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A Descriptive Study of Health-Related Risks and Outcome Differences by Loneliness Status in a Sample of Older Veterans

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Abstract

There is a need to understand the influences and outcomes related to loneliness in veterans living with complex illness. Patients require self-care to manage complications and exacerbations associated with complex illness. Deficits in self-care result in negative health outcomes and drive resource utilization upward. The identification of potential factors related to self-care is important. Loneliness may be one factor that influences patients' ability and desire to care for themselves. Descriptive correlational design was used to evaluate loneliness both as a predictor and outcome in veterans admitted to the hospital for three complex respiratory illnesses (heart failure, chronic obstructive pulmonary disease, and pneumonia). Secondary variables of interest included sociodemographic and clinical characteristics and measures of healthcare utilization. There were no statistically significant findings from this study; yet knowledge generated helped to inform the development of a veteran-centric view of loneliness that may support greater understanding of loneliness in the veteran population. The researcher concluded that the proposed study framework was not supported by the study findings and a revised framework was suggested to guide similar research in the future. Knowledge generated from this study may be used to facilitate future research aimed at decreasing loneliness and increasing self-care leading to improved outcomes in veterans living with complex illness.

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Chapter 1: Introduction

Introduction

Chapter 1 introduces the problem, purpose, background, and significance of loneliness in the target population. Assumptions and research questions are also presented. The overall aim of this study is to add new knowledge to the existing body of literature through a study of baseline data and patient characteristics of older veterans admitted to an acute care setting for the treatment and management of three targeted illnesses: heart failure (HF), chronic obstructive pulmonary disease (COPD), and pneumonia (PNA).

Problem

Loneliness is prevalent among older adults and is associated with poor health outcomes (Cacioppo et al., 2002). Loneliness is defined as the perceived difference between the quality and quantity of relationships that a person has and what the person wants (Bombassei et al., 2009). Understanding the health risks and negative health outcomes associated with loneliness is needed. Growing evidence suggests that loneliness may contribute to self-care deficits in the older population presenting with complex illness (Loboprabhu et al., 2015). Three of the most common illnesses associated with poor outcomes and high healthcare costs in this population are heart failure (HF), chronic obstructive pulmonary disease (COPD), and pneumonia (PNA); (Agency for Healthcare Research and Quality [AHRQ], 2014). These three complex illnesses result in frequent rehospitalizations, poor health outcomes, and present opportunities for improvement.

Problem Statement

Although past research has shown loneliness to be a significant contributor to poor stress response, poor overall health, lack of social networks (friends, family, support groups), poor relationships, and negative health outcomes (Cacioppo et al., 2002, 2006; Holt-Lunstad et al., 2010, 2015), the influences and outcomes of loneliness in older veterans living with HF, COPD, and PNA are not well understood. Research on loneliness in older adults, specifically veterans admitted with complex, chronic illnesses that require self-management, is limited and research that may expand the knowledge of health-related risks for loneliness and negative health outcomes that may be associated with loneliness for veterans may be valuable. This new knowledge may be used by nurses and health care providers to support interventions to engage veterans in services and resources aimed at addressing loneliness in the target population.

Purpose

This study describes baseline characteristics of older veterans admitted for three targeted illnesses and explores differences among patients with and without loneliness. Identifying the sociodemographic and clinical factors associated with loneliness is crucial for tailoring appropriate self-care interventions to improve health outcomes for this population. Findings from this study may lead to significant advances in understanding loneliness in this population and how sociodemographic and clinical characteristics may contribute to loneliness. As a result, this study's new knowledge may be used to facilitate the future design and delivery of loneliness interventions in the veteran population.

Background and Significance

Congestive heart failure (HF), chronic obstructive pulmonary disease (COPD), and pneumonia (PNA) are three complex illnesses that together, contribute significantly

to rising health care costs in the veteran health care system (Centers for Medicare & Medicaid Services, 2015). The Centers for Disease Control and Prevention (CDC) reported that nearly 40.9% of deaths in the United States (U.S.) are caused by common chronic illnesses such as HF and COPD, with an additional 14.3% of deaths resulting from PNA (CDC, 2017). Caring for persons living with HF and COPD costs the U.S. nearly 108 billion dollars annually (Cook et al., 2014). Healthcare costs associated with PNA complications also significantly contribute to rising fiscal burden (CDC, 2015). Complex respiratory illnesses like HF, COPD, and PNA result in frequent hospitalizations, high costs of care, and increased utilization of acute care services. Both HF and COPD are considered chronic diseases that require self-care and self-management. Pneumonia, although not chronic, is still costly and occurs more often in patients with chronic respiratory illness such as HF and COPD (Mor et al., 2013; Janson et al., 2018).

Deficits in self-care among patients with HF and COPD are believed to contribute to rehospitalizations. An estimated 1.13 million people were hospitalized with PNA in 2017 (CDC, 2017). Acute exacerbation of symptoms leading to hospitalizations is common in patients living with HF (Goldstein & Lynn, 2006) and COPD patients often have similar experiences. In many cases, patients do not know if their symptoms are being caused by HF or COPD exacerbation, or new-onset PNA. People with HF and COPD are more likely to develop PNA (Mor et al., 2013; Janson et al., 2018). Such exacerbations lead to costly rehospitalizations estimated to be nearly 31 billion dollars annually (Centers for Medicare & Medicaid Services, 2015). Therefore, finding strategies that may support or increase one's ability and desire to participate in self-care may be

valuable. Loneliness may pose one such approach to addressing self-care deficits in populations living with complex illnesses like HF, COPD, and PNA.

Self-care is critical and necessary for managing complex, chronic illness (Artherton et al., 2018). Interventions aimed at decreasing loneliness may be beneficial to supporting self-care. Improved self-care may play a role in reducing hospital readmissions and addressing the rising health care costs observed in patients diagnosed with HF, COPD, and PNA. To best address this critical need, factors associated with self-care deficits should be explored.

One such factor influencing self-care may be loneliness. Loneliness has been studied and is recognized as a contributor to poor health. Nursing and health care have been interested in the concept of loneliness for decades. In the 1950s, Peplau and Perlman (1982) first discussed loneliness as a "feeling of unexplained dread, desperation, or extreme restlessness" (p. 1476). Peplau and Perlman recognized the importance of loneliness as a negative health problem and related this to Maslow's hierarchy of needs. Loneliness may result from an unmet need for belonging (Hagerty et al., 1992). Human beings have an inherent need to socialize and belong. Maslow placed "belongingness" third on the hierarchy of needs following physical and personal safety needs (Maslow, 1954).

A potential approach to better understand the relationship between self-care deficits and poor health outcomes in the veteran population living with one of the targeted illnesses. Cox et al. (1988) found loneliness to be the strongest predictor of negative perceived health and suggested nursing research was needed to study how loneliness affects older adults' health. Both loneliness and social isolation have been

shown to predict the overall risk of mortality along with a variety of other poor health outcomes (Cacioppo & Hawley, 2003; Holt-Lunstad et al., 2010).

Although loneliness is associated with negative physical, psychological, and social experiences, there is paucity in understanding what factors influence loneliness. There is little research exploring the outcomes experienced by patients with or without loneliness. There may be many ways that loneliness may affect health. It is believed that loneliness negatively influences health behaviors, contributes to a sense of distress, and may lead to self-care deficits and poorly managed chronic illness (Cacioppo & Hawley, 2003; Heinrich & Gullone, 2006).

Most of the loneliness research has been conducted in the general public. Loneliness research within the veteran population is scarce. Veterans are unique as they share similar life experiences often referred to as "military culture." Loneliness may be experienced differently amongst veterans compared to the general public. Military culture may contribute to unique experiences and outcomes in the veteran population. To date, no research has been conducted comparing loneliness between veterans and non-veterans.

In recent years, loneliness in the general public has been extensively researched and is often measured as a single construct, independent of other constructs such as depression, anxiety, social isolation, and social support. Therefore, given this gap in research studying the connection between loneliness and other constructs, it is reasonable to consider the presence of unique health risks and outcomes related to loneliness. Expanding what is known within the veteran population will provide new insight and assist with developing prevention strategies, screenings and assessments, approaches to care planning, and innovative interventions. Clinicians, nurses, and policymakers may

use this new knowledge to improve healthcare delivery and better meet the unique needs

of the veteran population.

Assumptions

The following assumptions underlie this study:

1. Veterans experience loneliness.

2. Loneliness influences self-care.

3. Self-care is important and necessary for health maintenance and illness recovery.

4. Lack of self-care leads to declining health and exacerbation of chronic illnesses.

5. Self-care in chronic illness is inherently complex.

Research Questions

This study has eight research questions:

RQ1: What are the sociodemographic characteristics of older veterans admitted to the hospital for treatment of HF, COPD, and PNA?

- Living arrangement

- Living setting

- Housing concerns

- Financial concerns

- Transportation concerns

- Social activity

RQ2: What are the clinical characteristics of older veterans admitted to the hospital for treatment of HF, COPD, and PNA?

- Physical mobility

- Needing assistance

- General health

- Quality of life

- Mental health

- Confidence to manage health

- Presence of symptoms (e.g., pain, tiredness, shortness of breath, trouble sleeping)

RQ3: What is the healthcare utilization of older veterans admitted to the hospital for treatment of HF, COPD, and PNA?

- Number of ER visits in the past year

- Number of hospital admissions in the past year

- Length of stay

RQ4: What is the overall level of loneliness for veterans admitted to the hospital for treatment of HF, COPD, and PNA?

RQ5: Are sociodemographic characteristics associated with loneliness for veterans admitted to the hospital for treatment of HF, COPD, and PNA?

- Living arrangement

- Living setting

- Housing concerns

- Financial concerns

- Transportation concerns

- Social activity

RQ6: Are clinical characteristics associated with loneliness for veterans admitted to the

hospital for treatment of HF, COPD, and PNA?

- Physical mobility

- Needing assistance

- General health

- Quality of life

- Mental health

- Confidence to manage health

- Presence of symptoms (e.g., pain, tiredness, shortness of breath, trouble sleeping)

RQ7: Does loneliness (for veterans admitted to the hospital for treatment of HF, COPD, or PNA) differ by a targeted health problem (HF, COPD, PNA)?

RQ8: Does healthcare utilization differ by level of loneliness experienced by veterans admitted to the hospital for treatment of HF, COPD, or PNA?

- Number of ER visits in the past year

- Number of admissions in the past year

- Length of stay

Chapter 2: Literature Review

Introduction

Chapter 2 presents the theoretical definitions and theories used to guide the study. The study is framed from three theoretical perspectives, including Neuman's System Theory, the Situation Specific Theory of Chronic Disease, and an author-developed conceptual model. The eight major factors associated with self-care are presented. A theoretical critique and author-developed conceptual model are discussed. Finally, search strategies and literature relevant to the problem and research questions are presented. The evidence is synthesized and discussed in two sections including factors associated with loneliness and negative outcomes associated with loneliness.

Theoretical Definitions

Self- care is defined as a naturalistic decision-making process that influences actions that maintain physiologic stability, facilitate the perception of symptoms, and direct the management of those symptoms (Riegel et al., 2016). There are three parts: self-care maintenance, self-care monitoring, and self-care management. This definition is based on the Situation-Specific Theory of Chronic Disease.

Loneliness is defined as the perceived difference between the quality and quantity of relationships that a person has and that a person wants (Bombassei et al., 2009), specifically focusing on perceived isolation, perceived lack of companionship, and feeling of being left out.

Social support is defined as an individual's interpersonal interactions. Social support may be both tangible and emotional and may come from family members, neighbors, support groups, religious groups, and friends.

Veteran is defined as a person who served in an active branch of the United States (U.S.) military (Air Force, Army, Navy, Marines, Coast Guard, Space Force) and was discharged or released under conditions other than dishonorable (Title 38 Code of Federal Regulations).

Culture defined by Bhawuk and Triandis (1996), "consists of many shared elements that give individual standards for perceiving, believing, evaluating, communicating, and acting among those who share a language, historical period, or geographic location."

Military culture is defined as the unique culture and experiences shared by those who served in a branch of the U.S. military. Based on unique tradition, mission, structure, and leadership throughout American history, members and veterans of the military share unique bonds, ethics, and values (U.S. Department of Veterans Affairs, 2014).

Lines of defense are defined as three hypothetical boundaries (line of flexible defense, line of normal defense, and line of resistance) that defend the human system from stressors. The defense lines may be built up or broken down and represent a patient's ability to maintain or regain a state of equilibrium.

Healthcare utilization is the quantification or description of the use of services by persons to prevent and cure health problems, promote maintenance of health and well-being, or obtain information about one's health status and prognosis (Carrasquillo, 2013). This concept specifically pertains to acute care experiences and focuses on emergency room visits, acute hospital admissions, and the length of stay.

Theory

        This following section illustrates the lines of defense and how the Systems Theory applies to veterans living with chronic illness. When lines of defense are disrupted,

deficits in self-care are likely to occur. This is a particularly frequent occurrence for veterans. Lack of routine self-care to control chronic illness leads to illness-related complications and a cycle of neglected health. Loneliness may underpin this cycle of poor self-care. Loneliness, a major factor in whether patients participate in self-care, is missing from a major self-care and chronic disease theory in the literature. This study's premise, therefore, is that with further study of loneliness in veterans, nurses may recognize loneliness and intervene, resulting in reversal of the cycle of neglected self-care. Measures of loneliness are brief and research on loneliness in veterans could not be found in respect to the illnesses that are the focus of this study. In addition to the Neuman's System Theory, the Situation-Specific Theory of Chronic Disease (SSTCD) and an author-developed conceptual model will be discussed.

Neuman's System Theory

The theory, originally designed in 1970 by Betty Neuman, was developed to provide a holistic view of human beings' physiological, psychological, sociocultural, and developmental aspects (Neuman & Young, 1972). The theory hypothesizes that human beings have three different, yet related lines of defense against disease. These are referred to as 1) the flexible line of defense, 2) the normal line of defense, and 3) the line of resistance. Individuals who strengthen these lines through the implementation of prevention strategies or interventions aimed at coping/self-management mechanisms may maintain or return to a more healthy, stable state.

The nurse's role is to retain the human system's stability through three levels of protection (Neuman, 2011). Primary prevention of illness is used to protect the normal defense line while strengthening the flexible line of defense. Secondary prevention

strategies strengthen the lines of resistance, reducing reaction to breakdowns, and increasing resistance factors. Tertiary prevention aims to readapt and stabilize human systems returning the patient to a state of wellness. However, breakdowns in one or more of the lines may result in acute illness leading to chronic complex disease. Based on this theoretical framework interventions should aim to strengthen individual defenses against stressors.

Stressors are defined as any phenomenon that may penetrate a patient's defensive lines (Health Research Foundation, 2020). Stressors may be positive or negative and Neuman identifies three types of stressors. Intrapersonal stressors occur within a patient boundary and directly relate to the internal patient environment. Examples of intrapersonal stressors include factors like physiological status, self-perceptions, and confidence. Interpersonal stressors occur outside of the patient boundary and impact the patient from an external approach. These types of stressors often are related to relationships, living arrangements, and care environments. Extrapersonal stressors are also external but they occur at a greater distance than interpersonal stressors. Examples of extrapersonal stressors are things that patients often have no control over such as social factors, demographic factors, and government policies.

