions and educational level (Jowsey, Pearce-Brown, Douglas, & Yen, 2014; Riegel & Carlson, 2002; Riegel & Dickson, 2008). Data collection using the SCHFI was performed pre- and post-intervention for both groups.

With two independent groups and one intervention with covariates, a one-way between-subjects ANCOVA was performed. The ANCOVA analysis "combines ANOVA with linear regression to measure the differences among group means while controlling for a continuous variable that might affect the outcome" (Kellar & Kelvin, 2013 p. 247). This analysis of the specific covariates further reduces error variance, provided a more accurate difference between groups, and increased statistical power. Statistical power is the likelihood of correctly rejecting the null hypothesis when finding a significant difference between groups if one exists. The following ANCOVA analysis assumptions were met: the two groups were mutually exclusive, there was homogeneity of the variance, the covariates were continuous variables, and the dependent variable of self-care was normally distributed. A cross-tabulation Chi-Square table

analysis was used to determine the significance between groups (nominal data) for 30-day hospital readmission rates.

Threats to Validity

The threat to the study's internal validity was using the self-reporting method to collect self-care scores on the SCHFI. Using self-reporting may have contributed to higher posttest numbers in both groups. The use of the same instrument for pre- and post-testing also may be a threat to external validity due to pretest learning from the instrument itself. However, according to Riegel et al., (2009) the most recent version of the instrument does not demonstrate a learning effect associated with administering the instrument multiple times. If there is a change in scores, it is reflective of changes in self-care related to the study intervention.

Consistency in the delivery of the intervention was enhanced by having one person (the PI) interact with participants throughout the study. Conducting this study only with rural Appalachian residents affects the results' external validity and generalizability. Tracking participants' 30-day readmissions at only one facility may be an additional study weakness, as participants could have been admitted to other facilities during the 30-day post-discharge period. This study's strengths included the use of a nursing and behavioral health theory to guide the intervention, as well as the use of a unique population: rural Appalachians with a chronic illness.

Risks and Protections

Risks to the participant from the MI intervention were no greater than what may be encountered in everyday life. The PI is an APRN licensed in the state of Tennessee who has specialized in outpatient care of internal medicine and cardiology patients for the past 17 years. The PI also is board certified as a Family Nurse Practitioner by the American Nurses Credentialing Center and an Associate of the American College of Cardiology. Participants were

instructed to seek medical care at their local emergency department immediately for any sudden change in functional status or increase of HF symptoms such as increased shortness of breath, sudden weight gain, and chest pain.

Ethical Considerations

Approval for the study was obtained from the IRBs at the University of Tennessee and the University of Tennessee's College of Nursing (Appendix H). The PI was accountable for reporting any variances in study methods to the University of Tennessee IRB in a timely manner. The PI and RA had current certification with the Collaborative Institutional Training Initiative program (CITI) for both social and behavioral research and responsible conduct of research. As required by the IRB, the PI obtained a letter of approval from the regional hospital where the research was conducted (Appendix I). Informed consent was obtained from each participant prior to study enrollment. Each participant was given verbal and written information about the study and time to ask questions prior to giving consent. Individuals who agreed to participate signed the informed consent. The PI holds the original signed informed consents in a secure location, and each participant was given a copy of the signed consent. An additional copy of the signed informed consent will be kept in a locked container by the dissertation committee chair, Dr. Carole Myers. All study forms, questionnaires, and data sheets will be kept for six years and then destroyed. Participants were instructed that participation was voluntary and that they could withdraw from the research at any time without threat of alteration in treatment or care from their providers or the facility. Permission to obtain information from the EHR at the hospital facility was included in the informed consent. No participants were excluded based on gender, ethnicity, or socioeconomic status.

Chapter Summary

The purpose of this study was to compare the effects of a nurse-led MI intervention in addition to standard discharge care on the self-care of HF patients in a two-group RCT. The independent variable of MI was described. This intervention was chosen after reviewing past research using MI and the results indicating the need for a personalized, client-centered approach to behavior change to reduce hospital readmission rates among HF patients. The PI explained the study to patients who met inclusion criteria and invited them to participate. After giving informed consent, the patients were enrolled in the study. Both groups received standard care while in the hospital and completed a SCHFI within 48 hours of discharge. Demographic data was collected at baseline for both groups. The EG also received four MI sessions, with the first completed in person and the following three by telephone. Both groups completed a post-intervention SCHFI at 21 days post-discharge. The PI reviewed all data for accuracy and completeness prior to performing final data analysis. A one-way ANCOVA analysis was performed in SPSS version 22 to discover statistical differences in the means of the CG and EG. A Chi-Square table was completed to assess hospital readmission rate significance between groups. The outcomes of these statistical analyses are presented in Chapter 4.

Chapter 4: Results

The study's findings are presented in this chapter along with a restatement of the research hypotheses. Next is information about the study's sample, followed by a description of hypothesis testing methods for data analysis. The chapter concludes with a summary of the study findings.

Research Hypothesis

In this study, two research hypotheses were tested to examine the effects of MI on HF self-care during the transitional care period:

1. Patients who undergo a nurse-led MI intervention in addition to standard practice HF discharge care will have a statistically significant increase in their level of self-care, after controlling for educational level and number of comorbidities, during the first 30 days after hospital discharge when compared to the CG as measured by the SCHFI; and
2. Patients who undergo the nurse-led MI intervention in addition to standard HF discharge care will have a statistically significant decrease in their 30-day hospital readmission rate as compared to the CG receiving standard care only.

This study had two null hypotheses:

1. There will be no statistically significant difference between the EG's and CG's self-care level after controlling for educational level and number of comorbidities during the first 30 days after hospital discharge as measured by the SCHFI; and
2. There will be no statistically significant difference between hospital readmission rates for EG and CG.

Description of Sample

Recruitment of participants in this prospective, experimental study was conducted by the RA who scanned daily admission reports from the hospital's EHRs for patients with an admission diagnosis of chronic HF, as noted by ICD-10 codes 150.1 for left ventricular failure, 150.2 for systolic HF, or 150.9 for unspecified HF. Approximately 830 patient files were scanned over the 90-day patient enrollment period. The 93 patients who met the inclusion criteria were approached by the RA to receive a study explanation and informed consent paperwork. Seven patients declined to be included in the study and six were enrolled in the facility's transitional care program and therefore were excluded from the final analysis. This left 80 participants who signed informed consents and agreed to enroll in the research protocol. After signing consent, two participants were lost to follow-up, leaving 78 participants who completed the entire 30-day study. Participants were randomly assigned to either the EG (n=40) or the CG (n=38) using a computer-generated table of random numbers from SPSS. Seventy-eight participants completed the pre and post SCHFI (Figure 4). Hospital readmission rates were followed for 30-days after discharge through daily readmission reports generated by the facility's EHR. Admissions occurring at other facilities were not tracked in this study.

Demographic data collected included age, gender, presence of social support, race, insurance coverage, educational level, number of comorbidities, tobacco use, annual income, number of medications, NYHA functional level, and EF percentage. Twelve participants (16.7%) did not provide annual income level information on the demographic form.

Participants ranged in age from 41 to 85 years (Mean=67.47, SD=10.68). There were 41 males (52.6%) and 37 females (47.4%). Regarding social support, 20 participants lived alone (25.6%) and 58 lived with others (74.4%).

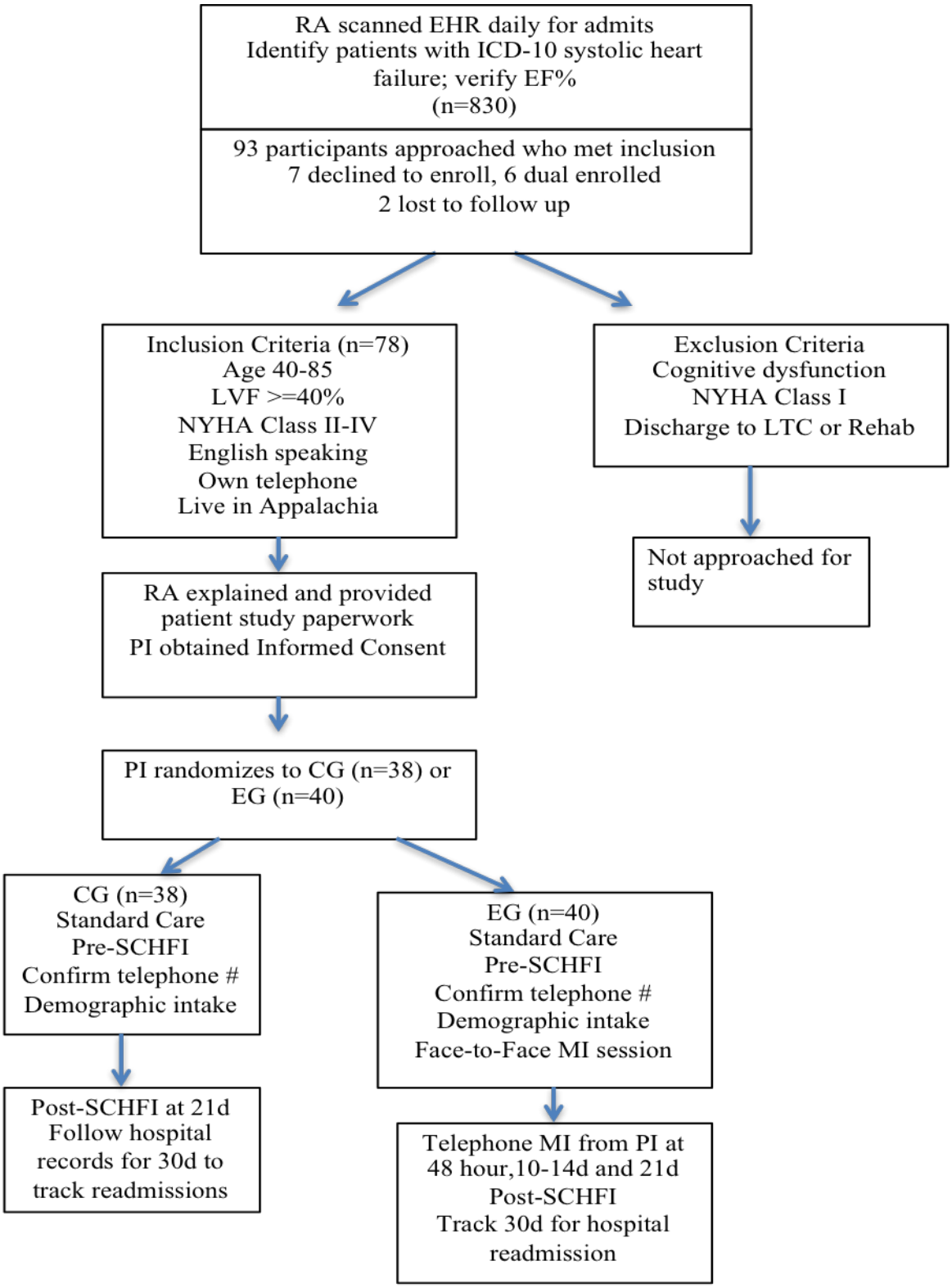

Figure 4. Flow of research study

Seventy-six participants identified their race as white (97.4%) and two identified as non-white (2.6%).