Application of Neuman's Systems Theory to Current Study. To facilitate overall health, strengthening and maintaining each line of defense and resistance is important. The flexible line of defense, as defined by Neuman, describes internal and external factors that interact with the patient, the clinician, and the environment (Neuman, 2011). The flexible line of defense may maintain, increase, or decrease depending on the stressors and how the patient reacts to those. Energy depletion,

eventually leading to illness and possible death, may occur when defense lines are ineffective. Patients and clinicians must recognize stressors that may cause breakdowns. Relevant to this study, loneliness may be considered a stressor introducing the potential for breakdowns leading to an eventual decline in health. This study aims to explore loneliness as a potential stressor and suggests that loneliness may be related to deficits in self-care leading to poor health outcomes and increased healthcare utilization.

Self-care may serve as both a facilitator and a barrier to health. For example, patients who have strong self-care habits may experience strong lines of defense against illness; however, patients who experience deficits in self-care may experience illness. Therefore, the identification of barriers that may impose breakdowns on one's ability to care for themselves is important. Loneliness may be such a barrier and this study aims to explore loneliness.

Situation-Specific Theory of Chronic Disease

Because of the interest in loneliness and how loneliness may relate to self-care, the study is also guided by a second theoretical framework, the Situation-Specific Theory of Chronic Disease. The Situation-Specific Theory of Chronic Disease (SSTCD) is a middle-range theoretical framework. The SSTCD addresses the process of maintaining health within the context of the management of chronic illness (Riegel et al., 2012). The theory is situation specific meaning that the three primary concepts that ground the SSTCD are: self-care maintenance, self-care monitoring, and self-care management. The theory evolved from clinical practice, Riegel and colleagues' experiences with patients, and research within patient populations managing chronic diseases.

The theory defines self-care as a naturalistic decision-making process that influences actions that maintain physiologic stability, facilitate the perception of symptoms, and direct the management of those symptoms (Riegel et al., 2016). Self-care may be performed in states of health and illness. Everyone performs self-care at some level throughout their lifespan. Engaging in self-care creates active participation in the management of health and illness. The SSTCD is characterized by three well-defined concepts of self-care: maintenance, monitoring, and management.

Self-care maintenance is defined as patients' behaviors to maintain physical and emotional stability (Riegel et al., 2012). These behaviors may be self-determined or influenced and guided by recommendations from others that are mutually agreed upon. These behaviors improve well-being, preserve health, and/or maintain physical and emotional stability. For patients who are well, maintenance may focus on self-improvement, whereas, in ill patients, maintenance behaviors may mirror the recommendations of health care providers (Riegel et al., 2012). For example, in patients living with HF, maintenance may include cooking with less salt. For those living with COPD an example may be taking medications as prescribed or performing physical activity.

Self-care monitoring is defined as the process of observing oneself for changes in signs and symptoms that may be indicative of changing or advancing disease states (Riegel et al., 2012). Monitoring may be further described as routine vigilant surveillance or "body listening" (Dickson et al., 2008). In patients who are well monitoring may be something a person does regularly to monitor their overall health, such as checking their weight on a scale; however, monitoring is required for the ill person and is a systematic

and routine practice that results in improved outcomes. For example, a person with HF may monitor daily weight changes or changes in lower extremity swelling. A person with COPD may monitor their oxygen saturation on a regular scheduled basis. Monitoring is required for effective recognition of changes in signs and symptoms of chronic illness.

Self-care management is defined as responding to signs and symptoms when they occur (Riegel et al., 2012). Self-care management involves evaluating changes in physical and emotional signs and symptoms to determine if action is needed. These changes may be due to illness, treatment, or the environment (Riegel et al., 2012). Patients who are the most successful in self-care management may comprehend the meaning of changes and assimilate a course of action. The course of action may include the implementation of treatment or intervention and the evaluation of such actions. For example, a person with HF may recognize excess fluid retention by monitoring changes in their daily weight. This change is a sign of possible HF exacerbation and could require additional guidance and evaluation from their health care provider. A COPD patient may recognize consistently labored breathing and respond to these changes by calling their provider to request a change in their medication.

Self-care is a complex process as evidenced by the large body of evidence describing the challenges experienced by patients and clinicians alike. One challenge clinicians and researchers face in understanding the complexities, barriers, and facilitators of self-care is developing appropriate, theory-driven interventions that support patients and their caregivers to maintain their health and manage their chronic illness (Jaarsma et al., 2017). There is likely no single cause of deficits in self-care. Poor self-care is likely

the result of complex interactions between factors across many levels, including individual, interpersonal, community, and societal levels.

The theory also presents factors that influence one's ability to participate and perform self-care. These factors are experience with care, skill, motivation, culture, confidence, habits, function, cognition, access to care, and support from others (Riegel et al., 2012). Each of the factors affects the processes underlying self-care, according to the SSTCD (Riegel et al., 2012). Clinicians and researchers need to understand and explore how individual factors hinder or support patient engagement in self-care.

Experience and Skills. The ability to manage a disease and effectively participate in self-care requires a patient to have the skills to plan, set goals, and make decisions. Self-care requires the ability to use information in the context of disease management. Patients learn self-care skills by practicing disease-specific skills and varying components of self-care in a way that can be integrated into their daily lives (Dickson et al., 2009, 2014). As patients gain experience, symptom management improves. In a meta-analysis of 33 studies of heart failure disease management programs, interventions that promoted understanding of the complexities of a chronic illness like HF and its associated self-care were most effective (Clark et al., 2016). Even more specifically, interventions that emphasized links between symptoms and self-care tasks were more valuable.

Motivation. Motivation is described in SSTCD as the driving force that humans use to achieve their goals. Zhang et al. (2015) found that autonomy, followed by well-being, social relationships, and symptom relief, was the most important of patients' goals. Motivation is often described as either intrinsic or extrinsic, and both play roles in assisting patients with self-care. More importantly, when patients can see the benefits of

performing self-care, they are more motivated. Common motivators are related to personal feelings (pleasure, self-direction, being healthy), life circumstances (maintaining a lifestyle, financial stability), and social values (ability to stay socially engaged, participate in social obligations) as highlighted by Karimi and Clark (2016).

Habits. Daily routines, also described as habits, can influence self-care. Daily routines, past experiences, and learned strategies to support self-care can be developed and incorporated into the daily lives of patients. Spaling et al. (2015) suggest that interventions aimed at improving self-care should include strategies to promote self-efficacy, learning, and applying self-care recommendations into daily life.

Cultural Beliefs and Values. Cultural beliefs and values affect self-care in a variety of ways. For example, resource availability, behavior acceptability, and decision-making all have strong connections to one's culture and personal values (Jaarsma et al., 2013; Riegel et al., 2009). Self-care has been widely studied in varying cultures (Jaarsma et al., 2013), and findings suggest that differences exist across cultures. Patients may use religious and cultural beliefs to help them come to terms with living with a chronic illness (Chiaranai, 2014). In some cultures, health-related decision-making is conducted by those held in the highest regard, such as elders or spiritual leaders (Srisuk et al., 2014).

Veterans have unique culture, beliefs, and values, informed by the military culture. The military culture has its own set of terms, language, and acronyms related to job title, position, location, services, time, and resources for military service members and their families (U.S. Department of Veterans Affairs, 2014). Each military branch also has its own set of moral codes (Kuehner, 2013), such as honor, courage, and strength, which affect the service member's personal and professional outlook (Luby, 2012).

Military culture promotes the notion of strength and emotional control (Halvorson, 2010), which in turn propels a fear of appearing weak (Huebner, 2013), especially regarding mental health (Danish & Antonides, 2013; Dingfelder, 2009). Therefore, military culture plays an important role in how a veteran may or may not conduct self-care.

Functional and Cognitive Abilities. Functional and cognitive ability likely influence self-care behaviors. Cognitive impairment is common, with the prevalence reported as high as 80% in chronic illnesses (Nordlund et al., 2015). Deficits in cognitive abilities such as memory, attention, problem-solving, and psychomotor speed can negatively affect self-care (Cameron et al., 2010; Cannon et al., 2015; Currie et al., 2015;). A recent synthesis of evidence suggests that even mild cognitive impairment is associated with low self-care (Currie et al., 2015).

Functional ability is also associated with self-care. Functional abilities such as conducting activities of daily living (standing on a scale, physical mobility to bathe, strength to do dishes), making healthy meals, or even picking up a phone to call a healthcare provider, are essential for adequate self-care. Functional restrictions can limit patients' ability to participate in self-care behaviors (Kamrani et al., 2014).

Confidence. Self-care confidence is an important factor that influences self-care behaviors. Improving self-care confidence was associated with improved self-care behaviors in populations with chronic diseases such as HF (Vellone et al., 2016). Vellone et al. (2016) even noted that confidence was more important than cognition in predicting HF self-care. Patient self-efficacy, commonly correlated with confidence, was significantly associated with better self-care in a study conducted by Kessing et al. (2016).

Access to Care. Self-care is influenced by access to health care systems and healthcare providers. Regular outpatient visits, easy access to care, and newer virtual care delivery strategies have been linked to patient activation and engagement. Although most self-care is conducted in the home, access to care is important for obtaining guidance, receiving education, and managing varying phases of chronic illness. In one study, regular visits with primary care providers and home visits from a trained nurse were highlighted as being very important to self-care (Liljeroos et al., 2014).

Rural patients often lack access to healthcare, and a growing body of research addresses self-care in rural patients. In one study (Do et al., 2015), the patient activation level was low (e.g., taking no action to manage their HF), and low patient activation was associated with inadequate HF knowledge, low confidence, and poor self-care management after hospital discharge. In another study of rural HF patients, Caldwell and colleagues found that a simplified education program designed for resource-scarce settings improved knowledge and patient-reported self-care behaviors (Caldwell et al., 2005).

Support from Others. Support from others plays a critical role in patient self-care. Both tangible and emotional support may influence self-care behaviors (Graven et al., 2015). In patients living with chronic diseases such as HF, support from others may be vital to assisting patients with day-to-day self-care activities. A systematic review of qualitative research found six contextual factors that influence self-care: social networks, social support, place, finances, work and occupation, and support groups and programs (Strachan et al., 2014).

Critique of the SSTCD. The SSTCD describes eight factors that contribute to self-care. The author of this dissertation believes the theory should be extended. In describing and exploring support from others, the author suggests that the definition does not fully integrate an inclusive consideration of the various components and characteristics of loneliness. Loneliness is a perceived deficit in the quantity and quality of relationships and support one might desire to have. As defined in SSTCD, support from others lacks the subjective appraisal of social interaction, companionship, and isolation. Therefore, the author believes that the theory needs to be extended to include loneliness as a significant contributor to one's desire to participate in and the ability to care for one's self.

Conceptual Model of Patient Characteristics and Outcomes Related to Loneliness

Based on the theoretical review and the existing body of research, the author conceptualized a model of sociodemographic and clinical characteristics for loneliness and the relationship between loneliness and healthcare utilization (Figure 1).

Figure 1

Model of Conceptualized Sociodemographic and Clinical Characteristics for Loneliness

and the Relationship between Loneliness and Healthcare Utilization

```
┌─────────────────────────┐
│  Sociodemographic       │
│  Characteristics        │
│  Living arrangement     │
│  Living setting         │──────┐
│  Housing concerns       │       ↘
│  Financial concerns     │                    ┌──────────────────────────┐
│  Transportation concerns│        ┌──────────┐│  Healthcare Utilization  │
│  Social activity        │        │Loneliness│→│  ER admissions           │
└─────────────────────────┘        └──────────┘│  Hospital admissions     │
                                    ↗           │  Length of stay          │
┌─────────────────────────┐       ↗            └──────────────────────────┘
│  Clinical Characteristics│──────┘
│  Physical mobility      │
│  Physical assistance    │
│  General health         │
│  Quality of life        │
│  Mental health          │
│  Confidence             │
│  Presence of symptoms   │
└─────────────────────────┘
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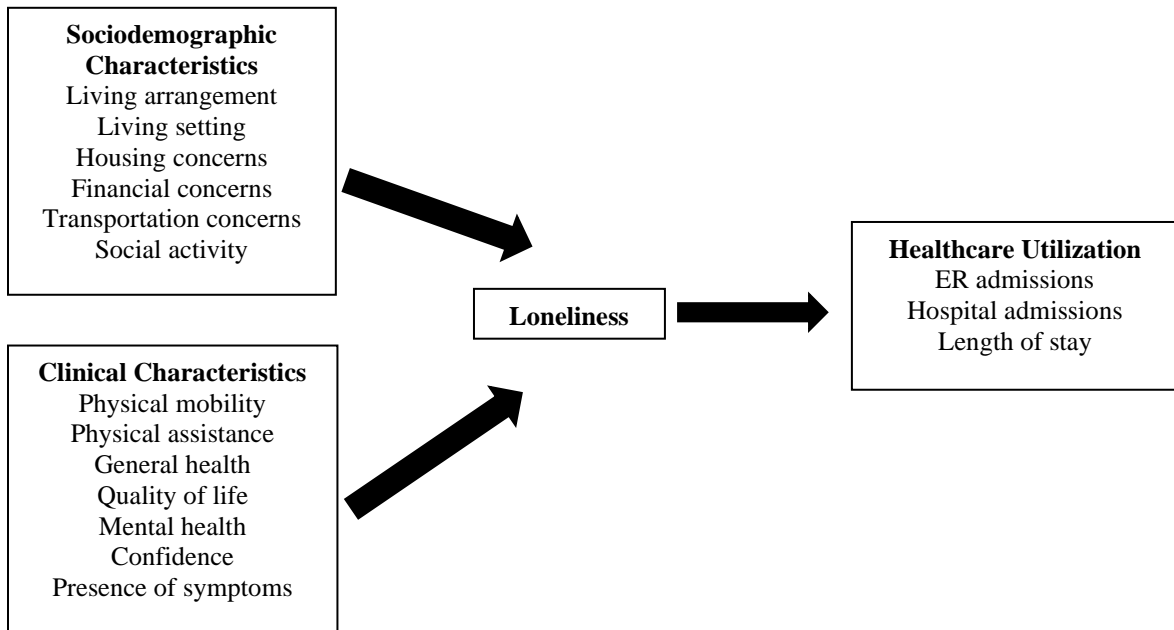
Review of Literature

Methods of Literature Search

A comprehensive literature search was conducted with the assistance of a medical

librarian. Research and review articles were retrieved without date restriction from the

following databases: OVID, CINAHL, PubMed, and Medline. Search terms were

loneliness, social isolation, and veteran. Articles were included if they met the following

criteria: (1) study participants were older veterans with one or more complex diseases

experiencing loneliness or social isolation, (2) published in English, and (3) conducted in

the US. Articles were excluded if they were expert or opinion papers, did not report the

study sample's age, did not include loneliness as a component of the research or findings,

or targeted patients with psychiatric disorders. Psychiatric research was excluded as these diagnoses were also excluded from the original study sample being analyzed for the current study. Titles and abstracts were reviewed to determine relevance to the topic of interest.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and Cochrane criteria were used for article review (Higgins & Green, 2008). The PRISMA flow chart in Figure 2 includes identified and published research articles. The initial search rendered 69 articles. After accounting for duplication, 60 articles remained. After the title and abstract review, 31 articles remained. After reviewing methods, 21 additional articles were removed. The final review of the literature contained 10 articles. Types of studies included in the review were quantitative (7), mixed methods (2), and a literature synthesis (1). Literature included in the review spanned from the early 2000s to the most recent publications in 2020.

Figure 2

PRISMA Flow Diagram
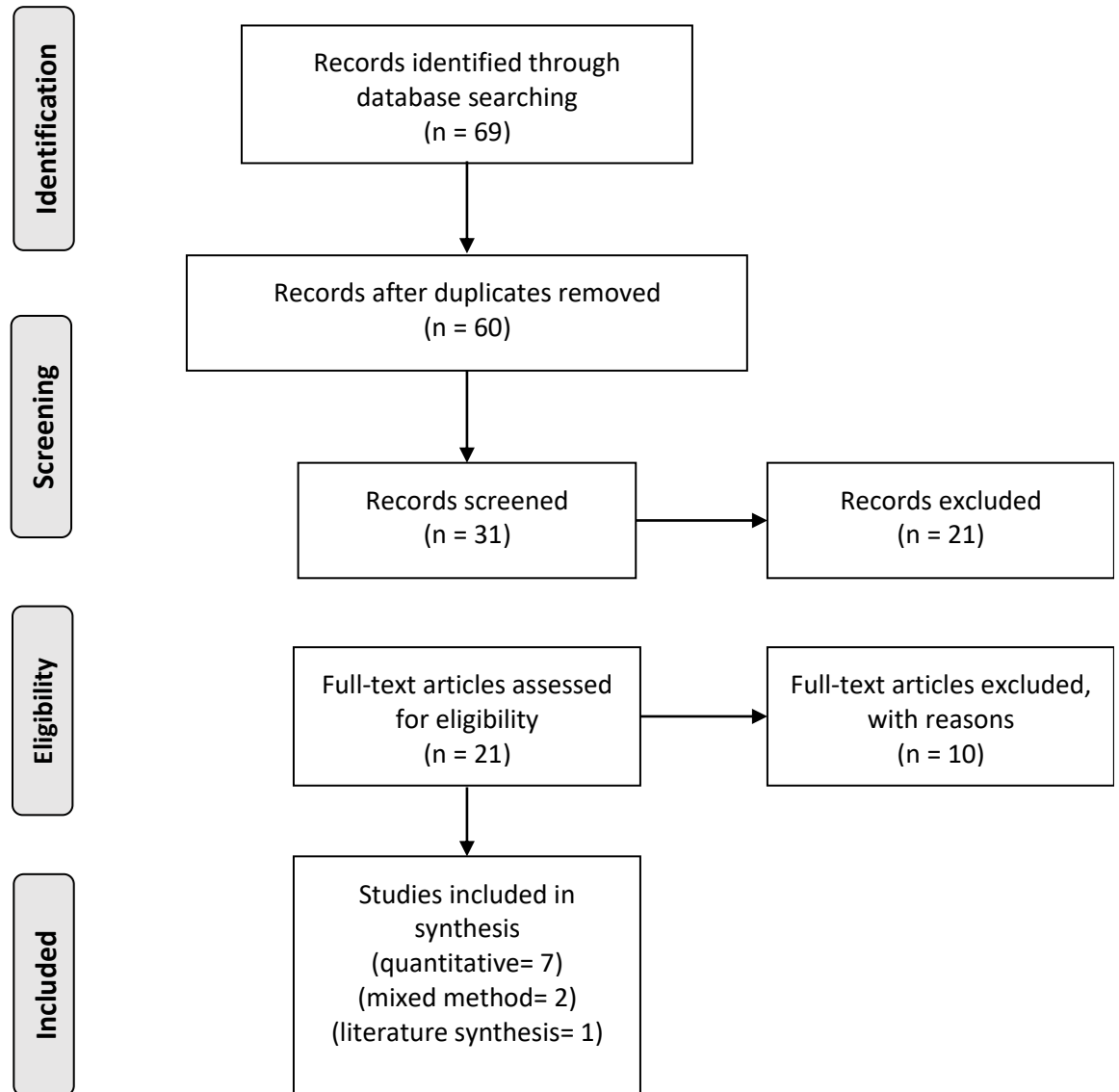
Quality Assessment and Search Limitations of Literature Search

Research articles were evaluated for quality. Quantitative studies were assessed

using the Cochrane Criteria (Higgins & Green, 2008). Articles with a qualitative

component were assessed using the Consolidated Criteria for Reporting Qualitative

Research (COREQ). Due to the variety of research methods used in the included studies,

a constant comparison was used to identify themes across data and methodologies. This approach allowed for comparison and synthesis of the included articles. An evidence table (Appendix A) was created to compare data within and across studies to facilitate analysis. After comparisons were made, the following key concepts emerged: factors related to loneliness and negative outcomes of loneliness.

A limitation of the literature review process was the identified variance in how investigators defined loneliness across studies. In many cases social isolation and loneliness were used interchangeably. In the studies reviewed, a variety of definitions were used, including a "discrepancy between desired and actual social relationships," a "debilitating condition characterized by feelings of isolation," an "unpleasant and distressing emotion that is evoked when special relationships are extremely deficient," and an "affective and cognitive reaction to a threat to social bonds." Only one study (Stein & Tuval-Amshiach, 2015) provided a conceptual definition of loneliness. The current study defines loneliness as a perceived deficit in the quality and quantity of relationships and support one might desire to have and includes the subjective appraisal of social interaction, companionship, and isolation.

Results of Literature Search

Ten articles met eligibility criteria and were included in the review. Articles focused on predictors of loneliness and outcomes of loneliness. Five articles targeted older veterans, three articles included all age ranges, and two articles specifically aimed to understand age-related differences between veterans in the sample. Three studies limited the sample to only males and one study considered only veterans with HIV/AIDS (an example of a complex, chronic condition). The sample sizes ranged from 20 to 2,128.

Although a review of literature targeted older veterans, ages ranged from 18 to 89 years. The review targeted U.S. military veterans. Few articles reported race or ethnicity.

Synthesis of Evidence

Factors Associated with Loneliness

Wilson et al. (2018) published a synthesis of literature exploring aspects of social isolation and loneliness in military veterans. The synthesis included published research articles involving veterans experiencing loneliness and/or social isolation. A total of 17 studies were included in the review. Four areas of loneliness and social isolation emerged. These included prevalence of loneliness in the veteran population, experiences related to military service as impacting loneliness, the relationship between mental health and loneliness or social isolation, and interventions to combat loneliness and social isolation. Findings from the synthesis concluded that military veterans experience loneliness and social isolation, which must be considered when designing interventions within this population (Wilson et al., 2018).

Factors specific to military experiences such as military-related trauma and PTSD were associated with prevalence of loneliness and social isolation. Common factors associated with loneliness include losing contact with comrades, physical or mental health issues, and struggling to transition or relate to civilian counterparts. To counteract loneliness, participants acknowledged the value of interventions that included a shared sense of identity (e.g., companionship and socializing with other veterans who have shared similar experiences; Wilson et al., 2018).

Age is a factor often strongly associated with loneliness. Loneliness was assessed as part of the National Health and Resilience in Veterans Study ($N = 2,025$) using a

questionnaire (Revised UCLA Loneliness Scale). Participants in the study were aged 60 years or older. Findings from the study concluded that loneliness is prevalent among older veterans in the United States. Forty-four percent of veterans reported feeling lonely at least some of the time and 10.4% reported feeling lonely often (Kuwert et al., 2014).

Findings also suggest that older veterans' loneliness is associated with health and psychosocial variables including poor social support and depressive symptoms. Greater age, inability to participate in daily living activities, lifetime traumas, perceived stress, and current depression or PTSD was positively associated with loneliness. Negative correlations of loneliness include being married/cohabitating, higher income, greater subjective cognitive function, social support, secure attachment, dispositional gratitude, and frequently attending religious services. Therefore, loneliness mitigation in the older and aging veteran population should include multifactorial interventions that emphasize reducing depressive symptoms and boosting social support (Kuwert et al., 2014).

When comparing loneliness by age in the veteran population compared to that of the general population, Cigna (2020) found loneliness occurs more often in the general population. Prevalence is increasing year after year jumping from 54% in 2018 to 61% in 2019 (Cigna, 2020). When surveyed by generational assignment, 50% of participants from the baby boomer generation (born roughly between 1961 to the late 1970's) reported feeling lonely and 44% of the elderly generation (born before 1961) reported feeling lonely (Cigna, 2020). In the United States, loneliness among the elderly is estimated to result in nearly 6.7 billion dollars of federal health care costs (Health Resources & Services Administration, 2019).

In addition to age, Kuwert et al. (2014) suggested that loneliness is related to several other factors in the veteran population. Functional limitations, traumatic life events, perceived stress, depression symptoms, and symptoms of post-traumatic stress disorder (PTSD) were all found to be related to loneliness (Kuwert et al., 2014). Several studies specifically examined the relationship between loneliness and PTSD, and findings support that those veterans who experience PTSD report higher loneliness (Solomon et al., 2011). Carr et al. (2017) examined the impact of trauma, widowhood, and death exposure in veterans and found that widowhood was significantly related to loneliness.

Psychological factors associated with loneliness included poor mental health, low self-efficacy beliefs, negative life events, and cognitive deficits. Signoracci et al. (2016) found that veterans living with a chronic, complex disease (HIV/AIDS) experienced loneliness and social isolation due to the stigma associated with their disease status. Both intrinsic and extrinsic factors related to veteran status and military experience are associated with loneliness prevalence (Carr et al., 2017; Kuwert et al., 2014; Solomon et al., 2011). A unique veteran culture such as experiencing combat and trauma, loss of comrades and/or peers, and struggling to relate to civilians may lead to social isolation and loneliness in this sub-population. Therefore, healthcare providers and researchers need to consider veterans' unique experiences when designing interventions to address and reduce loneliness and social isolation.

Loneliness and Negative Health Outcomes

There is some research exploring loneliness and its relationship to negative health outcomes in the veteran population. A study published in the *Journal of Affective Disorders* concluded that loneliness may be the "most important component of

connectedness and is associated with depression severity, suicidality, and health-related behaviors" (Teo et al., 2018). Recent research has explored the unique experiences of military-related loneliness compared to typical civilian populations. Findings suggest that loneliness is prevalent and persists for decades after veterans leave military service.

Among five forms of social connection, Teo (2018) found that loneliness was tied to the highest levels of depression and suicidal ideation and the lowest levels of veterans' efforts to manage their health and seek help when needed. Although the intent of the research was not relating loneliness to depression, a key finding from the research was that loneliness was the most important predictor of major depression and symptoms of depression such as feeling down, fatigued, overwhelmed, or unmotivated (Teo et al., 2018). Also, of the 301 veterans enrolled in the study, 84% had moderate to severe depression symptoms and 28% screened positive for suicidal ideation (Teo et al., 2018). Based on the study, loneliness affected all types of veterans, regardless of age, sex, or race. Additionally, the number of social confidants was not related to depression or symptom severity, concluding that loneliness is not the same as being alone. Loneliness refers to veterans' distress when their social relationships are not what they want them to be, such as feeling alone or left out (Teo et al., 2018).

King et al. (2014) and Kuwert et al. (2014) noted in two separate studies that loneliness was a salient risk factor for suicide as veterans age. Among veterans who called a Veterans Affairs (VA) crisis hotline, loneliness was one of the most cited reasons for calling (Porter et al. 1997). In another study, loneliness and social isolation were both robust risk factors for suicide in veterans and service members (Hom et al., 2017).

Specifically, loneliness was a stronger predictor than hopelessness, anxiety, or perceived burden (Hom et al., 2017).

Martin and Hartley (2017) explored the relationship between loneliness, depression, and perceived stress. In a sample of veterans ($N = 64$), loneliness was found to predict depression, and the relationship was mediated by perceived stress (Martin & Hartley, 2017). Both loneliness and social isolation were related to attempting or seriously considering suicide in veterans (Porter et al., 1997). In reviewing data from phone hotline records ($N = 271$), loneliness was the most common trigger for hotline crisis contacts. King et al. (2014) discovered that loneliness was significantly associated with both older (age 65+ years) and middle age (45-64 years) veterans calling the suicide crisis line. In the study of the Unified Psychogeriatric Biopsychosocial Evaluation and Treatment Program (UPBEAT), almost half of the older veterans (60+ years) reported being socially isolated (Mistry et al., 2001). Those at high or moderate risk of social isolation were 4–5 times more likely to be readmitted to the hospital compared to those veterans reporting low levels of social isolation.

Research focused on the negative impact of loneliness on veterans' health is limited. Loneliness research in the veteran population is scarce and only a few studies have found relevant key findings. This dissertation's author did not identify any previously conducted research aimed at exploring healthcare utilization as an outcome of loneliness in veterans.

Summary of Evidence Synthesis

Loneliness research within the veteran population is limited. When narrowing the search strategies to the target population (i.e., older veterans with chronic disease), the

body of evidence was very small. The differences in loneliness between the veteran and general population is unknown. There is currently little evidence comparing loneliness between these two populations. Therefore, this is an area of research that deserves attention. Additionally, the body of research exploring loneliness in the older veteran population living with and managing a complex disease, such as HF, COPD, or PNA, is also limited. At the time of this writing, no previous research was identified studying the role of loneliness in self-care within the veteran population. Therefore, there are several research interests related to loneliness research in the veteran population that deserve focus in the future. Considerable research is needed to explore the prevalence of loneliness in veterans, veteran experience, and interventions targeting loneliness management.

Chapter 3: Methodology

Introduction

Chapter 3 presents the research questions and study methodology that was used. The methodology describes the research design, sample, setting, and instruments. The study variables are described. Data collection techniques, recruitment and enrollment, and data analysis are presented. The chapter concludes by describing processes used to protect human subjects enrolled in the research study.

Study Methodology

Research Questions

This study has eight research questions:

RQ1: What are the sociodemographic characteristics of older veterans admitted to the

hospital for treatment of HF, COPD, and PNA?

- Living arrangement

- Living setting

- Housing concerns

- Financial concerns

- Transportation concerns

- Social activity

RQ2: What are the clinical characteristics of older veterans admitted to the hospital for

treatment of HF, COPD, and PNA?

- Physical mobility

- Needing assistance

- General health

- Quality of life

- Mental health

- Confidence to manage health

- Presence of symptoms (e.g., pain, tiredness, shortness of breath, trouble sleeping)

RQ3: What is the healthcare utilization of older veterans admitted to the hospital for