Fifty-six participants claimed Medicare as their primary insurance provider (71.8%), and 22 identified a non-Medicare provider (28.2%). No study participants were uninsured at the time of enrollment. Forty participants (51.3%) were classified as NYHA Functional Class II, 28 (35.9%) were classified as NYHA Functional Class III, and 10 (12.8%) were classified as NYHA Functional Class IV. Participants' EF levels (Mean=31.2%, SD=8.75) were one (1.3%) at 10%, four (5.1%) at 15%, twelve (15.4%) at 20%, eleven (14.1%) at 25%, eleven (14.1%) at 30%, nine (11.5%) at 35%, and thirty (38.5%) at 40%. Regarding education level (Mean=3.35 [high school graduate], SD=1.34), 23 participants (29.5%) had an eighth-grade education, 29 (37.2%) completed high school, 9 (11.5%) attended some college classes, 12 (15.4%) completed an associate's degree, 2 (2.6%) completed a bachelor's degree, and 3 (3.8%) completed a master's degree. Forty-eight participants (61.5%) were non-tobacco users and thirty (38.5%) had used tobacco in the past year. The following comorbidities were included on demographic intake form: diabetes, lung disease, heart disease, high blood pressure, high cholesterol, and history of a previous heart attack. Participants answered this question by circling their comorbidities.

One participant reported no comorbidities (1.3%), nine (11.5%) had one comorbidity, 14 (17.9%) had two comorbidities, 27 (34.6%) had three comorbidities, and 27 (34.5%) had four or more comorbidities. For annual income, 27 participants (34.6%) earned less than $15,000 per year; 19 (24.4%) earned $15,000 to $24,999, 11 (14.1%) earned $25,000 to $34,999, 4 (5.1%) earned $35,000 to $49,999, and 5 (6.4%) earned more than $50,000 per year. Twelve participants (15.4%) refused to answer the income question. The number of medications per participant

ranged from 0–22 per day (Mean=8.85, SD=4.73). Independent sample t-tests were conducted with no statistically significant differences noted between groups (Table 1).

Table 1. Sample Demographics-Independent t-test

Variable	Group	N	Mean	Std Deviation	Std Error Mean	Sig. (2-tailed)
Age	CG	38	66.68	10.89	1.77	.528
	EG	40	68.23	10.57	1.67	
Social Support	CG	38	0.74	0.45	0.07	.896
	EG	40	0.75	0.44	0.07	
EF %	CG	38	32.24	8.618	1.41	.290
	EG	40	30.13	8.366	1.39	
NYHA	CG	38	2.63	0.75	0.12	.845
	EG	40	2.60	0.67	0.11	
# of Med	CG	38	8.89	4.68	0.76	.930
	EG	40	8.80	4.83	0.76	
Education	CG	38	3.18	1.06	0.17	.304
	EG	40	3.50	1.57	0.25	
Income	CG	38	1.84	1.37	0.22	.901
	EG	40	1.80	1.59	0.25	
Comorbid	CG	38	3.08	1.28	0.21	.820
	EG	40	3.15	1.46	0.23	

Note. CG=control group; EG=experimental group; N=sample size number; EF=ejection fraction; Significance is two-tailed

Hypothesis Testing

The situation-specific theory of HF self-care (Riegel & Dickson, 2008) guided the study. In this theory, the model of self-care of heart failure explains the relationships between the concepts of self-care maintenance and self-care management with self-care confidence as a mediator for successful self-care. These three concepts are measured by the SCHFI (Riegel et al., 2009).

Hypothesis #1

The first tested hypothesis stated that patients who undergo a nurse-led MI intervention in addition to standard practice HF discharge care will have a statistically significant increase in

their level of self-care during the first 30-day transitional care period after discharge, after controlling for educational level and number of comorbidities, when compared to the CG as measured by the SCHFI. The first null hypothesis stated that there will be no statistically significant difference between the CG and CG for level of self-care as measured by the SCHFI after the nurse-led MI intervention during the first 30-day transitional care period after hospital discharge.

For the intervention, the PI and patient interacted in a partnership-like relationship and explored any unresolved ambivalence to behavior change by focusing on the patient's needs, ability to change, desires to change, and the commitment to change (El-Mallakh et al., 2012). The pros and cons of the EG participants' current health behaviors also were explored at each telephone follow-up session within a supportive environment created by the PI. The PI used OARS method skills (**O**pen-ended questions, **R**eflective listening, **A**ffirmation of the participant's belief statements, and **S**ummarization of the client's perspective of behavior change) during the MI intervention (Markland et al., 2005). Examples of the OARS questions used in the study are presented in Appendix A. An MI-trained nurse (the PI) delivered the intervention to the EG first in a brief 15-minute face-to-face session within 48 hours prior to discharge from the hospital to home, then again by telephone at 24–48 hours, 10–14 days, and 21-days post-discharge. Pre- and post-intervention findings for the three self-care theory concepts as measured by the SCHFI were analyzed. The baseline demographic categories for the CG and EG are presented in Table 2. The Pearson Chi-square for each category was not significant for differences between groups.

The SCHFI is a 22-item survey instrument with three separately scored scales: self-care maintenance, self-care management, and self-care confidence (Riegel et al., 2009). The scores

Table 2. Baseline Sample Demographics by Research Group

Category	Characteristic	CG	EG	Pearson Chi-Square
Gender	Male	22	19	.375
	Female	16	21	
Social Support	Lives Alone	10	10	1.00
	Lives with others	28	30	
Race	White	38	38	.494
	Non-white	0	2	
Insurance	Medicare	25	31	.364
	Non-Medicare	13	9	
EF %	15%	1	4	.249
	20%	8	4	
	25%	3	8	
	30%	5	6	
	35%	3	6	
	40%	18	12	
NYHA Level	II	20	20	.631
	III	12	16	
	IV	6	4	
Tobacco Use	Yes	19	11	.062
	No	19	29	

Note. CG=control group; EG= experimental group; EF=ejection fraction; NYHA=New York Heart Association classification

were standardized for each of the three scales with scores ranging from 0–100. A univariate analysis with one-way ANCOVA was used to test for differences in mean scores at pre- and post-intervention between the EG and CG. A Levene's test was performed to assure the equality of variances for the two groups. Because there was no significance in the homogeneity of variance in each of the self-care scales observed in the study (pre- and post-intervention), the ANCOVA analysis was used. The covariates of educational level and number of comorbidities were analyzed and noted to have homogeneity of regression slopes in accordance with the self-care dependent variable in the ANCOVA analysis and, therefore, were deemed appropriate covariates. There were no values eliminated in the data cleaning.

With significance set at an alpha level of 0.05, the one-way ANCOVA results, as shown in Tables 3 through 8, indicate a significant main effect between groups for post-intervention self-care maintenance, F (1, 74)=6.93, p=.010, partial η^2=.086, and between groups for post-intervention self-care management, F (1, 74)=9.945, p=.002, partial η^2 = .118. There was only significance noted between treatments post intervention for self-care management, F (3, 74)=3.96, p=.011, partial η^2 =.138.

Table 3. ANCOVA Summary Table for Pre-Intervention Self-care Maintenance

Source	*SS*	*df*	*MS*	*F*	*p value*	*partial* η^2
Between treatments	44.359	3	14.79	.050	.985	.002
Education	12.462	1	12.46	.042	.839	.001
Comorbid	21.703	1	21.70	.073	.788	.001
Group	8.639	1	8.639	.029	.865	.000
Error	22078.42	74	298.36			
Total	247872.6	78				

Note. SS=sum of squares; df=degrees of freedom; MS=mean square; F=factor ratios.

Table 4. ANCOVA Summary Table for Pre-Intervention Self-care Management

Source	*SS*	*df*	*MS*	*F*	*p value*	*partial* η^2
Between treatments	1225.44	3	408.48	1.01	.393	.039
Education	946.55	1	946.55	2.34	.130	.031
Comorbid	199.81	1	199.81	.494	.484	.007
Group	.258	1	.258	.001	.980	.000
Error	29923.28	74	405.30			
Total	117150.0	78				

Note. SS=sum of squares; df=degrees of freedom; MS=mean square; F=factor ratios

Table 5. ANCOVA Summary Table for Pre-Intervention Self-care Confidence

Source	*SS*	*df*	*MS*	*F*	*p value*	*partial* η^2
Between treatments	1165.04	3	388.35	.814	.490	.032
Education	551.46	1	551.46	1.15	.286	.015
Comorbid	469.50	1	469.50	.984	.324	.013
Group	110.51	1	110.51	.232	.632	.003
Error	35311.43	74	477.18			
Total	363234.8	78				

Note. SS=sum of squares; df=degrees of freedom; MS=mean square; F=factor ratios

Table 6. ANCOVA Summary Table for Post-Intervention Self-care Maintenance

Source	*SS*	*df*	*MS*	*F*	*p value*	*partial* η^2
Between treatments	2326.80	3	775.60	2.68	.053	.098
Education	52.59	1	52.59	0.182	.671	.002
Comorbid	181.20	1	181.20	0.627	.431	.008
Group	2001.71	1	2001.71	6.92	.010	.086
Error	21379.14	74	288.91			
Total	308060.6	78				

Note. SS=sum of squares; df=degrees of freedom; MS=mean square; F=factor ratios

Table 7. ANCOVA Summary Table for Post-Intervention Self-care Management

Source	*SS*	*df*	*MS*	*F*	*p value*	*partial* η^2
Between treatments	4243.73	3	1414.58	3.962	.011	.138
Education	118.08	1	118.08	0.331	.567	.004
Comorbid	395.40	1	395.40	1.107	.296	.015
Group	3550.75	1	3550.75	9.945	.002	.118
Error	26421.65	74	357.05			
Total	165250.0	78				

Note. SS=sum of squares; df=degrees of freedom; MS=mean square; F=factor ratios

Table 8. ANCOVA Summary Table for Post-Intervention Self-care Confidence

Source	*SS*	*df*	*MS*	*F*	*p value*	*partial* η^2
Between treatments	1840.12	3	613.37	1.245	.300	.048
Education	580.96	1	580.96	1.179	.281	.016
Comorbid	17.18	1	17.18	0.035	.852	.000
Group	1035.03	1	1035.03	2.101	.151	.028
Error	36451.92	74	492.59			
Total	408894.2	78				

Note. SS=sum of squares; df=degrees of freedom; MS=mean square; F=factor ratio

There were no significant main effects between groups for pre-intervention self-care maintenance, F (1, 74)=.029, p=.865, partial η^2=.000; pre-intervention self-care management, F (1, 74)=.001, p=.980, partial η^2=.000; pre-intervention self-care confidence, F (1, 74)=.232, p=.632, partial η^2=.003; and post-intervention self-care confidence, F (1, 74)=2.101, p=.151, partial η^2=.028. Table 9 presents the ranges and adjusted means for the CG and EG. The higher mean in each grouping indicates the better self-care score.

Table 9. Scores and Adjusted/Unadjusted Group Means for Self-Care

Dependent Variable	Group	Range (min-max)	Adjusted *M* (SD)	Unadjusted *M*
Pre-maintenance	CG	16.66-89.99	54.21(18.8)	54.12
	EG	9.99-83.32	53.41(15.2)	53.47
Pre-management	CG	0-90	32.76(20.2)	33.15
	EG	0-80	33.62(20.1)	33.26
Pre-confidence	CG	27.80-100	65.70(21.5)	65.95
	EG	5.56-100	63.80(22.2)	63.55
Post-maintenance	CG	13.33-79.99	55.08(18.6)	55.14
	EG	13.33-93.32	65.41(14.9)	65.35
Post-management	CG	0-80	34.47(19.5)	34.56
	EG	20-95	48.25(18.1)	48.17
Post-confidence	CG	16.68-100	64.82(22.6)	65.16
	EG	22.24-100	72.84(21.6)	72.51

Note. CG=control group; EG=experimental group; M=mean; SD=standard deviation

Riegel et al., (2009) stated that a half standard deviation increase in pre- to post-intervention means as measured by the SCHFI indicates a clinical significance in self-care measures. Table 9 displays the adjusted means for CG and EG at the pre- and post-intervention measurements. The EG post intervention increased by half a standard deviation for self-care maintenance and self-care management.

Hypothesis #2

The second hypothesis stated that patients who undergo the nurse-led MI intervention in addition to the standard HF discharge care will have a statistically significant decrease in their rate of 30-day hospital readmission as compared to the CG receiving standard practice discharge care only. The second null hypothesis stated that there will be no statistically significant difference in 30-day hospital readmission rates between groups.

The chi-square results for readmission rates between the CG (n=3) and EG (n=8) was χ^2 (1, n=78) = 2.70, p=> 0.05. There was no statistical significance for EG readmission rates compared to the CG after intervention. The null hypothesis was accepted (Table 10).

Table 10. Chi-Square Tests for Readmission Rates to Hospital between Groups

	Value	df	Asy. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson χ^2	2.70	1	.091		
Continuity Correction	1.88	1	.170		
Likelihood Ratio	2.98	1	.084		
Fisher's Exact Test				.100	.084
Liner-by- Linear Association	2.81	1	.093		
N of Valid Cases	78				

Note. df=degrees of freedom

Chapter Summary

Results were obtained through parametric statistics under normal assumptions. Descriptive statistics were used to compare the CG and EG at baseline to test homogeneity of variance. The nurse-led MI intervention was statistically significant in increasing self-care maintenance and self-care management as measured by the SCHFI for the EG after controlling for educational level and number of covariates. The outcome of 30-day hospital readmission rates was not statistically different between the EG and CG despite having statistically and clinically significant increases in self-care scores for self-care maintenance and self-care management. Study findings are discussed in detail in Chapter 5.

Chapter 5: Discussion

This RCT examined the effects of a brief nurse-led MI counseling session on self-care in HF patients during the transitional period of the first 30-days post discharge from a community owned rural hospital with an Appalachian population. This study was guided by Riegel and Dickson's (2008) situation-specific theory of heart failure self-care. The sample demographics, attrition rates, and a review of the study findings are reviewed in this chapter. The implications for the theoretical framework, healthcare policy, and nursing clinical practice also are discussed. Finally, a conclusion and implications for future research projects is presented.

Demographic Characteristics

The comparison of the CG's and EG's demographic characteristics showed no significant differences between the groups at baseline after controlling for educational level and number of comorbidities. The participants were evenly distributed between male (52.6%) and female (47.4%), and were predominately white (97.4%), had social support in the home (74.4%), and had Medicare as their primary insurance provider (71.8%). The population ranged in age from 41–85 with a mean age of 67.47. The education level ranged from 8th grade (29.5%) to Master's degree (3.8%) with most participants having a high school diploma or lower (70.5%). This education statistic is lower than the national reported statistics from the *2016 American Community Survey* that noted 73.9% to 83.3% of rural Tennessee residents have completed high school (Pollard & Jacobsen, 2016). Appalachian minorities were underrepresented in this sample (2.6%), as the statistics for the rural Appalachian region indicate that 17.1% of Appalachian residents identify themselves as a minority (Pollard & Jacobsen, 2016). Regarding income level, the majority of the sample was noted to be below poverty levels (59%), with the largest group (34.6%) reporting less than $15,000 in annual income. This number is higher than the average of

17.2% being reported below the poverty level for singles or families of four in the general Appalachian region (Pollard & Jacobsen, 2016). The number of comorbidities reported had a mean of 3.12, with many participants self-reporting (65.4%) three or more comorbidities. Overall, the study population predominately self-identified as white with few minority participants. Participants also reported being poorer and less educated than the population in the census records for the same Appalachian region.

Within both groups, it was noted that most participants lived with others rather than living alone, described themselves as white, and had Medicare as their primary insurance provider. While many participants within both groups had an EF of 35% or greater, patients with EFs less than 20% were included in both groups (CG=9 and EG=8), equaling more than 21% of participants with lower EFs. NYHA functional levels were evenly distributed as well, with only two additional functional level IV patients in the CG compared to the EG. Having two higher symptomatic level NYHA IV patients in the CG could have affected the outcome of the study by having an increase in patients who were more ill. These differences could be minimized in future studies by recruiting a larger sample from the study population.

The ranges for each demographic characteristic also were examined (Table 2). The age range was 42–85 years for the CG and 41–85 for the EG, which were similar. For comorbidities, the EG participants had 0–6 (only one had no comorbidities), and the CG participants had 1–6. The mode for number of comorbidities for both groups was three, which is representative for this population. Income levels varied between groups with the EG (with seven refusing to report) ranging from under $15,000 to $100,000 and above, and the CG (with five refusing to report) ranging from under $15,000 up to $74,999. This difference in income indicated that the participants who were willing to report in the CG earned slightly less income than those in the

EG. The higher income level of the EG could contribute to increased access to care and self-care abilities, this could be used as a covariate in the future to minimize error (Riegel, et al., 2007). Education level also varied between groups, with the EG ranging from an 8th grade education to a Master's degree, and the CG ranging from 12th grade with no diploma to an Associate's Degree. The EG had a wider range in education level than the CG, and five EG participants had earned higher than an Associate's Degree. The higher education of the EG could contribute to increased self-care, therefore this factor was used as a covariate to minimize this error. The number of medications taken daily by participants ranged from 0–22 in the EG and 0–20 in the CG. Because the number of comorbidities and medications taken complicates self-care, this data was recorded for comparison purposes. Moreover, comorbidities were used as a covariate to reduce error in the statistical process.

The use of smokeless and smoked tobacco in the past year was self-reported by participants. The percentage of tobacco users in the study was 38.5%. This rate was higher than the reported statistics for adults in Tennessee (24.2%) from the most recent National Health Interview Survey (U.S. Department of Health & Human Services, 2015). The CG had more tobacco users than the EG, which may have indicated that CG participants were less compliant with healthy behaviors prior to the start of the study. No demographic data showed significant differences between the CG and EG as noted by the Chi-square calculation in Table 1.

The study had a low attrition rate of 2.5%, with only two participants lost to follow up for not completing the post-intervention SCHFI. One participant asked to be removed from the study after signing her informed consent, and the other was lost to follow up due to having a disconnected telephone number. This attrition rate was significantly lower than were those reported in studies from the literature review. The attrition rate was 33% for Masterson Creber et

al.'s (2016) RCT, 34% for Paradis et al.'s RCT (2010), and 19% for Shively et al.'s (2013) RCT. Six participants had to be removed due to being enrolled in the hospital's transitional care program. These participants were replaced later by reenrollment to ensure the study had the 78 participants needed for adequate statistical power. Overall, the low attrition rate was a strength of this study. The PI spent three months at the facility recruiting participants and observing the discharge planning that occurred on the cardiac step-down floor. This observation time informally allowed the PI to reflect on policies and practices, and formulate recommendations to enhance patient outcomes.

A few of the participants recognized the PI from her years of working as an APRN in the community. Having established her professional reputation with some of the study participants may have contributed to them feeling a sense of relatedness during the MI intervention. Moreover, using a cardiac registered nurse known to many of the chronic HF patients at this facility as the RA may also have contributed to the clinical significance of the intervention. This sense of relatedness, as described by Markland et al., (2005) enhanced the nurse-patient relationship and ultimately may have led to lower attrition rates. The participants may also have been willing to help the PI with the study to please the researcher or to benefit themselves. This may have produced a response bias among the participants.

Study Findings

Hypothesis 1 stated that patients who underwent the nurse-led MI intervention in addition to standard practice HF discharge care will have a statistically significant increase in their level of self-care during the first 30-day discharge transitional period, after controlling for educational level and number of comorbidities, when compared to the CG as measured by the SCHFI. The results showed a significant main effect between groups for post-intervention self-care

maintenance and self-care management after a one-way ANCOVA was performed. The one-way ANCOVA analysis for each of the pre- and post-intervention scores noted significance for self-care maintenance post intervention in the EG (p=.010) with a medium to large effect size (partial η^2 =.086). The significance for self-care management from the one-way ANCOVA also was statistically significant in the EG (p=.002), with a medium to large effect size (partial η^2=.118). Self-care confidence post intervention between the CG and EG was not statistically significant but was clinically significant in the EG with the mean from pre- to post-intervention increasing by more than a half an SD. The significance for between treatments for self-care management post intervention was (p=.011) prior to removing the error of the covariates of comorbid conditions and educational level. This was the only between treatments statistic that was significant either pre-or post-intervention. There was only one treatment of MI and two groups in the statistical analysis. Self-care maintenance and management also both indicated clinical significance. Self-care confidence is mentioned in the theory as being a mediator/moderator to self-care within the heart failure self-care model and was not statistically significant in an increase in scores (Masterson Creber et al., 2016; Riegel & Dickson, 2008). This lack of significance may be related to the fact that approximately 74% of the participants had social support which enhances self-care confidence. Future studies could include using social support as a covariate. The results of this study support the fact that self-care maintenance and management can be increased as measured by the SCHFI with a behavior change intervention such as MI.

Hypothesis 2 stated that patients who undergo the nurse-led MI intervention in addition to standard HF discharge care will have a statistically significant decrease in their rate of 30-day

hospital readmission as compared to the CG receiving standard discharge care only. This was not shown to be statistically significant in the study results and the null hypothesis was accepted.

It is worth noting that conducting a similar study with a larger sample size might find significance in the EG over time due to the increased mean in overall post-intervention self-care scores. Thirty-day readmissions of study participants to surrounding healthcare facilities in the Upper Cumberland region also should be tracked in future studies to gain a more complete picture of study results. These statistics could be verified by asking patients to self-report any 30-day readmissions through an additional telephone contact. The lack of a significant statistical outcome for the second hypothesis was a result of a lack of definitive evidence regarding readmissions to the surrounding community hospital facilities. Readmissions to all surrounding facilities should be included in future studies to strengthen the results and perhaps find significance with the MI intervention for the EG.

Few patients met the benchmark of 70 points on the SCHFI (the score indicating adequate self-care) for any of the self-care concepts measured by the instrument. Data analysis revealed no skewed or absent SCHFI data. Prior to the intervention, only 14% of the study population had equal to or greater than a 70-point score for self-care maintenance (CG=6, EG=4), 7% for self-care management (CG=2, EG=3), and 46% for self-care confidence (CG=18, EG=15). Post-intervention, the patients who met the benchmark of 70 points on the SCHFI for self-care maintenance were 36% of the total population (CG=10, EG=18), 10% for self-care management (CG=2, EG=6), and 47% for self-care confidence (CG=15, EG=22). These benchmark statistics may have contributed to the lack of significance in reducing the hospital readmissions. Statistical and clinical significance was found for maintenance and management regardless of few patients meeting the benchmark level for adequate self-care.