treatment of HF, COPD, and PNA?

- Number of ER visits in the past year

- Number of hospital admissions in the past year

- Length of stay

RQ4: What is the overall level of loneliness for veterans admitted to the hospital for

treatment of HF, COPD, and PNA?

RQ5: Are sociodemographic characteristics associated with loneliness for veterans

admitted to the hospital for treatment of HF, COPD, and PNA?

- Living arrangement

- Living setting

- Housing concerns

- Financial concerns

- Transportation concerns

- Social activity

RQ6: Are clinical characteristics associated with loneliness for veterans admitted to the

hospital for treatment of HF, COPD, and PNA?

- Physical mobility

- Needing assistance

- General health

- Quality of life

- Mental health

- Confidence to manage health

- Presence of symptoms (e.g., pain, tiredness, shortness of breath, trouble sleeping)

RQ7: Does loneliness (for veterans admitted to the hospital for treatment of HF, COPD, or PNA) differ by a targeted health problem (HF, COPD, PNA)?

RQ8: Does healthcare utilization differ by level of loneliness experienced by veterans admitted to the hospital for treatment of HF, COPD, or PNA?

- Number of ER visits in the past year

- Number of admissions in the past year

- Length of stay

Research Design

A prospective, descriptive, correlational study design was used to explore the research questions in a sub-set of data from the Mirror: TCM study. In brief, the Mirror: TCM study consented and enrolled patients over the age of 65, who were admitted to the medical center with one of the three targeted illnesses, and at risk for readmission. A database is currently being built for data analysis. The primary outcome of the TCM, which is a randomized controlled trial (RCT), is to investigate the effectiveness of a model of transitional care. A total of 200 (100 in the intervention group and 100 in the control group) will be enrolled during the 30-month study period (August 2020-December 2022). Baseline data is collected at the time of participant screening and study

enrollment. Only baseline data collected during the first 6 months of the MIRROR: TCM enrollment have been analyzed in the current study.

Sample

The sample includes 34 patients from the larger Mirror: TCM study. The inclusion criteria were that patients must be (a) 65 years of age or older; (b) reside within the geographic service area; (c) have been admitted from home to the participating hospital with a primary diagnosis of HF, COPD, or PNA with a history of HF or COPD; (d) speak English or another language supported by the hospital site; (e) be reachable by telephone; and (f) have one or more of the following risk factors:

1. five or more chronic conditions documented in the medical record,

2. history of functional deficit (e.g., bathing, feeding, toileting, transferring, etc.),

3. experienced a recent fall,

4. screened as cognitively impaired,

5. history of depression,

6. emergency department visit or hospitalization within the past 30 days, or

7. $\geq$ two emergency visits or hospitalizations within the past six months.

Exclusion criteria were:

1. actively documented and unmanaged psychiatric conditions (ICD-10 diagnoses: F10-29),

2. undergoing active cancer treatment,

3. enrolled in the Program for All-Inclusive Care for the Elderly,

4. enrolled in the Medicare End-Stage Renal Disease program,

5. living in a long-term care facility, or

6. participating in another RCT providing comparable services related to discharge
   planning and transitional care.

Setting

The study was conducted in a Veterans Health Administration (VHA) hospital in Missouri. The hospital serves veterans across a geographically diverse two-state area. The total service area includes an estimated veteran population of 30,000. Based on previous admission data, approximately 17%-30% of veterans in the service area may meet eligibility criteria, and no recruitment concerns are identified for the target population.

Study Instruments

Various instruments were used to collect data for the study (Appendix C).

Six-Item Screener (SIS)

The Six-Item Screener (SIS) was used for brief cognitive assessment. The SIS consists of three questions on temporal orientation (day, month, and year) and three-item recall. A sample question is, "What year is this?" scored as 0 (unable to answer) or 1 (able to answer). The scale is simple, easy to remember, and easy to score, allowing it to be incorporated into older ER patients' routine clinical care. A total score is calculated and a score of <3 represents cognitive impairment. In a preliminary single-center study the SIS's sensitivity and specificity were 94% and 86%, respectively (Callahan et al., 2002).

Patient-Reported Outcomes Measurement Information System (PROMIS)

The Patient-Reported Outcomes Measurement Information System (PROMIS) is a national resource for precise and efficient measurement of patient-reported symptoms,

functioning, and health-related quality of life (HRQOL), and is appropriate for patients with a wide variety of complex, chronic diseases and conditions (Cella et al., 2010). This study used items from the three health domains: physical, mental, and social. These item banks have undergone qualitative appraisal by patients and experts and extensive quantitative evaluation in both clinical and healthy samples of adults (Barile et al. 2020). Questions from three subscales (Global Health, Emotional Distress-Anxiety, and Physical Function) were used and scores for each subscale were totaled.

PROMIS Global Health Subscale. This scale was used to measure general health and well-being. An example item is "In general, would you say your health is…" and responses are rated on a 5-point Likert scale ranging from 1 (poor) to 5 (excellent).

PROMIS Emotional Distress/Anxiety Subscale. This scale was used to measure anxiety. An example item from the Emotional Distress-Anxiety short form is "I felt fearful," and responses are rated on a 5-point Likert scale ranging from 1 (never) to 5 (always).

PROMIS Physical Function Subscale. This scale was used to measure physical function. An example item from the Physical Function domain is "Does your health now limit you in walking more than one mile," and responses are rated on a 5-point Likert scale ranging from 1 (cannot do) to 5 (not at all).

Patient Health Questionnaire (PHQ-9)

This nine-item scale was used to measure depression. The PHQ-9 may establish depression symptom severity. As a severity measure the PHQ-9 score ranges from 0 to 27. Each of the nine items was scored on a 4-point Likert scale from 0 (not at all) to 3 (nearly every day). An example item from the PHQ-9 is "Little interest or pleasure in

doing things." The total score was calculated, and higher scores represent more severe symptom severity. The PHQ-9 has established reliability and validity (Kroenke et al., 2001). In a validation study, a cumulative score of ≥ 10 typically indicated depression, with 88% sensitivity and 88% specificity (Kroenke et al., 2009). Data analysis indicated this eight-item scale to be highly reliable ($\alpha = .87$).

Medical Outcomes Study (MOS)

This scale will measure social support and confidence. The MOS is a brief, multidimensional, self-administered, social support survey developed for patients with chronic conditions. The MOS is comprehensive in terms of measuring various dimensions of social support. An example item is "How often is someone available to help you if you were confined to a bed" and responses are rated on a 5-point Likert scale ranging from 1 (none) of the time to 5 (all of the time). The total score was calculated, and higher scores reflect higher levels of social support. Multi-trait scaling analyses supported the dimensionality of four functional support scales (emotional/informational, tangible, affectionate, and positive social interaction) and the construction of an overall functional social support index. These support measures are distinct from structural measures of social support and related health measures. They are reliable (all alphas >0.91) and are stable over time (Sherbourne & Stewart, 1993).

UCLA Loneliness 3-item Survey (UCLA LS3)

This scale was used to measure subjective feelings of loneliness. The UCLA LS3 is a revised version of both the original UCLA Loneliness Scale and the Revised UCLA Loneliness Scale. The development of the UCLA LS3 is especially valuable for telephone-based research and large-scale studies. The UCLA LS3 has three items. An

example item is "How often do you feel that you lack companionship?" with responses

rated on a 3-point Likert system ranging from 1 (hardly ever) to 3 (often). The total score

is calculated and a score >6 is considered positive for loneliness. The Three-Item

Loneliness Scale displayed satisfactory reliability and concurrent and discriminant

validity (Hughes et al., 2004). Internal consistency was highly reliable (coefficient alpha

ranging from .89 to .94) and test-retest reliability was consistent as well ($r = .73$)

(Russell, 2010).

Patient Characteristics

The following sociodemographic, clinical, and resource utilization data were

extracted from study participant electronic medical records or obtained from patient self-

report. For each variable the definition and source of data are provided.

Socio-demographics

Age. Age was measured by numerical years and calculated based on birth date.

Age was retrieved from electronic medical records and validated by self-report.

Gender. Gender is defined as biological sex at birth, recorded as male or female,

and was retrieved from the electronic medical record.

Household. The household was described as current living arrangement (lives

alone, lives with significant other, or lives with children or caregiver) and was retrieved

from patient self-report.

Marital Status. Marital status will be defined as never married, married,

divorced, or widowed and was retrieved from patient self-report.

Clinical Characteristics

Number of Chronic Diseases. The presence of five or more chronic diseases was recorded with the primary diagnosis listed first. Information was gathered from the medical record. Chronic conditions are defined by the Centers for Medicaid and Medicare Services (CMS) and include the following: alcohol abuse, Alzheimer's Disease, dementia, arthritis, asthma, atrial fibrillation, autism, cancer, kidney disease, COPD, depression, diabetes, drug/substance abuse, HF, hepatitis, HIV/AIDS, hyperlipidemia, hypertension, ischemic heart disease, osteoporosis, schizophrenia, and stroke.

Resource Utilization

ER Visits in Past Year. Emergency room visits was defined as two or more ER visits in the past year. In instances when the medical record differed from the self-reported value, the self-reported response was used.

Hospital Admissions in Past Year. Hospital admissions was defined as those who reported having two or more hospital admissions in the past year. In instances when the medical record differed from the self-reported value the self-reported response was used.

Length of Stay. Length of stay was defined as the total number of bed days during the most recent hospital admission beginning on the date of admission and ending on the date of discharge. Length of stay was reported numerically. For patients who were initially admitted for observation only but were later fully admitted to the hospital, the observation start date was used to calculate the length of stay.

Data Collection Procedure

Recruitment and Data Collection

Data were obtained from a database containing baseline screening and enrollment data collected during the first six months of the Mirror: TCM research study. The data collection procedures utilized for collecting the original data are described in the Mirror TCM study protocol (Appendix B). No additional recruitment strategies were implemented for this study.

Protection of Human Subjects

The safety and protection of human subjects for research purposes were handled with the highest regard. A number of planning and safety precautions were put in place to ensure human subject protection. The study site IRB (VHA, Missouri) reviewed and approved the Mirror: TCM study and the current study for implementation (Appendix A).

The research design, methods, and procedures were reviewed by all the research team members and the site IRB, all of whom indicated their approval of the processes as delineated and believed that this research project would yield quality data that would generate new knowledge. Detailed operationalization of this plan was done to assure data quality. The review included discussion of the protocol to ensure adherence, discussion of procedures to ensure confidentiality was maintained, and that data were collected with minimal risk for violations of confidentiality.

Consent. The current study analyzed existing data; the original study required written, informed consent. The following process was used to enroll patients in the Mirror: TCM study. A trained enrollment coordinator facilitated the screening, enrollment, and consenting processes. Patients were initially screened using the SIS cognitive assessment and patients with SIS scores ≥ 3 were approached for potential enrollment. Patients who scored <3 on the SIS were asked to provide consent to

participate and a legally authorized representative (LAR) was also required to co-sign the informed consent before random assignment. Those who showed interest in participating were provided information about the Mirror: TCM study and asked to read and sign a consent form and HIPPA authorization (i.e., specifics about data elements to be collected and use of the private information). Enrollment coordinators were trained to answer and address patient questions and ensure that the study procedures were fully understood. The enrollment coordinators asked each patient to explain in their own words their understanding of the study. Any patient who could not recall the key elements of the study and did not have a LAR present was not enrolled.

      Protection Against Risk. The enrollment coordinator is a registered nurse (RN) with background and professional experience deemed competent to interact appropriately with older adults recently hospitalized for acute conditions. All staff on the study team were required to complete St. Louis Veteran Health Administration's required research ethics and compliance training and mandated training within the Collaborative IRB Training Initiative (CITI) program.

      The baseline surveys were designed to be completed in less than 30 minutes to limit patient fatigue during baseline screening and data collection. Interviewing was scheduled at a time that was convenient for patients. If patients were too fatigued to complete all measures, sociodemographic, clinical, and resource utilization data were collected at enrollment and the baseline surveys were administered by an enrollment coordinator during a subsequent in-person hospital visit. Afterwards, data were entered into RAPTER®, the secure platform used for data storage and management.

The enrollment coordinators were trained to be sensitive to patients' signals that breaks were needed during interviews. All patients were reminded that their participation was voluntary and that they could end their participation in the study at any time. There were no anticipated life-threatening adverse events for the Mirror: TCM study or the current study.

Privacy and Confidentiality. To protect against any risk to enrollees' privacy, data were collected electronically when feasible. Any printed data collection forms were coded with unique identifiers. The unique identification number was kept separate from the files with protected health information (PHI). Every effort was made to ensure that only members of the research team would know what information was collected from a subject. As part of the consent process enrollees were made aware that there were some rare circumstances where the research team may have to provide patient information to other people (regulatory or legal circumstances). Enrollees were are informed that the research team could not ensure total internet security.

Data Analysis