After the start of the study, the hospital initiated a chronic-care transitional follow-up program for high-risk readmission patients who had Chronic Obstructive Pulmonary Disease (COPD) and HF. In this program, a clinical pharmacist and nurse case manager identified high-risk inpatient admissions from a LACE score model that assigns a score for **L**ength of stay, **A**cuity of admission, **C**omorbidities, and **E**mergency room visits in the past six months (Wang et al., 2014). The transitional care team conducted telephone follow-up calls, reviewed medication lists at follow-up provider visits, and coordinated outpatient care. The new program only enrolled patients who had previous readmissions, multiple medications, and scored higher than 10 on their modified LACE model.

The current study's inclusion criterion was purposefully broad so that the RA could enroll chronic HF patients regardless of readmission risk. This broad inclusion was important in allowing the PI to formulate practice implications and suggestions for the facility. Inpatients were not screened for the hospital's transitional care program nor were they contacted by telephone on the weekends. The PI enrolled many study participants on the weekends from Friday afternoon to Sunday evening. Several patients informed the PI that they did not want to spend the weekend at home suffering from HF symptoms, and therefore would come to the emergency room or their primary care provider on Fridays to be evaluated and admitted. Only six patients were enrolled in the new hospital program and this study during the same 30-day period. This fact was not discovered until the PI made telephone contact with the participants, and noted that four in the CG and two in the EG were dual enrolled. These participants were removed from the analysis since they had contact with another nurse by telephone even though they were not receiving a MI intervention with mutual goal setting from the hospital program.

The PI also met with the transitional care program nursing case manager to ensure no other participants were enrolled in the hospital program during the study.

Implications for Theoretical Framework

The findings of this study helped test the theoretical framework of the situation-specific theory of heart failure self-care. This study is the first of its kind to apply this theoretical framework in a study with a rural Appalachian population. Furthermore, the use of the SCHFI developed from the self-care theory was used for the first time in this population. Statistically and clinically, the data support the use of MI as a behavior-change technique to increase HF self-care during the transitional care period from hospital to home. Self-care confidence was statistically unchanged between the pre- and post-intervention, a finding that supports the proposition that confidence is a mediator for self-care and not dependent on behavior change. The fact that patients were enrolled in the study with active HF symptoms was unique and contributed to the self-care management questions of the SCHFI. Only individuals who are experiencing or have experienced somatic HF symptoms can respond to questions in Section B of the SCHFI. Researchers of some past studies were unable to measure self-care management as they enrolled asymptomatic patients (Otsu & Moriyama, 2011; Paradis et al., 2010). The initial self-reported symptoms and self-care data collected via the SCHFI may have been overstated due to participants being in an acute care setting. This study also highlights the importance of the nurse's role in enhancing patient self-care, both in and out of the inpatient facility.

This study's use of MI supported past research on known self-care facilitators and barriers. The patient's healthcare values and beliefs were explored prior to goal setting to provide patient control of the situation and individualize treatment regimens. This tailored discharge education supported the work of Klymko et al., (2011), Reeder et al., (2015), Riegel et al.,

(2007), and Williams and Manias, (2013) who had already studied other interventions to increase self-care in heart failure in urban and suburban populations by individualizing discharge planning. To enhance learning and behavior change using MI, the intervention also supported the creation of an individualized discharge plan within the situational context of an acute care setting while the patient was symptomatic (Clark et al., 2009). The findings also built upon Riegel and Carlson's (2002) previous work indicating the need to help patients discover practical adaptations for living with HF, and allowing them to maintain control over their self-care management. Unfortunately, this study did not statistically support using MI to increase self-care confidence. By using the literature-supported barriers of multiple comorbidities and educational level as covariates for self-care, the research findings were statistically strengthened. This study's distinctives include its use of literature-supported covariates and an Appalachian population with a lower educational level and an average of three comorbidities in addition to HF.

The heart failure self-care theory by Riegel and Dickson (2008) was supported by this study's use of the self-care maintenance and management concepts as measurements pre and post intervention to improve transitional period self-care. The patients had statistically and clinically significant increases in mean scores due to the behavior change MI intervention. This finding supports Riegel et al.'s (2006) pilot study as well as studies by Paradis et al. (2010) and Masterson Creber et al. (2015) that all used MI to increase self-care. Conducting this research with a different population than the preceding three studies indicates the need for further studies in other unique and diverse populations.

Of note, Riegel, Dickson, and Faulkner (2016) recently updated the situation-specific theory of heart failure self-care. In this update, the authors removed the concept of self-care

confidence and added symptom perception with an emphasis on NDM as the process patients use to make real-time, self-care decisions (Riegel et al., 2016). Three major theory revisions were noted in the theory update: the distinction between autonomous and consultative self-care behaviors, the addition of the concept of symptom perception, and a further expansion of the theoretical concept of NDM (Riegel et al., 2016). The theoretical propositions and assumptions also were updated to reflect these major revisions. The terminology clarification for autonomous and consultative behaviors resulted from Vellone et al.'s (2013) psychometric testing of the SCHFI indicating that some self-care behaviors are undertaken independently, and some in consultation with a provider or caregiver. The addition of symptom perception resulted from the numerous research studies about somatic awareness. The initial study describing the concept of somatic awareness was discovered in patients who delayed seeking care for acute HF symptoms (Jurgens, 2006), and was then followed by multiple studies looking at symptom clusters in HF patients. The process of NDM, present in the 2008 version of the theory, was expanded in the 2016 version to include symptom perception in the action portion of decision-making process. Because the updated version of the theory was published after this study's design and data collection, the 2008 version was used along with the SCHFI. Because this study's results statistically and clinically increased self-care maintenance and management scores, they also support the updated version of the theory that still includes these concepts.

Implications for Clinical Practice

The clinical findings for this study suggest that implementing a nurse-led MI intervention during the first 30 days after hospital discharge is beneficial for increasing self-care maintenance and management in Appalachian HF patients. Unfortunately, this increase in self-care did not lead to an overall significant reduction of hospital readmissions in the EG. The fact that all

functional levels of symptomatic HF were enrolled in this study indicates that this intervention may be used on patients with a range in level NYHA classification from II-IV. NYHA level I patients were excluded from this study due to the fact they are asymptomatic and therefore could not complete the SCHFI part B related to self-care management. The study results also indicate that since the MI intervention can be delivered orally either in person or by telephone, it can be used regardless of a patient's literacy level, educational level, or provider access. Future research could include all NYHA levels in the chronic HF patient population to determine if somatic awareness is truly necessary in a rural population to have adequate self-care in a chronic illness. Research results from nurse-led RCTs are necessary for providing evidence-based practice protocols and interventions for patients with chronic HF.

This study's strengths included its unique rural Appalachian population, equal representation of males and females, and the use of the simple MI intervention, which can be easily implemented with minimal training for discharge goal setting (Brodie et al., 2008). Previously, this technique has been used in mental health, nutritional, occupational, diabetic, weight loss, and medication adherence counseling for achieving a specific behavior change (Copeland et al., 2015). The use of one provider to administer the intervention strengthened the delivery and fidelity of the MI sessions. Furthermore, the use of three telephone reinforcements during the transitional care period added to the research done by Sales et al. (2014) who completed weekly calls for a month, and Shively et al. (2013) who completed monthly calls for six months. Both of these studies demonstrated reduced hospital readmission rates (Sales et al., 2014; Shively et al., 2013). Previous studies' use of telephone reinforcements with no in-home visits reduced the provider's burden in delivering the intervention. This statistically and clinically significant RCT produced a recommendation for the frequency of reinforcement

education in the first 30-days post-discharge: three times. Future research on the cost to implement and the specific timing of three reinforcement telephone calls would be beneficial if less or more intervention times would be clinically significant.

This study's use of MI also added to the body of knowledge in a collaborative approach to behavior change by using both a nursing and behavioral health theory to guide the study. The lower educational status and income level of this population compared to the Appalachian regional statistics also were noteworthy. Despite the differences in this study's demographics compared to previous studies, there still was statistical significance in improving self-care scores with the nurse-led MI intervention. The barrier of health literacy was addressed in this study by giving participants the option of having the PI administer the pre- and post-SCHFI to them orally. The PI chose the SCHFI because the instrument could be administered orally.

The nursing process includes assessment, planning, and evaluation. This intervention expands nursing's involvement in the discharge process during the transitional care period. The MI intervention is congruent with the nursing process as it can be used to assess each patient's needs, mutually set individualized goals with the patient, and help the patient evaluate the effectiveness of their symptom perception, maintenance, and HF management.

Implications for Future Policy

Policy implications for improving patient outcomes can be derived from this research at both the facility and national policymaking levels. The JC regulates national healthcare facilities to inform and monitor evidence-based practices. The JC has specific discharge instruction requirements related to HF management (JC, 2010). Results from this study show that an evidence-based, behavior change MI intervention that increased self-care management could be used in discharge education delivery at the facility level.

The CMS currently fines facilities for HF patient readmissions regardless of the reason for the readmission. This penalty occurs even if the patient is admitted to an inpatient facility other than the one from which they were originally discharged and even if it is a different diagnosis than HF (Pyenson et al., 2015). If the primary facility's discharge was adequate, patient-centered, individualized, and care-coordinated, the resultant readmission due to any cause penalizes only the primary facility. These CMS penalties also do not account for the patients' responsibility when they are non-adherent with prescribed medical regimens. With the unknown proposed changes in the Patient Protection Affordable Care Act (ACA) by the new administration in healthcare policy making, discharge and transitional care requirements may change. Regardless of these changes, nurses and patients should be included in the healthcare reform process.

With the passage of the ACA in 2010 and the creation of the Community-Based Care Transitions Program, improving discharge planning and transitional care became a major healthcare reform initiative (Naylor et al., 2011). In 2012, the American Association of Heart Failure Nurses (AAHFN) and the Heart Failure Society of America (HFSA) issued a joint position paper indicating that nursing is responsible for the patient discharge instruction that is essential to patient care in the transitional period (Lee et al., 2012). The AAHFN followed this joint paper with a position statement about educating HF patients. This article encouraged nurses to use MI as an evidence-based approach to patient education along with multidisciplinary delivery, multimodal teaching, and inclusion of family and caregivers (Rasmusson, Flattery, & Baas, 2015). Both groups stated that they are in partnership with each other in advocating for the full scope of nursing practice and leadership at the baccalaureate and advanced practice levels to improve HF care and improve patient outcomes (Lee et al., 2012). This study's results encourage

nurses at all levels to be involved in the decision-making processes and implementation for changing discharge education delivery. Individualized discharge education is within the scope of practice for baccalaureate nurses. This research could be expanded in the future to include all chronic illness patients at risk for readmission.

Coursework that teaches MI techniques as a communication tool for improving patient outcomes through self-care behavior change should be included at the baccalaureate and graduate nursing education levels. For this to occur, the MI communication method must align with each nursing program's accreditation standards. Accreditation standards from the National League of Nurses and the Commission on Collegiate Nursing Education require curricula development to accommodate a culturally diverse population that allow students to recognize health indicators in a variety of patients and provide illness prevention and management techniques. The use of a MI method in a culturally diverse population such as rural Appalachia can support its inclusion in curricular changes for individualizing patient care. Further research in other diverse populations would be needed to support this study.

The PI recommends several changes be made to the regional hospital's current policies and procedures. First, the PI suggests that facility administrators change the discharge protocol to include a brief MI intervention delivered to HF patients by a bachelors-prepared nurse prior to 48 hours of discharge to home. Additionally, administrators should consider assigning a nurse to make a follow-up call to patients within 48 hours of discharge to answer their questions and clarify discharge instructions. Typically, day shift nurses had a 4:1 patient load, while evening shift nurses had a 5:1 patient load. These ratios along with the high admit and discharge census on this step-down floor made discharge planning difficult and, at times, rushed to open a room for the next admit. Many patients did not receive the standard care booklet until they were ready

to sign discharge papers and go home. This situation did not give patients and family members sufficient time to reflect on the information provided and form questions regarding self-care management at home. Participants were given face-to-face discharge teaching only if they asked to discuss a specific topic. The transition-to-home process could be improved by giving patients enough time to review and reflect on the standard care booklet, providing self-care information in small increments during multiple teaching sessions, and using the MI method to help patients set discharge goals.

Before this study, the facility's discharge policy did not consider patients' level of health literacy. To address this issue, the PI offered study participants the option of receiving orally delivered discharge instructions. A brief MI session delivered near discharge or started when the patient is admitted only requires 15–20 minutes of a nurse's time. This task could be completed by a bedside nurse caring for the patient during admission or one performing other interventions during the patient's stay. If questions arose or patient goals were developed during the inpatient stay that required the input of another health professional, this consultation could be completed before discharge and then reinforced by the discharging nurse. Nutrition, clinical pharmacy, physical therapy, and case management were the services most often requested by participants' who needed help to reach their self-care goals. The need for creative lower sodium dietary changes were the most requested transitional care goal set by the participants. These collaborative services should be streamlined into the discharge process to give patients access to a variety of providers, and help reduce the bedside nurse's teaching burden.

A team of healthcare providers—including members from nursing, nutrition, clinical pharmacy, physical therapy, and case management services—could serve as a HF care coordination team for future goal-setting and follow-up visits in the patient's home, as well as

clinic follow-ups with the primary provider. Having support from all outpatient healthcare disciplines for the holistic, patient-centered goals developed during the brief MI session likely would result improved outcomes in the transitional care period. Moreover, the MI counseling method allows patients to reach a higher level of autonomy and self-care, and reduces their ambivalence to change. Research has shown that self-care support for Appalachian individuals needs to promote patients' feelings of relatedness to others and be compatible with their cultural practices (Behringer & Friedell, 2006). These objectives can be achieved during a brief MI intervention, due to this method's theoretical groundings of relatedness to others and autonomy from the SDT. Improving self-care practices encourages disease management skills that help decrease morbidity and improve patients' quality of life (Miller & Rollnick, 2002). Finally, the practice of having a registered nurse trained in HF care and the MI technique make a follow-up telephone calls to recently discharged patients could help enhance patient-centered care, strengthen care coordination by the collaborative team, and increase self-care maintenance, management, and confidence during the transitional care period.

Implications for Future Research

In future research with HF patients in the same region, the PI would include a greater number of minorities than this study's sample, preferably one that reflects the percentage of minorities in the Appalachian population (17.1%). The PI also would use a larger sample size and include multiple rural healthcare facilities in the Upper Cumberland region to improve sampling demographics in future studies. Additionally, the PI would include diastolic HF in the future studies, as its symptom clusters and patient treatment are similar to systolic HF. While this study only included patients with systolic dysfunction, many symptomatic diastolic HF patients might have benefitted from the intervention. Considering the updated theory includes symptom

perception as a main concept, it would be beneficial to include objective data tracking by using the Heart Failure Somatic Perception Scale in future studies. Furthermore, including data from a six-minute walk test as well as steps walked per day, recorded dietary salt intake, and daily weight also would be beneficial for recording functional capacity and perhaps somatic changes as well.

Future research also could include a collaborative, interprofessional team to support chronic HF patients in the transitional period. This team would be led by baccalaureate-prepared nurses and include a clinical pharmacist, outpatient providers, nurse case managers, a nutritionist, and physical therapist. Another option would be to include home visits to improve patients' access to resources. A visit to the participant's home would be valuable for participants without reliable transportation who lived in an underserved healthcare area. A study on the specific socioeconomic determinants of health also is needed in individuals with chronic illness living in the rural Upper Cumberland Appalachian region. The differences in this study population's demographic data compared to Appalachian statistical data indicate the importance of exploring the socioeconomic determinants of health unique to this population.

The IOM's (2003) *Core Competencies for Health Professions* include the topics of providing patient-centered care, working with interdisciplinary teams, performing evidence-based practice, utilizing informatics, and exercising continuous quality improvement efforts. Another implication of this research is testing ways to use hospitals' informatics infrastructure to track and identify high-risk chronic illness patients at admission. Most hospitals employ an informatics nurse and computer science professionals with access to patients EHRs. Such access also could be used to track patients' socioeconomic needs, goals previously developed during

MI, and healthcare service utilization. Such efforts could help enhance quality improvement efforts by coordinating care from the emergency room to the inpatient floor.

Conclusion

This study examined the effects of a nurse-led MI technique on behavior change to increase self-care in an Appalachian population with chronic HF population and help reduce hospital readmission rates. Results showed that participants in the EG had a statistically significant increase in self-care maintenance, management, and confidence scores, but there was not an overall reduction in hospital readmission rates. This nursing theory-guided study added to the evidence-based literature regarding chronic illness self-care practice in HF. Future healthcare reform proposed by this research supports the inclusion of MI during the discharge and transitional care periods. Future research is needed in this population to include more minorities, a nurse-directed collaborative care team in the outpatient setting, and inclusion of multiple healthcare facility sites in the same Appalachian region.

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Appendices

Appendix A

Motivational Interviewing PI outline:

Basic Skills for **OARS**: after asking for permission to discuss self-care, use these:

Open ended Questions: ask open-ended questions that cannot be answered with yes/no
Example:

What are your goals for the future?
What effect does your HF have on your future goals?
What do you see as a problem to change _____?
What do you see as a helper to change _____?
What would you like to help change in the future to prevent HF symptoms?
What do you like about your HF self-care?
Why is it important to take your heart medicines?
What would happen if you started exercising, stopped smoking, or _____?
What one thing we talked about today would you like to change? How?
What are the five most important things in your life?
What have you tried before to make a change?

Affirming Response: to acknowledge their positive behaviors
Example:

I appreciate that you were willing to share that with me
You are a resourceful, clever, smart, etc. person
That is a good suggestion for _____
I enjoyed our discussion today
You've tried very hard in the past, or you've accomplished a lot in a short time

Reflective Listening statements:
Example:

So you feel_____
It sounds like you_____
So, what I hear you saying is_____
This is what I am hearing; please correct me if I am wrong

Summary statements: Must begin with indicating you are summarizing
Example:

Let me see if I understand so far
Here is what I have heard you say today
Did I hear you correctly?

Then make sure to tell them when you are contacting them again, recheck telephone number, and ask for a convenient time to contact.

Appendix B

Heart Failure Booklet

ZONES TO MANAGE HEART FAILURE

COOKEVILLE REGIONAL MEDICAL CENTER
The Proven Choice

Discharge Weight: _____ Doctor's Name: _____

First Weight at home: _____ Doctor's Phone: _____

	YOU HAVE:	WHAT TO DO:
GREEN ZONE	♥ No shortness of breath ♥ No weight gain more than 3 pounds per day ♥ No swelling of feet, ankles, legs or stomach ♥ No chest pain	♥ Keep up the good work ♥ Take your medicine ♥ Eat a low salt diet ♥ Weigh yourself every day
YELLOW ZONE	♥ Weight gain of 3 pounds in one day or 5 pounds in one week ♥ More shortness of breath ♥ More swelling in your feet, ankles, legs, or stomach ♥ Feeling more tired ♥ New or unusual coughing ♥ Dizziness ♥ Hard to breathe lying down - need to sleep sitting in chair	♥ **Call your doctor or nurse**
RED ZONE	♥ Hard time breathing ♥ Struggling to breathe even at rest ♥ Chest pain or discomfort ♥ Feeling faint	♥ **Call 911 or** ♥ **Get help, go to Emergency Room**

Form 1170-PRN (1/12)

COOKEVILLE REGIONAL MEDICAL CENTER

CONGESTIVE HEART FAILURE PATIENT INSTRUCTIONS

What is Congestive Heart Failure (CHF)?
It occurs when the heart muscle is weak and has trouble pumping out blood. Fluid collects in the lungs and other parts of the body. This causes your body to not get enough oxygen-rich blood to keep you healthy and strong.

What are Signs & Symptoms of Congestive Heart Failure?

- Trouble breathing that gets worse during exercise or when lying down
- Swelling in ankles, legs, or abdomen
- Feeling tired and/or weak
- Chest pain
- Weight gain

If any of the above symptoms develop or worsen, please contact your physician; go to nearest ER, or call 911.

I understand that I should do the following upon discharge to help manage my congestive heart failure:

1. Take your medicine as prescribed by the physician.
   * See Medication Discharge Instruction Sheet for list of medications to continue after discharge.
2. Eat a low-fat, low-salt diet. Foods low in fat and salt are healthier for the heart.
3. Weigh yourself daily and notify your physician if there is more than 3 lb. weight gain in 1 day.
4. Engage in some physical activity daily such as walking. Always consult your physician prior to beginning an exercise program.
5. Stop smoking if you are a smoker. Please check with your physician for information on how to stop smoking.
6. It is important to follow up with your physician after you leave the hospital. Please keep your recommended/scheduled appointment.

Date:_____

Patient signature: _____ Nurse Signature: _____

American Heart Association Phone: 1-800-242-8721 Web Address: http://www.heart.org

Heart Failure Society of America Phone: 1-651-642-1633 Web Address: http://www.abouthf.org

PATIENT ID STICKER

WHITE COPY - CHART YELLOW COPY - PATIENT Form 1115 (Rev. 2/13)

Heart Failure

2016

Heart Failure Treatment

Heart failure is a serious disease that affects how long you live. HF cannot be cured but can be managed with good medications and your attention to several details.

Early diagnosis and treatment is important to promote a normal life and keep you out of the hospital. There are a number of medications that work together to improve symptoms and help your heart work better. Taking these medications, following salt and fluid restrictions, and getting regular exercise will improve your health.

These are changes you need to commit to daily:

Take all medications exactly as prescribed.

Follow a low sodium (salt) diet.

Limit fluid intake.

Weigh yourself daily and record the values.

Decrease stress.

Stop smoking and do not drink alcohol.

Limit caffeine.

Continue physical activity as directed.

Know the signs of worsening heart failure and notify your health care provider.

Stay current on your immunizations

Other:

Get flu vaccines yearly

If you have a chronic disease, it is recommended that you get the pneumonia vaccine prior to age 65. You can repeat this one time if it has been 5 years or longer since your first pneumonia vaccine.

Try to stay inside during hot or cold weather. Extreme temperatures make the heart work harder.

Avoid medications such as NSAIDS or steroids. (Examples include Ibuprofen, Motrin, Aleve, Celebrex, Mobic, and Prednisone).

Notify your health care provider of any medication changes.

Weigh Yourself Every Day

1. To monitor your weight, you should weigh yourself every morning, on the same scale, wearing the same amount of clothing.

   Remember that scales weigh differently.