Data were analyzed using the statistical software program SPSS 26.0. Descriptive statistics were used to describe the overall sample. For research questions 1, 2, 3, and 4, baseline variables between subjects were analyzed using chi-square and t-tests based on each variable's level of measurement. For research questions 5, 6, 7, and 8, tests of correlation were used to analyze relationships between single variables of interest, loneliness, and healthcare utilization. Chi-square tests were used for categorical variables and Spearman's correlation coefficient was used for categorical variables or continuous variables that lacked normal distribution. All alpha levels were set at $\alpha=.05$.

A post hoc power analysis was run after data collection to determine the study power based on the final sample size. The sample size requirements of at least ten to twenty participants per independent variable were not met in this study (Faul et al., 2009; Tabachnick & Fidell, 2007). The analysis was underpowered. To achieve statistical power of 0.80, a reasonable effect size of 0.5, an alpha of 0.05, and a sample size of 55 or more would be required based on the G*Power program (Faul et al., 2009). A larger sample size will result in greater participants per each independent variable reducing the occurrence of small cell counts and the need to utilize non-parametric tests.

Chapter 4: Findings

Introduction

This chapter presents the findings of the study. The chapter begins by describing the preliminary data analysis and how missing data and data outliers were handled. The overall sample is described. The results of the analysis are organized by each research question and a summary of the results is presented.

Preliminary Data Analysis

After cleaning and preparing the data a discrepancy was identified in the data that varied from the original data analysis plan. It was discovered that the original study planned for the analysis of patient discharge diagnosis groups as a primary variable. The intended diagnoses were HF, COPD, and PNA; however, in preparing the data for analysis there were additional discharge diagnoses included in the dataset. These diagnoses included a range of cardiovascular and respiratory diagnoses including cardiomyopathy, non-STEMI MI, bronchospasms, and COVID. Rather than removing the other diagnoses, the diagnoses were regrouped into an "other" category for the purpose of statistical analysis. The new discharge diagnoses were regrouped into four categories to include HF, COPD, PNA, and other diagnoses. All participants in the study met inclusion criteria (history of HF, COPD, or PNA) at the time of enrollment. Descriptive statistics were calculated for main study variables (see Table 1). Assumptions of normality were not met and non-parametric statistical tests (χ^2 and Spearman's correlation coefficient) were used to answer the research questions.

Missing Data

Missing data points were noted on baseline interview measures. Based on communication with the collaborating principal investigator (PI) and the enrollment coordinator, the missing data were removed for analysis when the missing data eliminated the ability to calculate a total score, or when missing data could not otherwise be recovered. The sample included 36 veterans that were enrolled in the Mirror: TCM study at the time of this analysis. Of those, two participants scored less than 3 on the SIS cognitive screener and were not able to complete the self-report items resulting in significant missing data. Therefore, two participants were removed from the analysis resulting in a final sample of 34.

Description of the Overall Sample

Thirty-four patients were included in the study. The overall sample ranged in age from 66 years to 93 years with a mean age of 75.12 (SD= 7.40). The sample included only males. Most of the participants were white (67.6%, $n = 23$) followed by black (32.4%, $n = 11$). No other race was represented in the study sample. Most participants were married (41.2%, $n = 14$), had two years or more of college education (50.0%, $n = 17$), and were retired (97.1%, $n = 33$). The primary hospital discharge diagnosis was heart failure (61.8%, $n = 21$), followed by pneumonia (11.8%, $n = 4$), and COPD (8.8%, $n = 3$). The remaining 17.6% of participants ($n = 6$) had a discharge diagnosis other than one of these three. A total of 73.5% of the sample was categorized as not lonely ($n = 25$) and 26.5% was categorized as lonely ($n = 9$). The summary of participant characteristics is presented (see Table 1).

Table 1

Sample Characteristics

Variables	n=34	f	%
Gender	Male	34	100
Education	8th Grade or Less	1	2.9
	Some HS	4	11.8
	HS Graduate or GED	8	23.5
	Some College or 2-year Degree	17	50.0
	4-year College Degree	1	2.9
	Advanced Degree	3	8.8
Marital Status			
	Single	5	14.7
	Married	14	41.2
	Divorced	10	29.4
	Widowed	5	14.7
Race	White	23	67.6
	Black	11	32.4
Employment	Retired	33	97.1
	Works Part-Time	1	2.9
Discharge Diagnoses	Heart Failure (HF)	21	61.8
	COPD	3	8.8
	Pneumonia (PNA)	4	11.8
	Other	6	17.6
Loneliness Status	Not lonely	25	73.5

	f	%
Lonely	9	26.5

	M	SD
Age	75.12	7.40

Note. f= frequency; %= percentage

Data Analysis

Research Question 1: What are the sociodemographic characteristics of older veterans admitted to the hospital?

Descriptive statistics were utilized to describe the sociodemographic characteristics of the overall sample. Forty-one percent ($n = 14$) of the sample with a diagnosis of HF lives alone, 2.9% ($n = 1$) of the sample with a diagnosis of COPD lives alone, and the remaining 47.1% ($n = 16$) of the sample with a non-primary diagnosis of HF, COPD, or PNA lives alone. A significant association between discharge diagnosis and living arrangement was observed (χ^2 (3) = 9.25, p= 0.02*). All study participants lived in single-family homes ($n = 34$).

Housing concerns were observed in 17.6% of those with HF ($n = 6$). Those with COPD, PNA, and other diagnosis did not report concerns over housing ($n = 28$). No association between diagnosis and housing concerns was found.

Concerns related to having enough money to pay for bills was observed in 52.9% of participants with HF ($n = 18$), 8.8% of those with COPD ($n = 3$), 5.9% of those with PNA ($n = 2$), and 20.7% of those with other diagnoses ($n = 6$). No association was found between concerns over being able to pay bills and diagnosis.

Participants who reported concerns over being able to afford healthy meals were found in 47.1% of those with a diagnosis of HF ($n = 16$), 8.8% of those with COPD ($n = 3$), 11.8% of those with PNA ($n = 4$), and 17.6% of those with other diagnoses ($n = 6$). No association was found between concerns over being able to afford healthy meals and diagnosis.

Lack of reliable transportation for medical appointments was observed in 11.8% of those with HF ($n = 4$). The remaining 88.2% of participants did not report medical transportation concerns ($n = 30$). Lack of transportation for non-medical needs was reported in 12% of those with HF ($n = 4$) with 2 participants reporting sometimes encountering non-medical transportation concerns and 2 participants reporting usually encountering non-medical transportation concerns. The remaining 88.2% of the sample ($n = 30$) did not report concerns with non-medical transportation. There were no associations found between medical and non-medical transportation concerns and diagnosis. The sociodemographic characteristics are summarized in Table 2.

Table 2

Sociodemographic Characteristics

Variables	n=34	*f*	%
Living Arrangement	Lives Alone	16	47.1
	Does Not Live Alone	18	52.9
Living Setting	Single Family Home	34	100
Has Concerns About Housing	Has Housing Concerns	6	17.6
	Does Not Have Housing		
	Concerns	28	82.4
Able to Pay Bills	Usually	29	85.3
	Sometimes	5	14.7
Able to Afford Healthy Meals	Usually	29	85.3
	Sometimes	3	8.8
	Never	2	5.9
Lack of Medical Transportation	Sometimes	4	11.8
	Never	30	88.2
Lack of Non-Medical Transportation	Usually	2	5.9
	Sometimes	2	5.9
	Never	30	88.2
Rating of Social Activity	Poor	6	17.6
	Fair	7	20.6
	Good	9	26.5
	Very good	6	17.6
	Excellent	6	17.6

Note. f= frequency; %= percentage

Research Question 2: What are the clinical characteristics of older veterans admitted to the hospital?

Descriptive statistics (see Table 3) were utilized to describe the clinical characteristics of the overall sample based on admission diagnosis (HF, COPD, and PNA). Mobility concerns were observed in 14.7% of those with HF ($n = 5$) and 5.9% of those with PNA ($n = 2$). Participants with COPD and other diagnoses did not report difficulty moving around their homes ($n = 27$). There was no association between mobility concerns and diagnosis.

Needing assistance sometimes or often was observed in 11.8% of those with HF (n = 4), 5.9% of those with PNA (n = 2), and 5.9% of those with other diagnoses (n = 2). Those with COPD did not report needing assistance from others. There was no association between needing assistance and diagnoses. A smaller percentage of participants reported needing assistance from others with activities of daily living (ADLs). A little over one-quarter of those with HF reported needing ADL assistance (26.5%; n = 9) and 2.9% of those with COPD reported the same. There was no association between ADL assistance and diagnoses.

Overall, general health was rated as fair in 35.3% of the sample and poor in 38.2% of the sample. General health was reported as fair or poor in 26.5% of those with HF ($n = 18$), 5.9% of those with COPD ($n = 2$), 5.8% of those with PNA ($n = 2$), and 8.8% of those with other diagnoses ($n = 3$). There was no association between general health rating and diagnoses.

Quality of life (QOL) was rated as fair in 35.3% of the sample and poor in 8.8% of the sample. QOL was rated as fair or poor in 32.3% ($n = 11$) of those diagnosed with

HF, in 2.9% of those with COPD ($n = 1$), in 5.9% of those with PNA ($n = 2$), and in 2.9% of those with other diagnoses ($n = 1$). There was no association between QOL and diagnoses.

Overall, mental health was rated as fair in 11.8% of the sample and poor in 2.9% of the sample. Mental health was rated as fair or poor in 8.8% ($n = 3$) of those with HF, in 2.9% of those with COPD ($n = 1$), and in 2.9% of those with other diagnoses. Zero participants with COPD rated their mental health as fair or poor. There was no association between perceived mental health rating and diagnoses.

Mild depression was observed in 29.4% of the overall sample ($n = 10$) and moderate depression was observed in 29.4% of the overall sample ($n = 10$). Mild or moderate depression was observed in 47.1% of those with HF ($n = 16$), in 5.8% of those with COPD ($n = 2$), and in 5.8% of those with PNA ($n = 2$). Participants with other diagnoses did not report mild or moderate depression. There was no association between depression categories (no depression, mild depression, and moderate depression) and diagnoses.

Self-reported confidence in being able to manage one's illness was reported in 67.2% of the total sample. Those with HF reported a confidence score of 7 or greater 41.2% of the time ($n = 14$), followed by 8.8% of those with COPD ($n = 3$), 2.9% of those with PNA ($n = 1$), and 14.7% of those with other diagnoses ($n = 5$). There was no association between self-reported confidence and diagnoses.

The exacerbation of symptoms was measured by self-reported presence of disease-related symptoms over the past 10 days. The presence of symptoms was rated on a 10-point Likert scale with zero representing no symptoms and 10 representing the worst

experience of each symptom for the past 10 days. These scores were regrouped into binary categories based on either the presence of symptoms for 7 or more days or symptoms present for less than 7 days.

Overall, 41.2% of the sample was experiencing pain for 7 or more days ($n = 14$). Of these, 32.4% of participants with HF experienced pain ($n = 11$), 5.9% of those with PNA ($n = 2$), and 5.9% of those with other diagnoses ($n = 1$). Those with COPD did not report the presence of pain over the past 7 days to be greater than 7 on a 10-point Likert scale. There was no association between pain and diagnoses.

Tiredness was experienced 7 or more days by 41.2% of the sample ($n = 14$). Those with HF experienced tiredness 32.4% of the time ($n = 11$) while those with COPD ($n = 1$), PNA ($n = 1$), and other diagnoses ($n = 1$) each experienced tiredness 2.9% of the time. There was no association between tiredness and diagnoses.

Shortness of breath for 7 or more days was reported in 47.1% of the overall sample ($n = 16$). Shortness of breath was reported in 26.5% of those with HF ($n = 9$), in 8.8% of those with COPD ($n = 3$), in 2.9% of those with PNA ($n = 1$), and in 8.8% of those with other diagnoses. There was no association between shortness of breath and diagnoses.

Difficulty sleeping for 7 or more days was reported by 38.2% of the sample ($n = 13$). Sleeping difficulty was reported by 20.6% of those with HF (n = 7), 5.9% of those with COPD (n = 5.9%), 2.9% of those with PNA ($n = 1$), and 8.8% of those with other diagnoses ($n = 3$). There were no associations between sleeping difficulty and diagnoses.

Table 3

Clinical Characteristics

Variables	n=34	f	%
Mobility	Usually	27	79.4
	Sometimes	7	20.6
Need Assistance	Never	21	61.8
	Rarely	4	11.8
	Sometimes	8	23.5
	Often	1	2.9
Need Assistance_ADLs	Never	22	64.7
	Rarely	6	17.6
	Sometimes	5	14.7
	Often	1	2.9
General Health	Poor	12	35.3
	Fair	13	38.2
	Good	5	14.7
	Very Good	4	11.8
Quality of Life	Poor	3	8.8
	Fair	12	35.3
	Good	11	32.4
	Very Good	5	14.7
	Excellent	3	8.8
Mental Health	Poor	1	2.9
	Fair	4	11.8
	Good	14	41.2
	Very Good	4	11.8
	Excellent	11	32.4

Depression	No Depression	14	41.2
	Mild Depression	10	29.4
	Moderate Depression	10	29.4
Confidence	Confidence 7 or Greater	23	67.6
	Confidence Less Than 7	11	32.4
Presence of Pain	Less Than 7 Days	20	58.8
	7 Days or More	14	41.2
Tiredness	Less Than 7 Days	20	58.8
	7 Days or More	14	41.2
Shortness of Breath	Less Than 7 Days	18	52.9
	7 Days or More	16	47.1
Unable to Sleep	Less Than 7 Days	21	61.8
	7 Days or More	13	38.2

Note. f= frequency; %= percentage

Research Question 3: What is the healthcare utilization of older veterans admitted to the hospital?

Descriptive statistics (see Table 4) were utilized to describe healthcare utilization of the overall sample based on admission diagnosis (HF, COPD, and PNA). Overall, 38.2% of the sample had 2 or more ER visits in the past year ($n = 13$). Of these, 23.5% of the HF group ($n = 8$), 2.9% of the PNA group ($n = 1$), and 11.8% from other diagnoses ($n = 4$) had 2 or more ER visits. There was no association between ER visits and diagnoses.

Acute hospital admissions were slightly higher than ER visits in the overall sample with 47.1% of the participants reporting 2 or more admissions over the past year ($n = 16$). Of these, 29.4% of the HF group ($n = 10$), 2.9% of the COPD group ($n = 1$), 8.8% of the PNA group ($n = 3$), and 5.9% of other diagnoses ($n = 2$) experienced 2 or

more hospital admissions. There was no association between hospital admissions and diagnoses.

The most common length of stay was 3 days (number of days) for the most recent hospital admission (35.3% of admissions) for all diagnoses. The average length of stay was 6.52 days (SD = 3.92) for heart failure admissions, 2.00 days (SD = 1.00) for COPD admissions, and 7.50 days (SD = 4.66) for PNA admissions. Other diagnoses averaged 4.67 days (SD = 2.58). The average length of stay for all diagnoses was 5.91 days (SD = 3.81) with a minimum length of stay equivalent to 1 day and the maximum length of stay of 16 days ($N = 34$).

Table 4

Healthcare Utilization Characteristics

Variables	n=34	f	%		
ER Visits	Less Than 2	20	58.8		
	2 or More	13	38.2		
	Did Not report	1	2.9		
Hospital Admissions	Less Than 2	14	41.2		
	2 or More	16	47.1		
	Did Not Report	4	11.8		
		M	SD	Min	Max
	Total Number of Bed				
Length of Stay	Days	5.91	3.81	1	16

Note. f= frequency; %= percentage. M = mean, SD = standard deviation; Min = minimum, Max = Maximum

Figure 3

Stem and Leaf Chart- LOS and Discharge Diagnosis
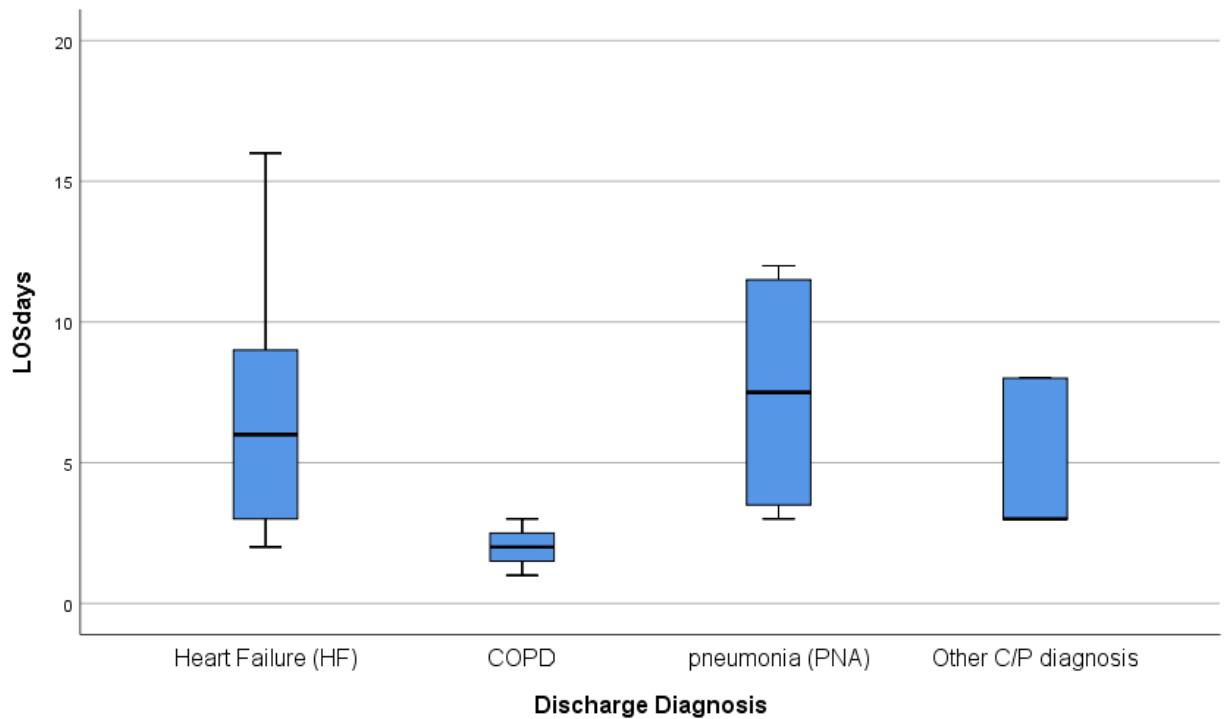
Research Question 4: What is the overall occurrence of loneliness?

Descriptive statistics were used to describe the occurrence of loneliness in the overall sample (see Table 5). Overall, loneliness was reported in 25.6% of the sample (n = 9). Loneliness was reported in 14.7% of those with HF (n = 5), in 2.9% of those with COPD (n = 1), in 5.9% of those with PNA (n = 1), and in 11.1% of those with other diagnoses (n = 2). There was no association between loneliness and diagnosis.

Table 5

Loneliness Overall

Variables	n=34	*f*	%		
Loneliness	Lonely	9	26.5		
	Not lonely	25	73.5		
		M	SD	Min	Max
Loneliness	Total score	4.74	2.23	3	9

Note. f= frequency; %= percentage. *M=mean, SD=standard deviation; Min=minimum, Max=Maximum*

Research Question 5: What sociodemographic characteristics are associated with loneliness?

Using Chi square and Spearman's rho, the relationship between individual sociodemographic characteristics and loneliness was explored in the overall sample (see Table 6). There were no statistically significant findings.

Loneliness was found to be positively correlated with living alone [χ^2 (1, N = 34) = .034, p >.05], experiencing housing concerns [χ^2 (1, N = 34) = .176, p >.05], difficulty paying bills [χ^2 (1, N = 34) = .551, p >.05], difficulty moving around the house [χ^2 (1, N = 34) = 1.216, p >.05], difficulty affording healthy meals [χ 2 (1, N = 34) = .811, p >.05], lack of medical-related transportation [χ^2 (1, N = 34) = 1.289, p >.05], and lack of non-medical transportation [χ^2 (1, N = 34) = 1.632, p >.05]. There were no significant associations between loneliness and any of the bivariate sociodemographic variables.

A Spearman's correlation coefficient was computed to determine the relationship between the loneliness and perceived level of social activity. The results indicate a non-significant negative relationship between loneliness and perceived level of social activity

[r (34) = -.286, p >.05]. Although non-significant, patients who were lonely experience

lower social activity.

Table 6

Sociodemographic Characteristics Associated with Loneliness

Variables	n=34	χ^2	p
Living Alone		.034	.855
Concerns about Housing		.176	.675
Difficulty Paying Bills		.551	.458
Difficulty Affording Healthy Meals		.811	.667
Lack of Medical Transportation		1.289	.256
Lack of Non-Medical Transportation		1.632	.442
		r	p
Level of Social Activity		-.286	.102

Note. χ^2 = *Chi square; p = significance; r = Spearman's rho*

Research Question 6: What clinical characteristics are associated with loneliness?

Using Chi square and Spearman's correlation coefficient, the relationship between

individual clinical characteristics and loneliness was explored in the overall sample (see

Table 7). There were no statistically significant findings.

Loneliness was found be positively correlated with needing assistance [χ^2 (1, N =

34) = 2.348, p >.05], needing assistance with ADLs [χ^2 (1, N = 34) = .620, p >.05], and

experiencing depressive symptoms [χ^2 (1, N = 34) = 4.421, p >.05]. There were no

significant associations.

A Spearman's correlation coefficient was computed to determine the relationship

between the loneliness and clinical variables that did not meet the assumptions for Chi

square tests. The results indicated non-significant negative relationships between loneliness and general health [r (34) = -.190, p >.05], quality of life [r (34) = -.287, p >.05], mental health [r (34) = -.032, p >.05], confidence to manage health problems [r (34) = -.096, p >.05], and pain occurrence over the last 7 days [r (34) = -.147, p >.05]. The results indicate non-significant positive relationships between loneliness and occurrence of tiredness over the past 7 days [r (34) = .117, p >.05], occurrence of shortness of breath over the past 7 days [r (34) = .075, p >.05], and occurrence of sleep problems over the past 7 days [r (34) = .028, p >.05]. None of these findings were statistically significant.

Table 7

Clinical Characteristics Associated with Loneliness

Variables	n=34	χ^2	*p*
Needing Assistance		2.348	.503
Needing Assistance with ADLs		.620	.892
Experiencing Depressive Symptoms		4.421	.110
		r	*p*
Rating of General Health		-.190	.281
Overall Quality of Life		-.287	.100
Rating of Mental Health		.032	.856
Confidence to Manage Health Problems		-.096	.588
Occurrence of Pain		-.147	.407
Occurrence of Tiredness		.117	.511
Occurrence of Shortness of Breath		.075	.672
Occurrence of Sleep Problems		.028	.877

Note. χ^2 = Chi square; p = significance; r = Spearman's rho

Research Question 7: Does loneliness differ by a targeted health problem (CHF, COPD, PNA)?

Using Spearman's correlation coefficient, the relationship between loneliness and the discharge diagnosis was explored in the overall sample (see Table 8). Spearman's correlation coefficient was used in place of Chi square due to assumptions of normality not being met (6 cells had counts less than 5). There were no statistically significant findings. The results indicate a non-significant relationship between loneliness and discharge diagnosis [r (34) = .039, p >.05]. Therefore, loneliness is not related to the targeted health problem (HF, COPD, PNA, or other) the patient was experiencing.

Table 8

Loneliness Difference by Health Problem

Variables	n=34	*r*	*p*
Discharge Diagnosis		.039	.826

Note. r= Spearman's rho; p= significance

Research Question 8: Does healthcare utilization differ by loneliness?

Loneliness was found to be positively correlated with 2 or more ER visits in the past year [χ^2 (1, N = 34) = 1.928, p >.05] and 2 or more hospitalizations in the past year [χ^2 (1, N = 34) = 2.072, p >.05]. Using the Mann-Whitney *U* test, loneliness was positively associated with length of stay (*U*= 135.00, N=34, p > .05). There were no statistically significant findings. See Table 9.

Table 9

Healthcare Utilization Difference by Loneliness

Variables	n=34	χ^2	*p*
2 or More ER Visits in Past Year		1.928	.381
2 or More Hospital Admissions in Past Year		2.072	.355
		U	*p*
Length of Stay in Days		135.0	.397

Note. χ^2 = Chi square; p = significance; U = Mann-Whitney U Statistic

Summary of Results

The study was conducted with predominantly white males in a metropolitan, Midwest, federal healthcare organization. Most participants were married, over the age of 65, retired, and had 2 or more years of college education. The study sample was small. The statistical analysis was underpowered. There were no significant findings.

There were no significant associations found between sociodemographic characteristics and diagnosis or loneliness status. There were no significant associations reported between clinical characteristics and diagnosis or loneliness status. Loneliness was not found to be correlated to any of the three measures of healthcare utilization (ER visits, hospitalizations, or length of stay).

Chapter 5: Discussion

Introduction

In this chapter, the summary of study, results, limitations, implications, recommendations, and conclusions are presented. The original study framework is reviewed, and a revised framework is presented based on study findings. Loneliness is reframed and discussed both theoretically and clinically using a veteran-centric point of view. Final study conclusions are presented.

Summary of the Study

Three common diagnoses associated with high healthcare costs were described. Differences in loneliness in targeted veteran populations characterized by clinical, sociodemographic, and healthcare utilization characteristics were explored. Based on the study findings and theoretical underpinnings, a revised framework is presented to study loneliness in the veteran population in the future.

Results

Loneliness

Group Differences. Overall, there were no significant group differences in the study sample. The sample was all male. Nearly two-thirds of the sample was White and the remaining one-third was Black. Therefore, the sample lacked both gender and race diversity. This limitation was expected due to the study being conducted in an older population of U.S. military veterans. However, in future research it is expected that as the sample increases in size, diversity in the sample will increase as well. There were no significant differences in education, marital status, or employment. The most commonly occurring discharge diagnosis was heart failure. Heart failure is one of the top three

leading diagnoses associated with high rates of hospital readmissions, disease

exacerbation, and poor self-management (Goldstein & Lynn, 2006; Riegel, Lee, &

Dickson, 2011). A little over one-quarter (25.6%, n=9)) of the sample reported

experiencing loneliness. This finding aligns with the reported prevalence of loneliness in

the general population that ranged from 10.4% to upwards of 61% (Cigna, 2020; Kuwert

et al., 2015) depending on the loneliness measurement used. Loneliness did not differ

significantly between diagnoses but was found to be slightly higher in those diagnosed

with heart failure (14.7%, $n = 5$). This finding may be related to the diagnosis but could

also be an outcome of the higher number of heart failure patients included in the study.

There are to date no other studies that evaluate loneliness based on the diagnoses

explored in this study. Therefore, this finding deserves future exploration in research

studies.

Sociodemographic Characteristics. There were no significant differences in the

sociodemographic characteristics of patients in the study sample. Living arrangements

and setting were nearly the same for about one-half of the sample living alone and the

remaining sample living with someone. Every patient in the study reported living in a

single-family home. Findings related to social resources and support were also similar

across the sample. In all cases only a small percentage of the sample reported concerns

related to housing (17.6%), ability to pay bills (14.7%), ability to afford healthy meals

(14.7%), or ability to find transportation for both medical (11.8%) and non-medical

(11.8%) related travel needs. This finding is interesting since a core concept of this study

was the relationship of self-care in patients who may be lonely. Kuwert et al. found that

loneliness is often associated with psychosocial variables (2014). It is interesting that

although loneliness was identified in approximately 25% of the sample, a far smaller percentage of the sample reported difficulty with social needs often found to be associated with self-care deficits (Ogilvie, Everson-Rose, Longstreth, Rodriguez, Diez-Roux, & Lutsey, 2015).

Finally, poor social interaction and social activity has been associated with both loneliness and deficits in self-care (Kuwert et al., 2014; Mistry et al., 2001). Approximately 38% ($n = 13$) of study participants rated their social activity as fair or poor, 25% ($n = 9$) as good, and 36% ($n = 12$) as very good or excellent. Again, although loneliness was observed at a rate similar to other studies, the rating of social activity is slightly higher, likely demonstrating no association between loneliness and self-care in this study.

Clinical Characteristics. Although no clinical characteristics were found to be statistically significant, there were some findings worth exploring further. Nearly 26% ($n = 9$) of the sample reported needing daily assistance and 18% ($n = 6$) reported needing assistance with ADLs such as feeding, bathing, and grooming. Over 70% ($n = 25$) of the sample reported their general health as fair or poor and 44% ($n = 15$) reported a fair or poor quality of life. Yet only 14% ($n = 5$) reported poor or fair mental health. This finding was interesting when comparing the sample findings to the depression scores. Nearly 60% ($n = 20$) of the sample was reported as experiencing mild or moderate depression. This variation in findings is notable and one possible explanation is the use of self-report vs. screening instruments. General health, quality of life, and mental health were all assessed using a single self-report item. However, risk of depression was calculated based on scores achieved using the PHQ-9, a screening instrument to measure

risk of depression. In many instances, when self-report measures are used, participants under-report the occurrence or presence of problems ((Furnham et al., 1982). Therefore, it is likely that the self-reported occurrence of needing assistance and mental health may be slightly lower than actual occurrence in the study sample due to inherent bias associated with self-report measures.

Other clinical measures included confidence to manage health problems, pain, tiredness, shortness of breath, and inability to sleep. These characteristics align with expected findings. Approximately one-third ($n = 11$) of the sample reported lack of confidence in managing their health problems over the past week. In addition, nearly half of the sample reported experiencing symptoms such as pain (41.2%), tiredness (41.2%), shortness of breath (47.1%), and inability to sleep (38.2%) over the past week. These findings suggest that the presence of symptoms and confidence to manage one's health problems are likely occurring together (Vellone et al., 2016; Kessing et al., 2016). The presence of symptoms is also suggestive of disease exacerbation which is often also correlated with poor self-care in patients living with complex conditions that require self-management (Kamrani et al., 2014).

Healthcare Utilization. There was wide variability in the healthcare utilization measures. Length of stay (measured by the number of days a patient stayed in the hospital) was widely variable (M=5.91, SD= 3.91). The shortest length of stay occurred in the COPD group (1 day) and longest stay was in the pneumonia group (16 days). There could be many factors that contributed to the length of stay which were not explored as part of this study. However, there was no correlation between length of stay and loneliness. Overall, pneumonia admissions accounted for the longest average stays (7.5

days) and COPD admissions accounted for the shortest average stays (2.0 days). Length of stay for heart failure admissions averaged 6.5 days.

Limitations

There are several limitations to this study. Limitations include the use of existing data for the purpose of answering new research questions, the use of self-report measures, and lack of variability in the sample. These limitations should be addressed in the methodology and design of future studies with similar aims and research questions.

The data used in this study were originally collected as part of a large transitional care research study. Therefore, the baseline data were not originally collected for the purpose of exploring loneliness in the target population. The original study used a validated measure of loneliness (UCLA-3 item Loneliness Scale) and therefore presented an opportunity to further gain insight and knowledge about loneliness in an otherwise under-explored population; however, the UCLA-3 item Loneliness Scale is brief. The scale uses 3 items and therefore, data analysis is limited due to the type and level of data collected.

Self-report instruments pose inherent risk of bias (Furnham et al., 1982). With self-report data, respondents may make decisions to present themselves in a certain way. This intentional presentation of self may be conscious or not; however, it does pose a potential limitation to the validity of self-reported data. In this study, self-reported measures were used to measure quality of life, general health, experiences with symptoms, concerns over abilities to care for oneself, and past utilization of healthcare resources. Therefore, bias must be considered when evaluating these measures.

The self-report instruments also resulted in data with statistical limitations. Because nominal and ordinal data was most common, there were limitations to the types of statistical analyses that could be used. As expected, due to the level of measurement and the small sample size, statistically significant findings were not found.

Generalizability of this study's findings is limited. The sample size was small ($n = 34$) and lacked variability for adequate analysis. For example, the data included only male participants, who were predominantly white (with a small representation of black participants and no representation of other races). The data only represented veterans over the age of 65; however, this limitation was expected as the study was conducted using a population of older veterans. Based on the age criterium, veterans in the sample likely served in the Vietnam and Korean wars and during these periods of military service, there was a much higher representation of men compared to women serving in the military.