2. Weigh yourself first thing in the morning and after you've gone to the bathroom.

3. Write down your weigh every day.

The best way to watch for fluid build-up is to weigh yourself daily. You may gain fluid without noticing swelling.

What is heart failure?

The heart is a pump that moves blood through the body. Heart failure (HF) can happen after the heart muscle or heart valve is damaged. The heart is less able to pump the blood to all parts of the body. Blood flow can slow and fluid can leak out into areas like the lungs, abdomen, legs, ankles, and feet. When this happens you may notice swelling and difficulty breathing. HF is not curable, but treatment can help you feel better and keep you out of the hospital.

There are many causes of HF:

- Coronary artery disease
- Previous heart attack
- High blood pressure
- Diabetes
- Smoking
- Heart valve disease
- Alcoholism
- Lung problems
- Severe anemia
- Thyroid disorders
- Obesity
- Infection in the heart

Symptoms:

Most HF symptoms can be explained by the build up of fluid outside of the blood vessels.

Common symptoms include:

- Weak or tired
- Waking up short of breath at night
- Swelling in the stomach (bloating)
- Loss of appetite
- Short-term memory loss
- Shortness of breath
- Swelling in legs, ankles, or feet
- Sudden Weight Gain (2-3 pounds in one day)
- Dry hacking cough, most often when lying flat
- Trouble breathing when resting or while lying down

Low Sodium Diet (2,000 mg or 2 grams)
Foods Allowed

BEVERAGES
Coffee, tea, soft drinks
Low sodium vegetable juice
Regular fruit juices

BREADS, CEREALS AND GRAINS
Hot cereal without salt
Puffed rice, puffed wheat, shredded wheat cereals
Low sodium crackers
Tortillas
Unsalted rice, barley, pasta
Unsalted air popped popcorn, pretzels, corn or tortilla chips

Limit to 6 servings per day:
White, wheat, rye or pumpernickel bread, dinner rolls, muffins, pancakes, unsalted crackers and breadsticks, homemade bread dressing

VEGETABLES
All fresh and plain frozen vegetables
"No salt added" canned vegetables
Rinsed and drained regular canned vegetables
Fresh white or sweet potatoes
Unsalted tomato paste
Low sodium tomato sauce

FRUITS
All fresh and frozen fruits

MILK
Limit to 2 servings per day
Milk, chocolate milk, yogurt, frozen yogurt

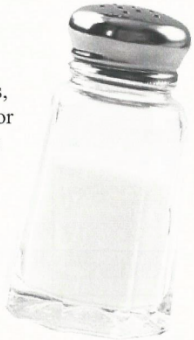
MEATS AND MEAT SUBSTITUTES
Fresh or frozen beef, lamb, pork and poultry
Fish and most shellfish: canned tuna or salmon that has been rinsed
Eggs and egg substitutes
Low-sodium cheese
Unsalted or low salt peanut butter
Homemade dried beans or peas
Frozen dinners with less than 600 milligrams of sodium

Limit to one serving per day:
(1/2 cup) cottage or ricotta cheese
(1 oz.) Swiss or mozzarella cheese

FATS
Butter or margarine
Vegetables Oils
Unsalted nuts
Homemade salad dressing

Limit to one serving per day:
Salad dressings, mayonnaise, or cream cheese

SOUPS
Low sodium or homemade broths, soups with fresh or frozen vegetables



Low Sodium Diet (2,000mg or 2 grams)
Foods to Avoid

BEVERAGES
Instant cappuccino, hot cocoa mixes,
and sports drinks (such as Gatorade)

BREADS, CEREALS AND GRAINS
Instant hot cereals
Bread, rolls, or crackers with salted tops
Corn bread
Frozen waffles, pastries
Commercially prepared rice, pasta or bread dressing mixes
Salty snacks

VEGETABLES
Sauerkraut
Processed vegetables
Regular tomato sauce and paste
Vegetables seasoned with ham, bacon, or salt pork
Commercially prepared potato mixes

FRUITS
Commercially dried fruits

MILK
Buttermilk

MEATS AND MEAT SUBSTITUTES
Bacon, ham, and sausage
Cold cuts, hot dogs
Chipped beef
Sardines, anchovies
Marinated herring
Imitation seafood
Pickled meats
Frozen breaded meats
Pickled eggs
Processed cheeses, cheese spread
Regular aged cheese

FATS
Bacon, bacon bits
Commercially prepared salad dressing
Dips made with dried soup mix or processed cheese
Tartar Sauce
Salted nuts and olives
Canned gravies or gravy mixes

SOUPS
Regular canned or dehydrated soups

Examples of low-salt spices, herbs, and seasonings

Allspice	Basil	Chili Powder	Cumin
Cayenne Pepper	Celery pepper	Coca Powder	Flavored Extracts
Cinnamon	Cloves	Dry Mustard	Lemon Juice
Curry	Dill	Ginger	Oregano
Fresh Garlic	Garlic Powder	Onion powder	Red Pepper
Low-Salt Ketchup	Nutmeg	Pimento	Thyme
Paprika	Parsley	Tabasco Sauce	Vinegar
Sage	Salt Substitute*	Black Pepper	
Ms. Dash	Bay leaves	Chives	

**Ask doctor if appropriate before using*

High-Salt Spices and Seasonings

Alfredo Mixes	Regular Ketchup	Horseradish	Taco Seasoning
Fish Sauce	Stir Fry Mixes	Onion Salt	Salad Dressing Mixes
Lite/Regular Soy Sauce	Celery Salt	Sea Salt	Lite Salt
Poultry Seasoning	Generic Sauce Mixes	Taco Sauce	Plum Sauce
Steak Sauces	MSG	Marinade Mixes	Teriyaki &
Barbecue Sauce	Salt	Kosher Salt	Worcestershire Sauce
Garlic Salt	Stir Fry Sauce	Pickle Relish	
Meat Tenderizer	Cocktail Sauce	Seasoned Salt	

Fluid Control

Your doctor may place you on Fluid Restrictions. This chart will help you to keep up with your fluid intake.

FLUID MEASUREMENTS

1 quart = 4 cups = 32 ounces = 960 ml
1 pint = 2 cups = 16 ounces = 480 ml
1 cup = 8 ounces = 240 ml

ITEMS THAT COUNT AS FLUIDS

Water	Milk	Soft Drinks
Alcohol	Cream	Non-dairy creamer
Coffee	Tea	Fruit juice
Fruit drink	Jello	Vegetable juice
Ice cream	Sherbet	Sorbet
Popsicle	Soup/Broth	Ice cubes

HINTS FOR FLUID CONTROL

1. Eat allowed fruits and vegetables ice cold between meals.
2. Try lemon wedges, sour hard candies, or chewing gum to stimulate saliva and moisten a dry mouth.
3. Rinse your mouth with mouthwash.
4. Chew on ice cubes.
5. Use small cups and glasses for beverages.
6. Remember that 2 cups of retained fluid is equal to 1 lb. of fluid weight gain.
7. Freeze allowed beverages in ice cube trays.
8. Drink in sips instead of gulps.
9. Measure fluid allotment for the day and store it in a container in the refrigerator.
10. Keep home well humidified.

Stop Smoking or Drinking Alcohol

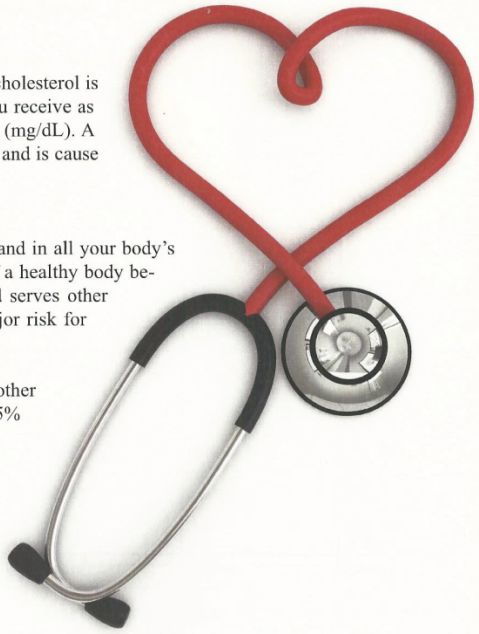
These activities can place a strain on your heart.

take control

quit the habit

If you have problems stopping, talk with your doctor.

Control Cholesterol



American Heart Association Recommendations

It's important for all people to know their cholesterol level. Total blood cholesterol is the most common measurement of blood cholesterol. It's the number you receive as test results. Cholesterol is measured in milligrams per deciliter of blood (mg/dL). A cholesterol level of 200 mg/dL or higher puts you in a high-risk category and is cause to take action.

What is cholesterol?

Cholesterol is a soft, fat-like, waxy substance found in the bloodstream and in all your body's cells. It's normal to have cholesterol. Cholesterol is an important part of a healthy body because it's used for producing cell membranes and some hormones, and serves other needed bodily functions. But too much cholesterol in the blood is a major risk for coronary heart disease (which leads to heart attack) and stroke.

Cholesterol comes from two sources: your body and food. Your liver and other cells in your body make about 75% of blood cholesterol. The other 25% comes from the foods you eat.

LDL cholesterol is the "bad" cholesterol. When too much of it circulates in the blood, it can clog arteries, increasing your risk of heart attack and stroke. LDL cholesterol is produced naturally by the body, but many people inherit genes that cause them to make too much. Eating saturated fat, trans fats and dietary cholesterol also increases how much you have.

How to Lower Cholesterol

The good news is, you can lower your cholesterol and reduce your risk of heart disease and stroke. Whether you've been prescribed medication or advised to make diet and lifestyle changes to help manage your cholesterol, carefully follow your doctor's recommendations. To keep your cholesterol under control, The American Heart Association recommends that you: schedule a screening, eat foods low in cholesterol and saturated fat and free of trans fat, maintain a healthy weight and stay physically active.

Activity Levels and Guidelines

Plan activities around two to three 20-30 minute rest periods every day. Do not overload or overwork your heart.

If you experience one of the following symptoms during activities

STOP AND REST:

- **Any change in your breathing (shortness of breath)**
- **Cough**
- **Chest Discomfort**
- **Pain**
- **Dizziness**
- **Fast Heart Beat (flutter, skips, palpations)**
- **Extreme Weakness or Tiredness**

If after rest, symptoms do not go away, call your doctor or go to the emergency room.

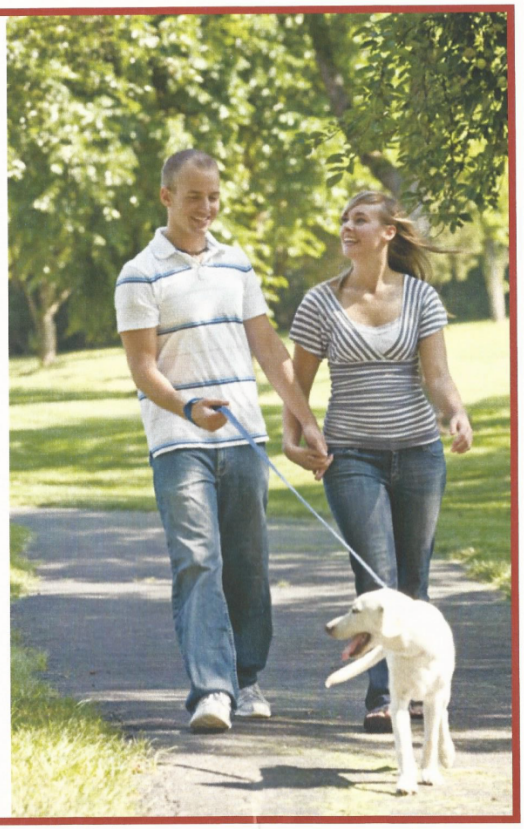
Avoid activities in extreme hot or cold outdoor temperatures or when you do not feel well.