These limitations should be considered when replicating future studies and effort should be made to widen the sample to include greater variability in participant age, race, and gender. It is anticipated that as the Mirror: TCM study dataset continues to grow the sample will become more diverse and more representative of the veteran population. This study demonstrates the potential for more rigorous analyses as the Mirror: TCM sample size increases.

Implications of the Results

This study produced new knowledge related to loneliness in the veteran population. Although findings were not statistically significant, there were still insights worth exploring further. The study is one of only a handful of studies exploring

loneliness within the veteran healthcare system and the only study to date that targets

older veterans with complex disease (HF, COPD, PNA). Furthermore, the study findings

have begun to establish groundwork and feasibility for future research within this field of

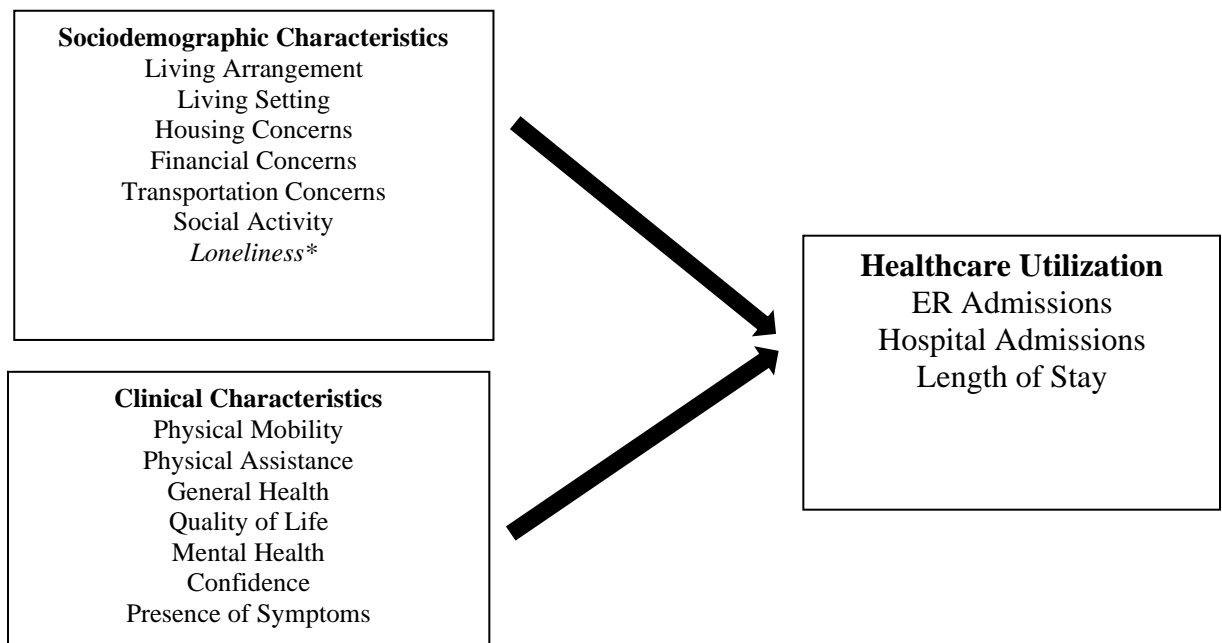study guided by established theoretical and conceptual frameworks.

Loneliness is a multifaceted, multidimensional concept. In this study, three factors

that are associated with loneliness (sociodemographic characteristics, clinical

characteristics, and healthcare utilization) were used to explore loneliness in the veteran

population. These concepts were relevant to loneliness based on previous research in the

field (Wilson et al., 2018; Kuwert et al., 2014; Health Resources & Services

Administration, 2019) and theoretical underpinnings (Neuman & Young, 1972; Riegel et

al., 2016). In the proposed model loneliness was hypothesized to be both a predictor of

increased healthcare utilization and an outcome of selected social and clinical

characteristics. However, the proposed conceptual model used to guide the study cannot

be supported based on non-significant findings.

The conclusion to not accept the proposed study framework does not devalue the

study findings but suggests that the model and proposed relationships must be re-

explored. Although some associations between predicted patient characteristics such as

social and clinical variables and loneliness were produced, past research and theory

suggest these associations may be stronger than observed (Wilson et al., 2018; Kuwert et

al., 2014; Cigna, 2020; Health Resources & Services Administration, 2019) One possible

explanation could be this study's small sample size, an underpowered statistical design,

or the study variables' level of measurement. Another possible consideration is that

loneliness is not predicted by social and clinical characteristics but should instead be

considered alongside these characteristics to predict patient outcomes such as healthcare

utilization. If the conceptual model used to guide the study was revised based on the

study findings, a new conceptual model could be suggested (Figure 4). Loneliness was

removed from the model as a stand-alone predictor and outcome and added to the model

as a sociodemographic characteristic that may predict healthcare utilization.

Figure 4

Revised Model of Conceptualized Sociodemographic and Clinical Characteristics and

the Relationship Between Loneliness and Healthcare Utilization

Sociodemographic Characteristics
Living Arrangement
Living Setting
Housing Concerns
Financial Concerns
Transportation Concerns
Social Activity
Loneliness*

Healthcare Utilization
ER Admissions
Hospital Admissions
Length of Stay

Clinical Characteristics
Physical Mobility
Physical Assistance
General Health
Quality of Life
Mental Health
Confidence
Presence of Symptoms

Based on these conclusions, future work should focus on assessing and stratifying

loneliness. There is also a need to understand the overall weight of loneliness as a

predictor of healthcare utilization. It is not known if loneliness would impact the effect of

sociodemographic characteristics on healthcare utilization, or the degree of such an

effect. In many instances, a small number of patients with complex medical and social

needs drive a large proportion of health care costs (Lantz, 2020). Using non-health care

data sources (such as sociodemographic data) to understand a patient's risk level is a new area of study (Nau et al., 2019). Patient-level information created for nonclinical purposes could possibly be integrated into patient assessment and care planning to provide a holistic approach to the delivery of healthcare. Such data, like loneliness, may be important to understand and identify health risk and care needs, especially in veterans, who are identified as being at higher risk for loneliness with advancing age and presence of complex diseases and multimorbidity.

Interventions that connect socially isolated and lonely older adults to health services are conceptually promising and additional high-quality studies are needed (Cohen-Mansfield & Perach, 2015; National Academies Press, 2020). Information on interventions targeting loneliness and their effect on health care utilization is sparse and inconsistent. Health systems and clinicians should tailor interventions to the needs of their population while keeping in mind that the documented impact of such interventions specific to social isolation, loneliness, health, and health care utilization is limited (Veazie et al., 2019).

Regarding policy, this study's findings provide useful implications for policy makers to develop health service programs that could benefit veterans living with or at risk for loneliness (National Academies Press, 2020). Policy makers should pay attention to various characteristics of loneliness when providing social and clinical resources for patients who are lonely. Policy makers should also begin to plan for payment and reimbursement structures conducive to supporting and managing patients living with loneliness. Such strategies may support social and environmental changes that currently impact and result in negative outcomes associated with lonely veterans.

Reframing Theory, Rethinking Loneliness

The definition of loneliness that guided this study was the perceived difference between the quality and quantity of relationships that a person has, and that a person wants (Bombassei et al., 2009). Based on this definition, perceived isolation, perceived lack of companionship, and the feeling of being left out were the characteristics of loneliness measured. The UCLA 3-item screener was utilized to capture, and measure loneliness based on these defined characteristics.
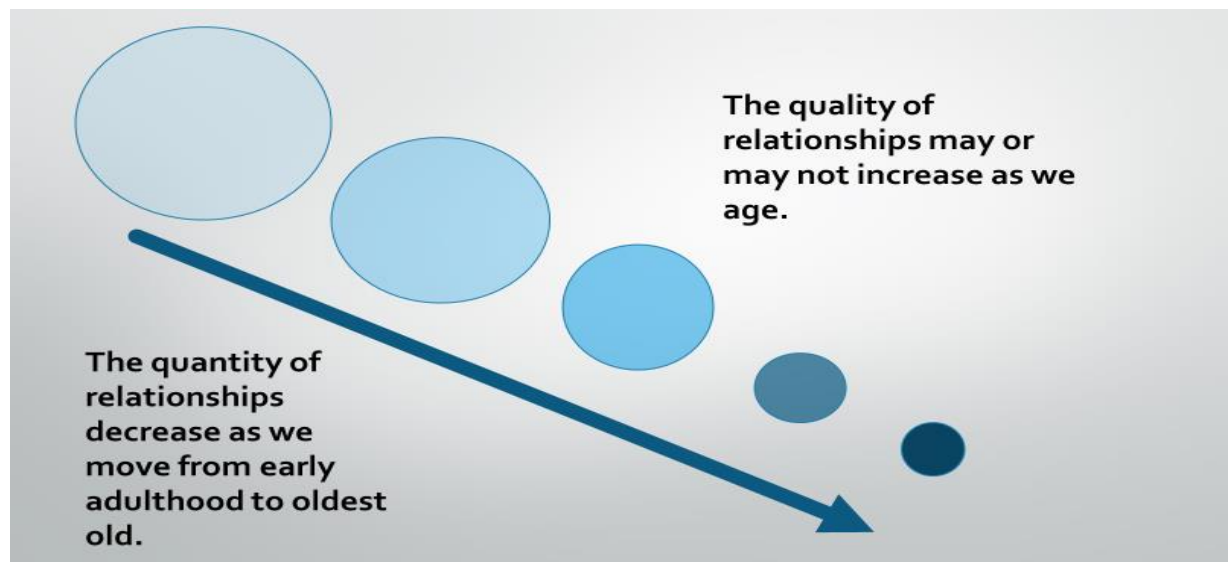
Although loneliness is well defined and there are reliable and valid measures to identify those with loneliness, a gap exists in understanding risk factors associated with loneliness and the overall contribution of loneliness, both alone and in combination with other risks, to healthcare outcomes. This is evident when considering veterans' unique military experiences, higher risk of complex disease, and older age. Therefore, it becomes increasingly important to not only frame loneliness in the veteran population using a tailored definition and conceptual model, but to also identify strategies to recognize those at highest risk and intervene earlier.

Findings from the study bridge past literature and theory with the current patient population characteristics and research findings. For example, past research connects emotional health, physical health, and overall wellbeing to loneliness (Wilson et al., 2018; Kuwert et al., 2014; Solomon et al., 2011; Carr et al., 2017; Signoracci et al., 2016). In alignment with previous findings, results from this study also showed positive associations between worse emotional and physical health and overall wellbeing and loneliness, although findings were non-significant.

Referring back to Neuman's System Theory (Neuman & Young, 1972) and the

SSTCD (Riegel et al., 2012), loneliness was considered a stressor that introduces the

potential for breakdowns in systematic lines of defense. A breakdown that is not

addressed or corrected is likely to lead to deficits in self-care resulting in chronicity of

complex illness such as those studied (HF, COPD, and PNA). This study explored

loneliness as a potential stressor and suggests that loneliness may be related to deficits in

self-care thus leading to poor health outcomes and increased healthcare utilization.

Therefore, rethinking loneliness in the veteran population may be warranted. The

appraisal and synthesis of loneliness research both in the general and veteran populations

resulted in a veteran-centric conceptualization of loneliness. This conceptualization of

loneliness builds on what is known about loneliness in the general public and

incorporates the unique characteristics that veterans experience (Carr et al., 2017; Kuwert

et al., 2014; Solomon et al., 2011) creating a veteran-centric conceptualization of

loneliness.

In Figure 5, loneliness is conceptualized in the general public. The size of the

circle represents the quantity or number of relationships a person might experience

throughout their life. A larger circle represents a higher number of relationships. A

smaller circle represents fewer relationships. The shade of each circle represents the

quality of those relationships. The darker the shade of the circle, the more high-quality

relationships one might experience. Therefore, the size and shade of each circle

represents both the quantity and quality of one's relationships across the lifespan. As one

goes through life, the smaller and deeper shaded circles represents the likely relationships

a person may experience throughout their lifetime. Older adults are at increased risk of

experiencing loneliness due to living alone, loss of family and friends, living with debilitating and chronic disease, and resulting physical and sensory impairments (National Academies Press, 2020). Based on the literature in the general population, as a person ages, it is likely they experience fewer relationships, yet those relationships are likely to be high-quality (Mansfield et al., 2018). This scenario results in an increased likelihood of a person experiencing loneliness with advanced age. In advanced age, the loss of one high-quality relationship could propel an older adult from non-lonely to lonely due to the small number of relationships one may have.

Figure 5

Conceptualization of Loneliness in the General Population

The quality of relationships may or may not increase as we age.

The quantity of relationships decrease as we move from early adulthood to oldest old.

Findings from this study and review of literature propose rethinking how we conceptualize loneliness in the veteran population. The veteran-centric model of loneliness incorporates the characteristics and factors that influence a higher likelihood that a veteran will experience loneliness (Walker, 2013). In Figure 6, the inner circle represents a veteran's likely experience of relationships compared to the general public across the lifespan. Consider that in addition the generalized experience of aging, the unique veteran experience may also impact relationships across the lifespan contributing to a greater likelihood of loneliness.

Past research in the veteran population has suggested that veterans experience a disconnection from society after transitioning out of the military setting (Carr et al., 2017; Kuwert et al., 2014). Since the military culture is unique, loneliness may be salient in the veteran population (Wilson, 2018). Geographical mobility and frequent deployments

during service create an environment that does not support lasting long-term friendships and relationships in the civilian setting (Stapleton, 2018). Veterans may feel they will not be understood or are unable to relate to civilians post-service era, they often experience friction during the period of transition from service to civilian life, and veterans vocalize difficulty recreating relationships built during their tenure in the service (Wilson, 2018). Military trauma, disability, and immobility also place veterans at risk for inability to develop relationships and social connections with others. In many instances, veterans experience the loss of their military "brothers and sisters" in combat situations resulting in quality relationships being taken away from them (Wilson et al., 2018).

This re-imagined model of loneliness incorporates not only the characteristics of loneliness observed in the general population, but also the unique and shared veteran experiences that may also contribute to loneliness. This synthesis of evidence results in a veteran-centric view of loneliness and highlights the potential increased risk for veterans to experience loneliness throughout their life represented by the very small and very dark shaded circle (Figure 6). This revised conceptualization of loneliness provides researchers and practitioners with a new lens to explore loneliness within the veteran population. Because of this, it is imperative that loneliness in older veterans be further explored and researched. Rethinking loneliness from a veteran-centric perspective allows the concept of loneliness to be tailored and explored within the unique domain of veterans seeking healthcare within the VHA.

Figure 6

Veteran-centric Conceptualization of Loneliness
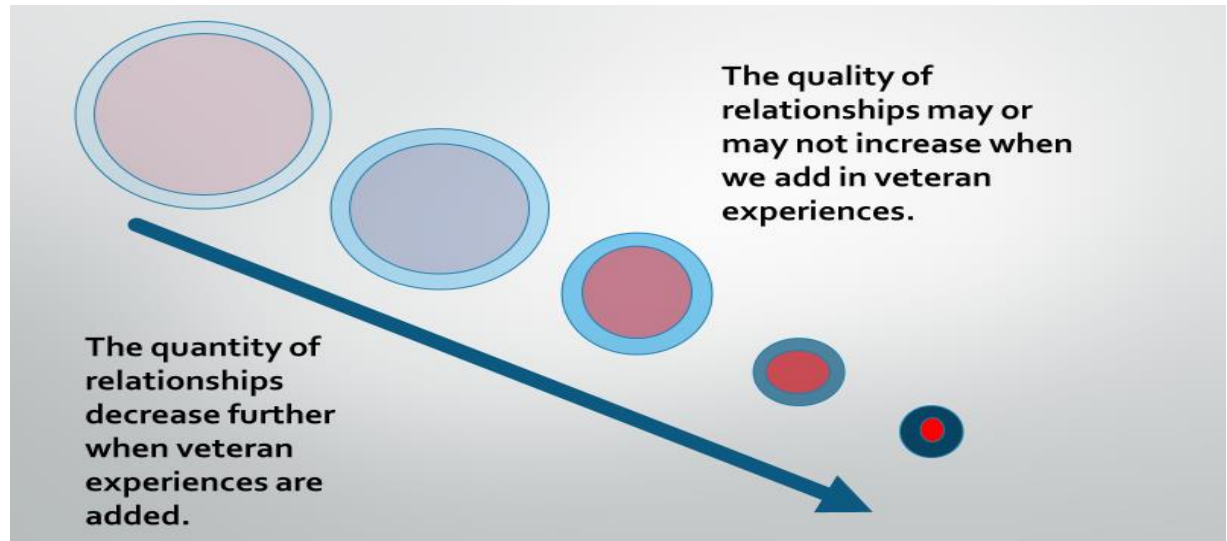
Rethinking loneliness in the veteran population allows researchers and clinicians to acknowledge the increased likelihood of loneliness occurring in veterans. Reframing our understanding using a veteran-centric point of view encourages awareness and understanding of loneliness and why veterans experience it in a unique way compared to the general public. In coming to this understanding, researchers and clinicians may begin to identify reliable and valid strategies to predict the occurrence of loneliness in those veterans at most risk.

Recommendations for Future Research

Future studies should include a more diverse sample including women and diverse ethnic groups. This study was underpowered, and therefore should be repeated

with a larger sample to validate similar findings and broaden generalizability. Future studies should explore loneliness longitudinally in the veteran population to determine differences between loneliness in the general population and unique populations such as veterans and to validate the reconceptualization of loneliness in the veteran population.

Future research should also study additional outcomes of loneliness such as healthcare utilization. Specifically, there is a gap in research targeting differences in acute healthcare utilization and preventative or tertiary healthcare utilization. It is believed that loneliness may predict utilization differently based on the type of healthcare being utilized. For example, this study explored acute healthcare utilization (length of stay, ER visits, and hospital readmissions); however, it is possible that loneliness may be negatively correlated with preventative and tertiary utilization (primary care, rehabilitation, and health promotion activities). There is a paucity of research examining the differences in the type of healthcare utilization and loneliness.

Future research may also consider using qualitative interviews with veterans at risk for loneliness before designing intervention and management strategies for this population. It is essential to study how to effectively support, manage, and encourage veteran patients who experience loneliness. Findings from such studies may be used to tailor and explore clinically relevant and valuable strategies to help those experiencing loneliness.

Finally, research in this field should include the development of a tailored measure that may examine and predict the occurrence of loneliness and support interventions to mitigate potential negative health outcomes. Such measures could

facilitate earlier recognition, management, and risk stratification; and possibly reduce

negative outcomes and experiences associated with loneliness in the veteran population.

Conclusions

Finding from this study have described loneliness in the older veteran population