Avoid tasks that require heavy lifting.

Check with your doctor before starting an exercise program. Exercise regularly following your doctor's guidelines. Short walks are a good way to begin your exercise program.

Ask your doctor about a Cardiac Rehabilitation Program.

Activities you may enjoy are bicycling, fishing, walking, gardening, swimming, aerobics, and many more.



Heart Failure Medicines

The purpose of Heart Failure medications is to make you feel better and to treat the disease that is causing you to feel bad. For this reason, it is very important for you to take your medications as instructed by your doctor even if you are feeling better.

The main types of heart failure medications are as follows:

1. ACE (angiotensin-converting enzyme) inhibitors lower blood pressure and decrease strain on the heart. This makes it easier for the heart to pump.

2. Beta Blockers help lower blood pressure and slow your heart rate. This lessens the work your heart has to do.

3. Digoxin helps your heart pump with more strength. This helps your heart pump blood to the rest of your body.

4. Isorbide dinitrate/hydralazine helps lower blood pressure and decreases how hard the heart has to pump.

5. Diuretics (water pill) help rid your body of excess water. This can help rid your body of edema (swelling). Having less fluid to pump means your heart doesn't have to work as hard. Some diuretics make you body lose a mineral called potassium. Your doctor will tell you if you need to take supplements or eat more foods high in potassium.

If you are taking all your medicines and feel worse be sure to tell your doctor.

Your Medications

The medicines your doctor has prescribed for you cannot make your HF go away, but they can make you much more comfortable and help you manage your HF. Here are some important tips about your medications:

Take all your medicine as directed by your doctor

Keep medicine in original containers and store as directed.

Take the right amount of medications at the same time each day. A pill organizer or a written schedule may help you to remember when to take you medicine.

Try to learn what each medication does and what it looks like. Remember some medicines may change shape or color. Clarify any changes with your pharmacist.

Make sure you have enough of all your medicines. Do not run out or try to make a month's supply last longer.

Carry a list of your medicines in your wallet or purse.

Tell your doctor and pharmacist about all medicines you take over-the-counter, any home remedies, herbals, vitamins, and prescribed medications.

Take your medicine bottles with you to all doctor appointments and to the hospital.

Do not skip or increase the doses of your medicine unless ordered by your doctor.

If you miss a dose, do not take it with the next dose.

If you cannot take your medicines, for any reason, call your doctor immediately.

Clarify any questions about your medicines with your doctor, nurse, or pharmacist.

Do not take any over-the-counter- medicines, herbals, or home remedies without asking your doctor or pharmacist. They may interfere with your prescribed medicine.

Get your medicine from only one pharmacy

Appointments and Phone Numbers

Follow-up appointments are important to keep so that your health care provider can closely monitor your symptoms and make proper changes.

Your appointment is _____ with _____.

Important Phone Numbers: _____ _____

My Doctor's number : _____

If any of the following occur contact your doctor:

- ❑ Difficulty in breathing
- ❑ Increased tiredness, weakness, or dizziness
- ❑ Weight gain of 3 pounds in one day or 5 pounds in one week
- ❑ Leg cramps
- ❑ Decrease in urine
- ❑ Increased bloating
- ❑ Increased swelling in legs, ankles, and feet

HEART & VASCULAR CENTER *at*
COOKEVILLE REGIONAL
The Proven Choice

Appendix C

Self-care in Heart Failure Index v6.2 (SCHFI)

All answers are confidential.
Think about how you have been feeling in the last month or since we last spoke as you complete these items.

Section A:
Listed below are common instructions given to persons with heart failure. How routinely do you do the following?

	Never or Rarely	Sometimes	Frequently	Always or Daily
(1) Weigh yourself	1	2	3	4
(2) Check your ankles for swelling	1	2	3	4
(3) Try to avoid getting sick (eg, flu shot, avoid ill people)	1	2	3	4
(4) Do some physical activity	1	2	3	4
(5) Keep your doctor or nurse appointments	1	2	3	4
(6) Eat a low-salt diet	1	2	3	4
(7) Exercise for 30 min	1	2	3	4
(8) Forget to take one of your medicines	1	2	3	4
(9) Ask for low-salt items when eating out or visiting others	1	2	3	4
(10) Use a system (pillbox, reminders) to help you remember your medicines	1	2	3	4

Section B:
Many patients have symptoms due to their heart failure. Trouble breathing and ankle swelling are common symptoms of heart failure. In the past month, have you had trouble breathing or ankle swelling? Circle one.
(0) No
(1) Yes
(11) If you had trouble breathing or ankle swelling in the past month... (Circle one number)

	Have Not Had These	I Did Not Recognize It	Not Quickly	Somewhat Quickly	Quickly	Very Quickly
How quickly did you recognize it as a symptom of heart failure?	N/A	0	1	2	3	4

Listed below are remedies that people with heart failure use. If you have trouble breathing or ankle swelling, how likely are you to try one of these remedies? (Circle one number for each remedy)

	Not Likely	Somewhat Likely	Likely	Very Likely
(12) Reduce the salt in your diet	1	2	3	4
(13) Reduce your fluid intake	1	2	3	4
(14) Take an extra water pill	1	2	3	4
(15) Call your doctor or nurse for guidance	1	2	3	4

(16) Think of a remedy you tried the last time you had trouble breathing or ankle swelling, (circle one number)

	I Did Not Try Anything	Not Sure	Somewhat Sure	Sure	Very Sure
How *sure* were you that the remedy helped or did not help?	0	1	2	3	4

Section C:
In general, how confident are you that you can

	Not Confident	Somewhat Confident	Very Confident	Extremely Confident
(17) keep yourself free of heart failure symptoms?	1	2	3	4
(18) follow the treatment advice you have been given?	1	2	3	4
(19) evaluate the importance of your symptoms?	1	2	3	4
(20) recognize changes in your health if they occur?	1	2	3	4
(21) do something that will relieve your symptoms?	1	2	3	4
(22) evaluate how well a remedy works?	1	2	3	4

Appendix D

RA flow sheet for Research "The Effects of Motivational Interviewing on Heart Failure Self-care during Transitional Care of the Appalachian Population"
Research Assistant's Explanation of Research Study to Potential Participants:

1. Scan hospital records for ICD-10 code of systolic heart failure
    a. 150.1 (LV failure)
    b. 150.2 (systolic)
    c. 150.9 (unspecified)
2. Verify Ejection Fraction in record as being below or at 40% by echocardiogram or cardiac catheterization
3. Review chart for inclusion and exclusion criteria
    a. Inclusion: b/w ages 40-80; NYHA II-IV classification; having HF for longer than 3 months; Have lived most of life in the Upper Cumberland Region of TN; English speaking
    b. Exclusion: comorbid diagnosis of dementia or cognitive impairment; NYHA I; discharge to LTC facility or inpatient rehab center
4. Approach potential participant for inclusion in study if they meet qualifications and notify PI of possible participant
5. Briefly explain research study: Example to use "We are asking you to take part in a research study that may help you with your discharge goals and home care instructions. You will be asked to fill out a short survey and provide basic health information. You may also be randomly placed in a group to receive additional nurse coaching by telephone. The primary researcher is a cardiac nurse practitioner and student at the University of Tennessee. There is no cost to you to participate. The primary researcher or her assistant will follow up with a phone call to your home in 3 weeks to have you complete a second survey just like the one you fill out today." Make sure you tell them that this is completely voluntary and they can withdraw at any time. The survey takes about 10-15 minutes to complete and the coaching will last 20-30 minutes while in hospital. Each follow up telephone call will take 15-30 minutes.
6. Informed consent to be discussed first by the RA. Provide the patient with a copy of the consent form if they are interested in participating for them to review and to allow time to ask questions. Explain that their participation in this study is voluntary; they may decline to participate without penalty. If they decide to participate, they may withdraw from the study at any time without penalty and without loss of treatment benefits to which they are otherwise entitled. If you withdraw from the study before data collection is completed your data will not be included in the final report and will be mechanically destroyed. The consent may be read to participant if necessary. Signed informed consent is required to participate.
7. Notify the PI of interest in study if patient is interested. Estimate a discharge date and communicate this to the PI by telephone, email, or text message.
    a. Jennifer L. Mabry (PI) jmabry3@utk.edu or 931-261-4308

IRB NUMBER: UTK IRB-16-03127-XP IRB APPROVAL DATE: 07/27/2016

Appendix E

Informed Consent

"The Effects of Motivational Interviewing on Heart Failure Self-Care during Transitional Care in an Appalachian Population"

Principal Investigator: Jennifer L. Mabry, MSN, FNP

INTRODUCTION
You are being asked to join a research study about extra hospital discharge teaching for your heart failure that will be done by a nurse. The purpose of the research study is to see if discharge teaching helps you take care of yourself. Joining this study is your choice. If you do not wish to be part of the study, it will not affect your relationship with your hospital or doctor.

PARTICIPANTS' INVOLVEMENT IN THE STUDY
You will be assigned to a research group by chance - like a flip of a coin.
If you are in Group A, you will have additional health coaching from a cardiac nurse about your heart failure in person while in the hospital and then also at home by telephone.
If you are in Group B, you will have healthcare teaching the same as all heart failure patients that have not joined the study.
Both groups will:

- Get a booklet titled "Heart Failure 2016" that was given to you to read during your hospitalization when you were admitted to the hospital.
- A health survey to complete before discharge and again in 4 weeks by telephone.
- Receive a phone call from a nurse to see how you are doing while you are at home recovering.

The total time of the extra teaching in the hospital will be about 20 to 30 minutes. The follow up phone calls will be about 15 minutes. The survey will take about 10 minutes to complete.

RISKS
A potential risk to this study would be the possible loss of confidentiality related to the information collected in this study. We will do our best to protect your personal health information and believe this risk is not likely to happen. There is no cost to you to join the study and no cost to your insurance company.

BENEFITS
There are not any anticipated direct benefits for joining this study. You may have an increase in self-care and a decreased chance of being readmitted to the hospital. Additional benefits of this study will be to add to what we know about taking care of heart failure patients.

_____ Participant's Initial
IRB NUMBER: UTK IRB-16-03127-XP
IRB APPROVAL DATE: 07/27/2016
IRB EXPIRATION DATE: 07/26/2017

CONFIDENTIALITY
Your information will be kept safe and will be only be seen by the people conducting the research study. Only the people doing the research will know who you are. Your research record will contain your initials and an assigned research number and kept in a secure location by the researcher. You will not be identified in any presentations or publications based on the results of this research study. Your health information or Protected Health Information (PHI) will be used only for the study purposes. Your PHI will be used until the study is completed.
Under federal privacy regulations, you have the right to determine who has access to your personal health information (called "protected health information" or PHI). PHI collected in this study will include your heart failure diagnosis, ejection fraction (percent of blood your heart pumps), your heart functioning classification, your name, and telephone number. Also basic information like your education level, household income, if you live with other people, if you are male or female, your insurance provider, if you use tobacco, and any other long term illnesses you may have. We also will be notified if you are readmitted to the hospital for your heart failure by the hospital within the first 30 days after you go home.