admitted to the hospital for one of three targeted complex disease states (HF, COPD,

PNA). There were no statistically significant findings, yet new knowledge about

loneliness in the veteran population was generated and recommendations for future

research were discussed.

Also, it was hypothesized that sociodemographic and clinical characteristics may

be associated with loneliness and that loneliness may be associated with poor health

outcomes. Prior research suggested that veterans (especially those who are older) have

unique experiences of loneliness, compared to the general population. Aging veterans are

at increased risk for fewer relationships and quality connections. In general, as people

age, they lose more and more close relationships. As age increases, people also tend to

lose mobility, a risk factor for loneliness. Aging veterans tend to be sicker and at higher

risk for immobility. Older veterans often present with multiple co-morbidities. Poor

health management in older veterans is commonly observed, and research has shown an

association between the lack of or desire to care for one's self and loneliness.

Findings from this study reiterate some of the conclusions from prior research.

Loneliness is associated with several sociodemographic characteristics, but the degree to

which loneliness may account for lack of self-care or healthcare utilization is not known.

These findings suggest that loneliness is present in the older veteran population living

with complex diseases such as HF, COPD, and PNA. This study strengthens the need for

further research on the relationship between loneliness, self-care, and poor health outcomes in the older veteran population.

Findings from this study illustrate the need for a conceptual model of loneliness in the veteran population and one such model was proposed. The proposed conceptual model incorporates past research from both the general and veteran populations, relevant theory, and new knowledge generated from this study. The conceptual model may provide an innovative way to explore, study, and understand loneliness in the veteran population for the purpose of improving early recognition and clinical management to reduce negative outcomes.

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Appendix A: Summary of Evidence

Author	Aim	Sample	Method	Findings
Factors Associated with Loneliness				
Carr et al. (2017)	To explore the relationship between military experiences, adjustment to widowhood, and loneliness for men	n= 2148, mean age 69	Longitudinal data collected via the Veterans Mail survey	Loneliness was significantly lower among those veterans with exposure to death compared to civilians who became widowed; however, veterans without exposure to death remain like civilians.
King et al. (2014)	Describe characteristics of male veterans who called the suicide crisis line, and examine age-related differences.	n= 412, mean age 49	Mixed method, examination of call logs	Loneliness was not commonly a presenting complaint; however, it was significantly associated with middle and older aged veterans calling the crisis line.
Kuwert et al. (2014)	Examine the correlates and prevalence of loneliness in a sample of veterans using data from the National Health and Resilience in Veterans Study.	n= 2025, mean age 71	Questionnaire adapted from the UCLA Loneliness Scale	Loneliness was prevalent amongst older veterans, associated with several health and psychosocial variables.
Martin and Hartley (2017)	Explore the understanding of relationship between loneliness and depression in veterans	n= 67, mean age not reported.	UCLA Loneliness Scale, perceived stress scale, depression scale	Loneliness was found to be a predictor of depression and stress was a mediating factor.
Negative Outcomes Associated with Loneliness				
Mistry et al. (2001)	To examine the role of social isolation in an older group of men enrolled in the UPBEAT study	n=123, mean age 72	Mental health inventory- 38 depression and anxiety subscales, Lubben Social Network scale, illness ratings	Patients who reported social isolation were four to five times more likely to be hospitalized within a year compared to those who reported low isolation.
Shaw et al. (2017)	To evaluate objective isolation and loneliness impact on Medicare spending and outcomes.	n=171, mean age 74	Health and Retirement Study data, Medicare claims, 3-item loneliness scale.	Objective isolation predicts greater spending, hospitalization, institutionalization,

Appendix B: VA STL IRB Study Approval Letter

Department of Veterans Affairs	**Memorandum**

Date: May 20, 2020

From: Chair, Institutional Review Board (151/JC)

To: Rachael Beard, RN, MSN, MEd, EdD

Subj: New Study Approval: Multisite Replication of the Transitional Care Model ePromise#1220216

1. The Institutional Review Board (IRB), at its May 6, 2020 meeting, reviewed and **approved** the above study pending the approval of the Privacy Officer.

2. The IRB Reviewed the cover memo and documents that you submitted on April 29[th], 2020. The IRB found that you adequately addressed their concerns and approve your study for one year. Your study's IRB approval will expire on May 6[th], 2021.

3. Please be aware that you may not begin your research until your above study is approved by the Research & Development Committee (RDC), and you receive and implementation memo from the Associate Chief of Staff (ACOS) of Research.

4. If you have any questions or concerns, please do not hesitate to call us at (314) 289-6333. Or email at STL.IRB.ADMIN@va.gov

Pamela J.
Weilitz 178343

Digitally signed by Pamela
J. Weilitz 178343
Date: 2020.05.21 07:54:35
-05'00'

Pam Becker Weilitz, DNP, APRN, ANP-BC, VA-CM
Chair, Institutional Review Board
VA St. Louis Health Care System

Appendix C: UMSL IRB Approval

UMSL | Research
University of Missouri–St. Louis

January 27, 2021

Principal Investigator: Rachael A Beard, PhD. Health Education and Promotion
Department: School, Educational, Counseling Psych.

Your IRB Application to project entitled A Descriptive Study of Health-Related Risks and Outcome Differences by Loneliness Status in a Sample of Older Veterans was reviewed and approved by the UMSL Institutional Review Board according to the terms and conditions described below:

IRB Project Number	2044362
IRB Review Number	295344
Initial Application Approval Date	January 27, 2021
IRB Expiration Date	January 27, 2022
Level of Review	Exempt
Project Status	Active - Exempt
Exempt Categories (Revised Common Rule)	45 CFR 46.104d(4)(ii)
Risk Level	Minimal Risk
Approved Documents	Excel file with the variables that I will be requesting from the Mirror: TCM database for the purpose of my dissertation work. IRB, Associate Chief of Staff for Research, approval letter

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

1. Enrollment and study related procedures must remain in compliance with the University of Missouri regulations related to interaction with human participants following guidance at http://www.umsl.edu/recd/compliance/umsl-guidance-covid19-restart-6.25.2020.pdf.
2. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
3. All changes must be IRB approved prior to implementation utilizing the Exempt Amendment Form.
4. The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date to keep the study active or to close it.
5. Maintain all research records for a period of seven years from the project completion date.

If you are offering subject payments and would like more information about research participant payments, please click here to view the UM Policy: https://www.umsystem.edu/ums/policies/finance/payments_to_research_study_participants

Appendix D: Study Instruments

Six-Item Screener

READ TO THE PATIENT: **I have a few questions I would like to ask you. First, I am going to name three objects. After I have said all three objects, please repeat the objects. HAT…CAR…TREE.**
(ALLOW ONE SECOND TO SAY EACH WORD. SAY EACH OBJECT UNTIL THEY GET EACH OBJECT CORRECT.)
Please remember these objects because I am going to ask you to repeat them again in a minute.

READ EACH QUESTION BELOW TO THE PATIENT.   SCORE ONE POINT FOR EACH CORRECT RESPONSE.

What year is this?   (0 or 1)
                                                        _____

What month is this?   (0 or 1)
                                                        _____

What day of the week is this?   (0 or 1)
                                                        _____

READ TO THE PATIENT:

What were the three objects I asked you to remember?

HAT	_____	(0 or 1)
CAR	_____	(0 or 1)
TREE	_____	(0 or 1)
Total score	_____	(0 to 6)

NEXT STEPS:

- SCORES of >=3: Considered cognitive; CONTINUE WITH PATIENT INFORMED

    CONSENT PROCESS

- SCORES of <3: Considered impaired; ASK THE PATIENT IF THEY WISH TO

    PARTICIPATE AND REQUEST TO SPEAK TO A FAMILY MEMBER (LAR) TO

    TELL THEM ABOUT THE TRIAL AND OBTAIN VERBAL/WRITTEN CONSENT

    PRIOR TO RANDOM ASSIGNMENT.

PROMIS Global (General Health Ratings)

Next, I am going to read to you some general questions about your health. Please let me know

how you would rate each question. The options are: excellent, very good, good, fair, or poor.

	Excellent (5)	Very Good (4)	Good (3)	Fair (2)	Poor (1)
In general, would you say your health is…	☐	☐	☐	☐	☐
In general, would you say your quality of life is…	☐	☐	☐	☐	☐
In general, how would you rate your physical health?	☐	☐	☐	☐	☐
In general, how would you rate your mental health, including your mood and your ability to think?	☐	☐	☐	☐	☐
In general, please rate how well you carry out your usual social activities and roles? (This includes activities at home, at work, and in your community, and responsibilities as a parent, spouse, caregiver, employee, friend, etc.)	☐	☐	☐	☐	☐

How confident are you that you can control and manage most of your health problems?

_____

(#)

On a scale from 1 to 10 where 1 is not at all confident and 10 is very confident

Write in number from 1 to 10; 1 = not at all confident, 10 = very confident

Scoring: (Raw sum x number of items on the short form)

 Number of items

PROMIS Emotional Distress-Anxiety Scale (Short Form 4a)

Now I want you to think about the past week. Please rate how often in the last 7 days you have experienced each of the following. Your options are never, rarely, sometimes, often, or always.

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
I felt fearful	☐	☐	☐	☐	☐
I found it hard to focus on anything other than my anxiety	☐	☐	☐	☐	☐
My worries overwhelmed me	☐	☐	☐	☐	☐
I felt uneasy	☐	☐	☐	☐	☐

Scoring: (Raw sum x number of items on the short form)

 Number of items

PROMIS Physical Function (short form 10a)

Next, I am going to read to you questions about your health. Please let me know how you would rate each question. The options are: Not at all, very little, somewhat, quite a lot, cannot do.

	Not at all (5)	Very little (4)	Somewhat (3)	Quite a lot (2)	Cannot do (1)
Does your health now limit you in doing vigorous activities, such as running, lifting heavy objects, participating in strenuous sports?	☐	☐	☐	☐	☐
Does your health now limit you in walking more than a mile?	☐	☐	☐	☐	☐
Does your health now limit you in climbing one flight of stairs?	☐	☐	☐	☐	☐
Does your health now limit you in lifting or carrying groceries?	☐	☐	☐	☐	☐
Does your health now limit you in bending, kneeling, or stooping?	☐	☐	☐	☐	☐

	Without any difficulty (5)	With a little difficulty (4)	With some difficulty (3)	With much difficulty (2)	Unable to do (1)

Are you able to do chores such as vacuuming or yard work?	☐	☐	☐	☐	☐
Are you able to dress yourself, including tying shoelaces and doing buttons?	☐	☐	☐	☐	☐
Are you able to shampoo our hair?	☐	☐	☐	☐	☐
Are you able to wash and dry your body?	☐	☐	☐	☐	☐
Are you able to get on and off the toilet?	☐	☐	☐	☐	☐

Scoring: (Raw sum x number of items on the short form)

Number of items

Patient Health Questionnaire (PHQ-9)

Next, I am going to ask you about how often you have been bothered by problems over the last two weeks. I want you to think about how often have you been bothered by any of the following problems. Your options are: not at all, several days, more than half the days or nearly every day.

	Not at all	Several days	More than half the days	Nearly every day
1. **Little interest or pleasure in doing things**	0	1	2	3
2. **Feeling down, depressed, or hopeless**	0	1	2	3
3. **Trouble falling or staying asleep, or sleeping too much**	0	1	2	3
4. **Feeling tired or having little energy**	0	1	2	3
5. **Poor appetite or overeating**	0	1	2	3
6. **Feeling bad about yourself - or that you are a failure or have let yourself or your family down**	0	1	2	3

7. **Trouble concentrating on things, such as reading the newspaper or watching television**

0   1   2   3

8. **Moving or speaking so slowly that other people could have noticed? Or the opposite— being so fidgety or restless that you have been moving around a lot more than usual**

0   1   2   3

	ADD COLUMNS		+	+
	TOTAL			

IF THE RESPONDENT MENTIONED ANY PROBLEMS, ASK**:**

How difficult have these problems made it difficult for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
☐	☐	☐	☐

Scoring: Count the number (#) of boxes checked in a column. Multiply that number by the value indicated below, then add the subtotal to produce a total score. The possible range is 0-27. Use the table below to interpret the PHQ-9 score. A cut-score of > 10 can be used for consideration of the presence of depression.

Not at all   (#) _____ x 0 = _____

Several days   (#) _____ x 1 = _____

More than half the days (#) _____ x 2 = _____

Nearly every day   (#) _____ x 3 = _____

        Total score= _____

Interpreting PHQ-9 Scores:

Minimal depression 0-4

Mild depression 5-9

Moderate depression 10-14

Moderately severe depression 15-19

Severe depression 20-27

Medical Outcomes Study (MOS) Social Support Survey

People sometimes look to others for companionship, assistance, or other types of support.

How often is each of the following kind of support available to you if you need it? After I

read the statement, the options will be: none of the time, a little of the time, some of the

time, most of the time, all of the time.

		none of the time (1)	a little of the time (2)	some of the time (3)	most of the time (4)	all of the time (5)
2	**Someone to help you if you were confined to a bed**	☐	☐	☐	☐	☐
3	**Someone you can count on to listen to you when you need to talk**	☐	☐	☐	☐	☐
4	**Someone to give you good advice about a crisis**	☐	☐	☐	☐	☐
5	**Someone to take you to the doctor if you needed it**	☐	☐	☐	☐	☐
8	**Someone to give you information to help you understand a situation**	☐	☐	☐	☐	☐
9	**Someone to confide in or talk to about yourself or problems**	☐	☐	☐	☐	☐

12	Someone to prepare your meals if you were unable to do it yourself	☐	☐	☐	☐	☐
13	Someone whose advice you really want	☐	☐	☐	☐	☐
15	Someone to help you with your daily chores if you were sick	☐	☐	☐	☐	☐
16	Someone to share your most private worries and fears with	☐	☐	☐	☐	☐
17	Someone to turn to for suggestions about how to deal with a personal problem	☐	☐	☐	☐	☐
19	Someone who understands your problems	☐	☐	☐	☐	☐

Scoring: The survey consists of two separate social support subscales

(emotional/informational and tangible) and an overall functional social support index. A

higher score for an individual scale or for the overall support index indicates more

support.

To obtain a score for each subscale, calculate the average of the scores for each item in

the subscale.

To obtain an overall support index, calculate the average of the scores for all items

included in the subscales. 3-Item Loneliness Scale (UCLA-3)

These next questions are about how you feel about different aspects of our life. For each

one, tell me how often you feel that way.

First, how often do you feel that you lack companionship? (Is it hardly ever, some of the time, or often?)

☐   Hardly ever (1)

☐   Some of the time (2)

☐   Often (3)

How often do you feel left out? (Is it hardly ever, some of the time, or often?)

☐   Hardly ever (1)

☐   Some of the time (2)

☐   Often (3)

How often do you feel isolated from others? (Is it hardly ever, some of the time, or often?)

☐   Hardly ever (1)

☐   Some of the time (2)

☐   Often (3)

*Scoring: Screening positive for loneliness is a score of 6 or higher on the 3-item UCLA Loneliness Scale.