By signing this consent form, you are authorizing the research team at the University of Tennessee to have access to your PHI collected in this study and to receive your PHI from CRMC. The Institutional Review Board (IRB) at the University of Tennessee may review your PHI as part of its responsibility to protect the rights and welfare of research subjects. Your PHI will not be used or disclosed to any other person or entity, except as required by law, or for authorized oversight of this research study by other regulatory agencies, or for other research for which the use and disclosure of your PHI has been approved by the IRB. Your PHI will be used until the study is completed.

You may cancel this authorization in writing at any time by contacting the principal investigator listed on the first page of the consent form. If you cancel the authorization, continued use of your PHI is permitted if it was obtained before the cancellation and its use is necessary in completing the research. However, PHI collected after your cancellation may not be used in the study. If you refuse to provide this authorization, you will not be able to participate in the research study. If you cancel the authorization, then you will be withdrawn from the study.

PARTICIPATION
Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be destroyed and not included in the final report. Your decision to participate, not participate, or withdraw your participation from the study will not affect your relationship with Cookeville Regional Medical Center or the services you receive from them.

_____Participants Initials
IRB NUMBER: UTK IRB-16-03127-XP
IRB APPROVAL DATE: 07/27/2016
IRB EXPIRATION DATE: 07/26/2017

CONTACT INFORMATION
If you have questions at any time about the any part of the study, you may contact the principal researcher, Jennifer L. Mabry, FNP-BC, at jmabry3@utk.edu, or her office number of (931) 372-6803 and leave a message. You may also contact Ms. Mabry's Faculty Advisor, Dr. Carole Myers, at cmyers9@utk.edu or by phone, 865-974-7626.

If you have questions about your rights as a participant, you may contact the University of Tennessee IRB Compliance Officer at utkirb@utk.edu or (865) 974-7697.

I have read this consent form (or it has been read to me). All of my questions about the study and my involvement have been answered.

I authorize the use and disclosure of my personal health information to the parties listed in the confidentiality section of this consent only for purposes described
By signing I have not given up any of my legal rights.
I have read the above information. I have received a copy of this form. I agree to participate in this study.

Participant's Name (printed) _____

Participant's Signature _____ Date _____

IRB NUMBER: UTK IRB-16-03127-XP
IRB APPROVAL DATE: 07/27/2016
IRB EXPIRATION DATE: 07/26/2017

Appendix F

SCHFI V 6.2

(http://www.self-careofheartfailureindex.com)

Self Care of Heart Failure Index SCHFI

History

History of the Self-Care of Heart Failure Index (SCHFI, pronounced "skiffy"): Our work in heart failure self-care began in the 1990s. Our first measurement article, describing the Self-Management of Heart Failure Scale was published in 2000. This tool was lengthy, cumbersome, and prone to scoring errors. In 2004 we published the SCHFI v.4 with 5 maintenance items, 6 management items, and 4 confidence items. Through the years we have modified item and stem wording in minor ways and tested those revisions in our own research. Most revisions were made to the maintenance scale to reflect the evolution in knowledge about heart failure (e.g., weight management, exercise). The management scale items have never changed. The confidence scale was published with 4 items but we have routinely used 6 items (2 addressing maintenance and 4 addressing management) in our research. Thus, with significant experience, we are able to say that none of the different versions has changed the psychometric profile to any significant degree.

The version available here is v.6.2, which was published in 2009. You do not need my permission to use this instrument; it is in the public domain. If you have questions, though, you may contact me at briegel@nursing.upenn.edu (mailto:briegel@nursing.upenn.edu).

Version 6.2 reflects the theory of heart failure self-care prior to our recent update (described in Riegel B, Dickson VV, and Faulkner KM. The situation specific theory of heart failure self-care: Revised and updated. Journal of Cardiovascular Nursing, published ahead of print, 2015). Please see the 2009 article on the instrument for information about reliability, validity, item difficulty, learning effects, social desirability, score adequacy, how much change is clinically relevant, and how to compare scores on prior versions of the SCHFI to those obtained with the new version. The most recent comprehensive psychometric testing was done by Barbaranelli et al (2014). See key references for the full reference.

Note that we are in the process of revising the SCHFI to capture the additional dimension of symptom perception.

Search for: Search

- **Categories**
  - Home (http://www.self-careofheartfailureindex.com/)
  - History (http://www.self-careofheartfailureindex.com/?page_id=52)
  - Directions and scoring (http://www.self-careofheartfailureindex.com/?page_id=49)
  - SCHFI V6.2 English (http://www.self-careofheartfailureindex.com/?page_id=6)
  - FOREIGN LANGUAGE VERSIONS (http://www.self-careofheartfailureindex.com/?page_id=39)
  - Key references (http://www.self-careofheartfailureindex.com/?page_id=54)
  - FAMILY OF SELF-CARE TOOLS (http://www.self-careofheartfailureindex.com/?page_id=38)
  - Dr. Barbara Riegel

Appendix G

Demographic Questionnaire

"The Effects of Motivational Interviewing on Heart Failure Self-Care during Transitional Care in an Appalachian Population"

Dear Participant:
Please help us in our research by filling out the information below to better understand your health
Initials_____ Age: _____

1. Gender:
Male Female

2. Social support:
Living Alone Living with others

3. Which race do you most identify with:
- o White
- o Black/African American
- o American Indian/Alaska Native
- o Asian
- o Native Hawaiian/Pacific Island
- o Unknown

4. Insurance:
- o Medicare
- o Medicaid
- o Private/Group insurance
- o National Health Insurance
- o Veterans Affairs/Military
- o No Insurance/self-pay
- o Unknown

5. Have you ever had any other health problems:
- o Diabetes (sugar)
- o Lung disease
- o Heart disease
- o High Cholesterol
- o High Blood pressure
- o Previous Heart Attack

6. Tobacco Use in past year:
Yes No
(Include smoking, dipping, or chewing)

5. Total household income per year including yourself:
- o Under $15,000
- o $15,000 to $24,999
- o $25,000 to $34,999
- o $35,000 to $49,999
- o $50,000 to $74,999
- o $75,000 to $99,999
- o $100,000 and over
- o Refused/Unknown

6. Educational Level:
- o Never attended school
- o 8th Grade
- o 12th Grade, no diploma
- o High School graduate
- o GED or equivalent
- o Some college, no degree
- o Associate Degree: occupational/technical/vocational program
- o Associate Degree: Academic program
- o Bachelor's Degree (e.g., BA, BS, AB, BBA)
- o Master's Degree (e.g., MA, MA, MEng, MEd, MBA)
- o Professional school degree (e.g., MD, DDS, DVM, JD)
- o Doctoral Degree (e.g., PhD, EdD)
- o Unknown

_____

_____

For researcher only:
Participant Number _____
Number of medications_____
NYHA functional level: _____
EF%_____

MI Intervention Study 2016-JLM

Appendix H

July 27, 2016

Re: UTK IRB-16-03127-XP
Study Title: "The Effects of Motivational Interviewing on Heart Failure Self-Care during Transitional Care in an Appalachian Population"

Dear Jennifer Lynn Mabry:

The UTK Institutional Review Board (IRB) reviewed your application for the above referenced project. It determined that your application is eligible for expedited review under 45 CFR 46.110(b)(1), categories (5) and (7). The IRB has reviewed these materials and determined that they do comply with proper consideration for the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects. Therefore, this letter constitutes full approval by the IRB of your application (version 1.2) as submitted, including:

- Consent Form (The Effects of Motivational Interviewing on Self-care in Heart Failure in an Appalachian Population) (v1.3)
- Pre IRB Team Brief Explanation of Research Study to Potential Participants (Appendix A) (v1.3)
- MI Intervention Telephone Log (v1.1)
- Pre IRB SCHFI r6.2_revised_3-09-2 (v1.0)
- CRMC Standard Care 2016 p1 (v1.0)
- CRMC Standard Care 2016 p2 (v1.0)
- Revised Pre IRB Demographic Data Collection 051116 (Appendix D) (v1.0)

The above listed forms have been dated and stamped IRB approved. Approval of this study will be valid from July 27, 2016 to July 26, 2017.

In accord with 45 CFR 46.116(d), informed consent is waived for the identification and recruitment of participants for this study. The approved site for the conduct of this study is Cookeville Regional Medical Center.

Institutional Review Board | Office of Research & Engagement
1534 White Avenue Knoxville, TN 37996-1529
865-974-7697 865-974-7400 fax irb.utk.edu

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In addition, the request for waiver of HIPAA authorization for the conduct of identification and recruitment of participants is approved. The waiver applies to the medical records of heart care patients who received care at Cookeville Regional Medical center between July 27, 2016 and July 26, 2017.

In the event that subjects are to be recruited using solicitation materials, such as brochures, posters, web-based advertisements, etc., these materials must receive prior approval of the IRB. Any revisions in the approved application must also be submitted to and approved by the IRB prior to implementation. In addition, you are responsible for reporting any unanticipated serious adverse events or other problems involving risks to subjects or others in the manner required by the local IRB policy.

Finally, re-approval of your project is required by the IRB in accord with the conditions specified above. You may not continue the research study beyond the time or other limits specified unless you obtain prior written approval of the IRB.

Sincerely,

Colleen P. Gilrane

Colleen P. Gilrane, Ph.D.
Chair

Institutional Review Board | Office of Research & Engagement
1534 White Avenue Knoxville, TN 37996-1529
865-974-7697 865-974-7400 fax irb.utk.edu

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Appendix I

John R. Beal
Chief Legal Counsel
1 Medical Center Blvd
Cookeville, TN 38501
(931) 783-2008
Fax (931) 526-8814
jbeal@crmchealth.org

March 2, 2016

Jennifer Mabry, MSN, FNP, AACC
Assistant Professor
Tennessee Technological University
Robert and Gloria Bell Hall, Office 353

Dear Ms. Mabry

Please accept this letter as acknowledgement that Cookeville Regional Medical Center will accept an IRB approval from The University of Tennessee Review Board for the research project that you will be conducting at our institution. We would need a copy of the protocol and a copy of the IRB approval letter. The approval letter should specifically state that Cookeville Regional Medical Center is an approved site for conduct of the research.

If you have any questions do not hesitate to contact my office. Please send all of the documents to my office.

Sincerely

John R. Beal

Vita

Jennifer L. Mabry has lived most of her life in the Appalachian region of Tennessee. She graduated from Tennessee Technological University in 1993 with her Bachelors of Science in Nursing degree. She then attended the University of Tennessee at Knoxville for her Master's in Science Nursing degree with certification as a Family Nurse Practitioner (FNP) in 2000. She is currently nationally certified as an Advanced Practice Registered Nurse with the American Nurses Credentialing Center as well as an Associate of the American College of Cardiology. As an FNP, she has specialized in outpatient chronic illness management in Internal Medicine and Cardiology specialty practices since certification. She has a special interest in heart failure patients, understanding self-care, and primary disease prevention. She was chosen as the first Jonas Nurse Leader Scholar in Health Policy in Cohort IV at UTK. Currently, she is a PhD candidate at the University of Tennessee at Knoxville and will complete her degree requirements in May of 2017.